GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

NVT PROTOCOLS

GRDC NATIONAL VARIETY TRIALS™

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Version 1.9

Release – 27/06/2024

Version Control Table

Version Number	Date	Description
1.9	27/06/2024	1.1 updated – NVT Management Team table updated to reflect recent staffing changes. 1.2 updated – Requirement for at least one TSP delegate to attend TSP Management Meeting per contracted geographical region. 1.5 updated – Responsibilities and NVT database access level of a Breeder's Authorised Representative updated clarified. 2.4 rewritten and restructured – Released and Commercial cultivar information updated. Definitions, processes, Breeder responsibilities, and important deadlines updated. 2.4(3) added – Cultivar "release" deadlines for inclusion in Harvest Report tables. 3.6(1) updated – Terminology updated to match the NVT database. 5.1(1) updated – Independent definitions included for early season and early break trial series. 5.7(2) updated – Difference between sowing date and germination date clarified. 5.7(4) updated – Wording updated to clarify that acceptance of germination in the unpreferred germination windows is not restricted to late sowing; early sowing may also be approved, depending on environmental conditions and alignment with regional practice. 5.7(6)(a) added – Early break wheat trials will not be approved for sowing outside the germination window. 5.7(6)(b)(iii) added – Trial sowing outside the germination window does not necessitate immediate removal of the trial from statistical analysis. 5.7(6)(b)(iv) added – Cultivars opted-out of late sown trials will not be included in NVT Grain Quality Assessment. 5.8(1)(a) added – KPIs relating to alignment of emergence with nearby crop may be waived in certain situations. 5.8(6) updated – The sowing date must be recorded in database within 48 hours of sowing (rather than seven days). 5.8(12)(f) added – Departure from dry sowing protocols may be approved under certain conditions in seasons with a widespread late break. The TSP still accepts responsibility for trial outcome. 5.10(1)(a) updated – Early season wheat trials may be sown simultaneous to main or long season wheat trials if the germination

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		windows overlap. Unlike early break wheat trials, early season wheat trials may be approved for late sowing. 5.14(4) updated – TSPs are required to source their own NVT trial signs. 5.21 updated – Wording updated for temperature recording instruments: Temperature is to be recorded using a temperature logger. Appendix A.1 updated – KML file upload added. Appendix B updated – Appendix name updated. Deadlines added for cultivar commercialisation, MCA expression of interest, and seed delivery to RSM provider. Wording of nominations dates updated. Appendix F.1 updated – Wording updated for temperature recording instruments: Temperature is to be recorded using a temperature logger. Appendix F.4 updated – Definitions of lodging measurements - lodging (plants lodged) and lodging severity (angle of lodging) – clarified. Appendix H updated – All “Site selection” sections include wording to “take into account plant back restrictions for different herbicides and how they differ with soil type and rainfall.” Appendix H.2 updated – “Required herbicide/insecticide/fungicide” section expanded for IMI and TT canola. Appendix H.3 updated – “Required herbicide/insecticide/fungicide” section includes recommendation that IMI herbicide is applied at IMI tolerant lentil series trials at the discretion of the TSP. Appendix I updated – Goal post varieties for early break and early sown wheat series differentiated. Appendix J.1 updated – Subheadings added for each crop. Appendix J.2 updated – Subheadings added for each state. Appendix M updated – Table updated with the 2024-2028 disease x crop combinations. Appendix R added – NVT Affiliated Personnel Nomination Form. Terminology standardised across Protocol sections relating to personnel: Trial Co-operator, Trial Service Provider, NVT Manager. Terminology standardised across Protocol sections relating to NVT cultivars: Released, Unreleased, Commercial, Pre-commercial, cultivar.

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1 GENERAL INFORMATION

1.1 GRDC NVT Management Team

Name	Title	Email	Phone
Mr. Sean Coffey	NVT Senior Manager	sean.coffey@grdc.com.au	0428 652 226
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Dr. Trevor Garnett	NVT Manager – South	trevor.garnett@grdc.com.au	0457 906 770
Ms. Isabelle Rogers	NVT Manager – West	isabelle.rogers@grdc.com.au	0451 937 420
Mr. Laurie Fitzgerald	NVT Manager – North	laurie.fitzgerald@grdc.com.au	0455 957 712
Ms. Dianne Wright	NVT Program Administrator	dianne.wright@grdc.com.au	08 8198 8410
Ms. Eleanor England	NVT Strategy and Support Officer	eleanor.england@grdc.com.au	02 6166 4589

For the purpose of this document “NVT Manager” may refer to any one of the abovementioned NVT Management Team.

1.2 National NVT Management Committee

(1) It is a requirement for all Trial Service Provider (TSP) organisations to participate in the National NVT Management Committee. The National NVT Management Committee comprises:

(a) The NVT Management Team.

(b) At least one (1) delegate from each of the NVT Trial Service Providers from each NVT geographical region for which the Trial Service Provider is contracted.

(2) The National NVT Management Committee meet once each year at a capital city venue determined by the NVT Manager. The meeting is chaired by the NVT Manager or their nominee. The cost of travel and accommodation for Trial Service Provider delegates is covered by the Trial Service Provider and delegates are expected to attend in person.

1.3 Regional NVT Advisory Committees

(1) Trial Service Providers are required to participate in the relevant regional NVT Advisory Committee (NAC) to advise on trial locations, regional best practice, and support around agronomic expertise for trial execution.

(2) Trial Service Providers are required to present a summary of the environmental and management factors affecting trials and the actions taken to avoid these issues occurring in the future.

(3) Trial Service Provider are required to meet their own costs for participating in NAC meetings.

(4) The committees are to be comprised of both leading farmers and agronomists.

(5) The committees’ recommendations should be supplied to the NVT Regional Managers.

(6) A Trial Service Provider may use NAC members for advice or information on suitable trial locations, sowing opportunities, and season conditions in local areas.

(7) The regional NAC will not report to the Trial Service Provider, nor the Trial Service Provider report to the committee.

1.4 Breeders and Participating Companies

(1) Any Breeder, Breeding Company, Seed Company, or Identity wishing to submit cultivars for NVT testing will be known as Breeder/s from this point forward in this document.

(2) Breeders submitting cultivars into NVT testing must be signatory to the NVT Breeder Participation Agreement.

(3) GRDC/NVT assess all participating parties on a case-by-case basis to ensure they qualify for participation in NVT. GRDC reserve the right to decline Breeder participation.

(4) Breeders will need to declare their intention to nominate Pre-commercial cultivars for Minor Crop Allocation (MCA) crop types where they have not previously participated by the MCA Expression of Interest Deadline listed in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES. Failure to do so will result in the relevant Pre-commercial Line Fee being applied to their Pre-commercial cultivar entries.

1.5 Access to the NVT Database & Affiliated Personnel

(1) To be considered a Participating Breeder, the Breeder must have an active NVT Breeder Participation Agreement and be submitting cultivars for testing into NVT in the current season.

(2) The signatory for the Participating Breeder Agreement will be provided “Authorised Representative” level access to the NVT database.

(3) The Participating Breeder’s Authorised Representative can provide:

(a) A list of Affiliated Personnel who will be given the same database access rights as the Participating Breeder (see 1.6 for Participating Breeder data access rights).

(b) A list of Affiliated Personnel to be granted “Advanced User” database access.

(c) A list of Personnel to be granted Authorised Representative database access.

(4) The Affiliated Personnel list will be maintained in an NVT register.

(5) The Participating Breeder’s Authorised Representative will be required to ensure that all Affiliated Personnel are abiding by all NVT data terms of use covered by the NVT Breeder Participation Agreement and the NVT Protocols.

(6) The Participating Breeder’s Authorised Representative will be responsible for ensuring the register of Affiliated Personnel is up to date and maintained at all times (i.e. staff leaving, changes to business arrangements with third company providers etc.).

(7) All Affiliated Personnel (including Advanced Users) will be revoked annually on June 30th each year. Authorised Representative Breeders will be required to supply an updated Affiliated Personnel Nomination Form (APPENDIX R – NVT PARTICIPATION AGREEMENT - AFFILIATED PERSONNEL NOMINATION FORM) prior to June 30th each year to be implemented on July 1st.

(8) NVT database access rights are summarised in the following table:

	Public	Affiliated Person	Affiliated Person - Advanced User	Authorised Representative for the Breeder*
Activity		Person nominated by a Participating Company Signatory (can be from the same company or third party organisations working with the Participating Breeder).	The Participating Breeder Signatory can assign themselves, and Affiliated Personnel, as Advanced Users for additional access rights to the NVT database.	Company Signatory with a current NVT Participation Agreement (PA), can nominate Authorised Personnel to receive data under their PA.
Access to published trial results (NVT website, single site trial reports, LTRY, Harvest Reports, pathology results).	✓	✓	✓	✓
Access to NVT trial sites and provide trial feedback.	✓	✓	✓	✓
Ability to provide feedback on NVT Protocols.	✓	✓	✓	✓
Access to mud maps and GPS locations (received directly from NVT).	X	✓	✓	✓
Participate in operational and strategic NVT meetings (pre-season meeting, pre-harvest meeting).	X	✓	✓	✓
Access to NVT database, raw data, Unreleased cultivars and pathology results for trials where the Breeder is participating.	X	✓	✓	✓
Nominate cultivars into NVT trials via the online database portal and commit to any costs associated with entry in those trials.	X	X	✓	X
Edit cultivar information and flag a cultivar as “released”.	X	X	✓	X
Ability to nominate Affiliated Persons & Advanced Users.	X	X	X	✓

*A duly authorised person that is signatory to either the NVT Breeder Participation Agreement or the Affiliated Personnel Nomination Form.

1.6 Breeder Data Access

(1) Breeders who are party to a NVT Breeder Participation Agreement will have access to NVT data and information that is not otherwise available to the public.

(2) A Breeder will only be granted access to data that relates to the crop type and cultivars of which have been entered by that Breeder in NVT.

(3) Following harvest, Breeders with Pre-commercial cultivars entered in NVT can access and use NVT trial data under the terms of the Participating Breeder NVT Data Licence Agreement.

(4) Breeders will be able to use trial data for internal analysis and breeding decision making. The use of trial data is for internal Breeder use and not for external publication.

2 ENTRY REQUIREMENTS

2.1 NVT Cultivar Nomination and Acceptance Criteria

(1) Breeders are invited to nominate Pre-commercial cultivars for inclusion in the NVT Program in accordance with the terms of the NVT Protocols and the NVT Breeder Participation Agreement.

(2) Breeders who intend to nominate cultivars in trial series with Minor Crop Allocations (MCAs; e.g. pulse, oat, or durum trial series) must provide an Expression of Interest to nvt@grdc.com.au by the MCA Expression of Interest Deadline listed in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES for the upcoming season.

(a) An Expression of Interest is not required where Breeders will be continuing participating within a crop or trial type. An Expression of Interest for current Breeders is required if they intend to participate in a new crop type.

(3) Nominated cultivars must have adaptation in nominated regions and have the potential to fulfill an Australian grain grower's requirements in their farming system.

(4) Breeders are required to identify the maturity class of each of their cultivars entered in NVT trials based on the days from sowing to 50% flowering, referenced against the Goal Post Varieties as listed in APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS). Breeders must notify an NVT Manager if their cultivar differs significantly from designated maturity classes as defined in APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS).

(5) Cultivars entered into NVT trials may be required to meet specific disease pathotype resistance requirements of a targeted region.

(6) Breeders may be required to provide information regarding their Pre-commercial cultivar entries and how they may differ from the accepted range of cultivars in any trial series. This applies to trial management factors such as seedling vigour, tillering ability, and harvest sensitivity.

(7) The onus is on Breeders to ensure the suitability of their cultivar within the nominated NVT region and trial series (refer to APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS). GRDC may provide feedback to Breeders regarding the suitability of nominated cultivars, however, the responsibility of suitability of cultivars is that of the Breeder.

(8) GRDC reserves the right to remove any Pre-commercial cultivar from a trial if it is determined by GRDC that the Pre-commercial cultivar was nominated in an unsuitable trial.

2.2 Nominating Cultivars

(1) Breeders must nominate Pre-commercial cultivars for entry in the upcoming NVT season by the Nominations Close date specified in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES. This will allow the NVT Manager to compile regional seeding lists.

(2) Each cultivar must be nominated in all trials within an NVT region, or as directed in the NVT nomination information.

(3) A fee payable by the Breeder ("Pre-commercial Line Fee") will be applied for the inclusion for eligible Pre-commercial cultivars in the NVT Program. See Schedule C of the NVT Breeder Participation Agreement. Information regarding the Pre-commercial Line Fee, applicable cultivars and additional relevant information will be provided by the NVT Manager at, or prior to, the Nominations Open date specified in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES.

(4) Any seed remaining after NVT trial requirements have been met must either be returned to the Breeder (if requested) or destroyed by confounding into a common container and delivered for rubbish disposal.

(5) A Chain of Custody (CoC) must be adhered to at all points of transfer and be available for scrutiny upon request by authorised representatives of the NVT Program. All details declared by the Breeder relating to seed must be accurate and reflective of seed quality at time of delivery to TSP, including, but not limited to germination % and seed weight (1000 seed weight).

(6) Each cultivar must have a unique name/number when nominated to NVT. Cultivars will be assigned a unique CultivarID in the NVT database that is fixed to that cultivar's genetic material.

(a) A Breeder must not nominate the same cultivar under different names and/or test codes.

(b) Name changes to cultivars are permitted, but unique genetic materials must remain fixed to their specific and unique CultivarID in the NVT system.

(i) Breeders are required to notify an NVT Manager whenever a name change occurs.

(ii) This includes slight changes to names such as prefixes, suffixes, and spelling.

2.3 Pricing

(1) In accordance with the terms of the NVT Breeder Participation Agreement, information about the Pre-commercial Line Fees (including the fees payable) will be provided to Breeders annually at the time when Breeders are invited to nominate Pre-commercial cultivars for entry in NVT.

(2) If the Breeder wishes to nominate any Pre-commercial cultivar for participation in the NVT Program, then the Breeder must pay the applicable Pre-commercial Line Fee in accordance with Schedule C of the NVT Breeder Participation Agreement.

(3) The Pre-commercial Line Fee is inclusive of the risk associated with trial failure. The risk of trial failure is offset by a discount being applied in the Pre-commercial Line Fees. To the extent permitted by law, a refund to Breeders will not be provided in the event a trial fails.

2.4 Cultivar Release and Commercialisation

(1) Released and Unreleased cultivars in NVT

(a) All information on current and past cultivars tested in the NVT Program is managed through the NVT database.

(b) The following terms are used to describe cultivars tested in the NVT Program based on the availability of their NVT data to Australian grain growers.

i. Unreleased – cultivar does not have NVT data publicly available.

ii. Released – cultivar has NVT data publicly available.

(c) A Breeder may "release" a cultivar at any stage prior to commercialisation, and under any naming convention they choose (i.e. as either a test code or a commercial name).

(d) NVT data and information relating to Unreleased cultivars is confidential.

i. Data on Unreleased cultivars in the NVT system remains confidential and cannot be published or distributed. This applies to all cultivars, including a Breeder's own Pre-commercial cultivars, as there is no opportunity for claims to be cross-checked, ratified, or publicly verified by the general public, GRDC, or other participating companies.

ii. All Unreleased cultivars are Pre-commercial, however not all Pre-commercial cultivars are Unreleased.

iii. Breeders will have two (2) years of visibility of all cultivar results for the specific crop and the specific trials that they have cultivars actively nominated for.

(e) NVT data and information relating to Released cultivars is considered public information.

(2) Cultivar "release" process

(a) It is the responsibility of Advanced User Breeders to "release" their cultivars through the NVT database.

(b) Requests for NVT to "release" a cultivar on a Breeder's behalf will be approved only if made by an Advanced User Breeder for that cultivar.

i. Breeders should inform an NVT Manager immediately if they have initiated the promotional use of a commercial name for an NVT cultivar and are unable to "release" the cultivar through the NVT database.

(c) By "releasing" a cultivar (or requesting NVT to "release" a cultivar on their behalf), a Breeder understands and accepts that:

i. NVT data will become public information.

ii. The cultivar will appear in NVT online public reports within 48 hours.

iii. The cultivar will appear in NVT Harvest Reports, as outlined below (2.4(3)).

iv. It is the Breeder's own responsibility to ensure the cultivar's information is recorded accurately in the NVT database.

v. Breeders do not have the ability to "unrelease" cultivars. Requests to "unrelease" a cultivar must be sent in writing to an NVT Manager.

(d) Upon cultivar "release", Breeders should provide a brief cultivar description in the comments section for that cultivar on the NVT database.

i. The description should consider the following points: Commercial Name, Cultivar maturity (i.e. early-mid), Preferred growing regions, Plant physiological traits (i.e. height, growth habit), Potential cultivar replacement, Comment on grain quality or cultivar classification, End Point Royalty rate ($), and Commercialisation partner or seed distributor.

ii. Cultivar descriptions should not reference yield potential, disease ratings nor should they list competitors' cultivars as replacement options.

iii. GRDC may edit this information to ensure it is fit for purpose.

iv. The description of a Released cultivar may be published in NVT publications such as sowing guides, harvest reports, and on the NVT website, to give users additional information on traits and characteristics not specifically measured in NVT.

(e) NVT reserves the right to "release" a cultivar and update the cultivar name if:

i. a Breeder has initiated the use of a commercial name for a cultivar for the purposes of industry promotion via any source or format of promotional media, and

ii. the Breeder has neither requested cultivar "release" through an NVT Manager or themselves "released" the cultivar in the NVT Database within two (2) business days of promotional commercial name usage, and

iii. an NVT Manager has made an unsuccessful attempt to engage the Breeder in the "release" process.

(3) Cultivars in NVT Harvest Reports

(a) NVT's Harvest Reports ("Harvest Reports") are published each season to provide Australian grain growers with the NVT Program's latest independent varietal information. These reports are published as soon as possible after harvest, and on a region-by-region basis, so that Australian grain growers have access to the most up-to-date and relevant information for cultivar selection in the upcoming season.

(b) Breeders should consider the timing of cultivar "release" and cultivar information updates in conjunction with the following information on cultivar inclusion in Harvest Reports.

(c) Released cultivars are included in Harvest Report yield performance tables.

i. NVT trial performance data becomes publicly available on a MET-by-MET basis, five (5) days after the MET review period begins.

ii. To have NVT trial performance data included in yield performance tables for a MET, a cultivar must be Released at the time of publication of that MET.

iii. Cultivars are named in yield performance tables according to their "Variety Name" recorded in the NVT database at the time of publication of each MET.

1. Editing a Released cultivar's name between MET publications will result in inconsistent naming of that cultivar.

(d) Newly Released cultivars are included in Harvest Report new variety tables.

i. New variety tables are finalised on a Harvest Report-by-Harvest Report basis, after all METs included in a Harvest Report are published.

ii. A cultivar will be included in the new variety table provided it is present in at least one (1) yield performance table within the Harvest Report and has not been previously included in any new variety table in a Harvest Report.

1. To be included in a new variety table a cultivar must be Released, at latest, five (5) days after the MET review period begins for a Harvest Report's final MET in which the cultivar is included.

2. To maximise Harvest Report exposure of newly Released cultivars, it is recommended to "release" a cultivar before MET publication begins for any METs in which the cultivar is included.

iii. The new variety tables list each cultivars' Breeding company, industry assigned Grain classification (if applicable), EPR ($), and Cultivar description.

1. The information for new variety tables is extracted from the NVT database after all data has been extracted for a specific Harvest Report.

2. It is the responsibility of Advanced User Breeders to ensure their cultivar information is recorded correctly in the database.

3. If a Released cultivar is missing a cultivar description at time of extraction, the cultivar will be included without a description in Harvest Reports.

(e) Cultivars included in any yield table in a Harvest Report are included also in the disease ratings tables in the same Harvest Report.

(4) Commercial and Pre-commercial cultivars in NVT

(a) The following terms are used to describe cultivars tested in the NVT Program based on their availability to Australia grain growers:

i. Pre-commercial – cultivar is being developed by a Breeder and is not available to Australian grain growers to purchase and grow commercially.

ii. Commercial – cultivar is available to Australian grain growers to purchase and grow commercially in the current season or the season immediately following for that crop type.

(b) Trialing costs for Commercial cultivars will be paid for by GRDC on behalf of Australian grain growers where either of the following is true:

i. The cultivar has previously been included in the program as a Commercial cultivar AND the NVT Management Team has identified the cultivar as being of commercial relevance and decided it will be retained for testing in the upcoming season.

ii. An NVT Manager has approved a Notice of Commercialisation (APPENDIX N – NOTICE OF COMMERCIALISATION) for the cultivar prior to the Commercialisation Deadline (APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES) AND there is no good reason to believe that testing of the cultivar in the NVT Program will not deliver benefit to Australian grain growers.

(c) To ensure Commercial cultivars included in the NVT Program remain relevant to Australian grain growers, the NVT Management Team annually review all Commercial cultivars included in the NVT Program through consultation with Participating Breeders, NVT Advisory Committees, and other members of industry.

i. GRDC and the NVT Management Team have the final say in each season's GRDC-funded Commercial cultivars and testing locations.

ii. Breeders may request to include Commercial cultivars at testing locations that GRDC has decided not to fund accepting that, if approved, the Pre-commercial Line Fee will be incurred for testing of the Commercial cultivar. The NVT Management Team will consider such requests on a case-by-case basis and reserve the right to decline requested testing.

(d) Pre-commercial cultivars can be nominated by Breeders for entry in the NVT Yield Program.

i. Trialing costs for Pre-commercial cultivars of major winter crops will be paid for by Breeders, excepting costs covered by GRDC according to the NVT Program's Commercialisation Credit model (see (5)(f)).

ii. Trialing costs for a set number of Pre-commercial cultivars of a minor winter crops will be paid for by GRDC on behalf of Australian grain growers according to the NVT Program's Minor Crop Allocation model. The number of Pre-commercial cultivars eligible for GRDC-funded testing according to this model is determined seasonally on a trial-by-trial basis at the full discretion of GRDC and the NVT Management Team.

(5) Cultivar "commercialisation" process

(a) A cultivar must be "released" if it is to be "commercialised".

(b) For a cultivar to achieve "commercial" status in an upcoming NVT season, an Authorised Representative for the Breeder must submit a signed Notice of Commercialisation form, by the Commercialisation Deadline listed in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES, declaring and/or evidencing that the cultivar:

i. has a fixed name for promotional usage,

ii. is being actively promoted to growers, and

iii. is available to Australian grain growers to purchase seed and grow commercially in the current season or the season immediately following for that crop type.

(c) Cultivars are "commercialised" upon receival of a satisfactorily completed Notice of Commercialisation form (APPENDIX N – NOTICE OF COMMERCIALISATION).

(d) Once a cultivar is "commercialised":

i. The NVT database will be updated to record and show the commercialisation date of the cultivar.

ii. The cultivar will be treated as a Commercial cultivar for testing in subsequent NVT seasons.

(e) Upon "commercialisation" the Breeder undertakes to supply seed for the NVT Research Seed Multiplication Program (Excluding Canola & Sorghum) by the Research Seed Multiplication Delivery Deadline listed in the APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES in the NVT Protocols, at the quantity requested by the NVT Research Seed Multiplication Manager.

(f) Upon "commercialisation" of eligible cultivars, GRDC will issue Commercialisation Credits to reimburse Pre-commercial Line Fees for the cultivar.

i. Commercialisation Credits for a cultivar are applied in the first year of that cultivar's testing in the NVT Program as a Commercial cultivar.

ii. Unused Commercialisation Credits will not be carried over for use in subsequent years.

iii. Breeders will be issued with one (1) Commercialisation Credit per NVT trial the cultivar was included in for testing during the two (2) most NVT seasons prior to the first season the cultivar is tested as a Commercial cultivar.

iv. Each Commercialisation Credit will take the form of a free Pre-commercial cultivar entry into the trial series (singular or plural) that the newly Commercial cultivar was entered as a Pre-commercial cultivar.

2.5 De-identified Cultivars

(1) Breeders may request the "de-identification" of Pre-commercial cultivars that are more than two (2) years from commercialisation.

(2) De-identified Pre-commercial cultivars will be assigned a cultivar code known only to the Breeder and the NVT Management Team.

(3) De-identified Pre-commercial cultivars will not be eligible for a Commercialisation Credit in the years when the cultivar is "de-identified".

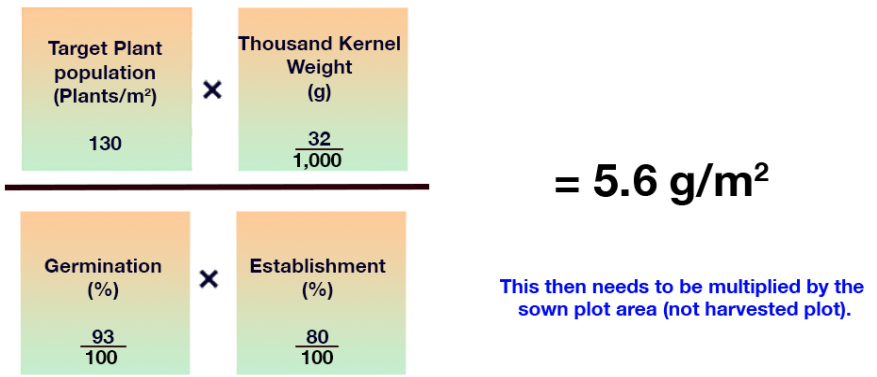
(4) De-identified cultivars will not be eligible for inclusion in the NVT Disease Ratings or Grain Quality Assessment Programs in years the cultivar is "de-identified".

2.6 Seed Supply (General)

(1) Accurate germination percentage and seed size (1000 grain weight) for each cultivar will be supplied to the Trial Service Provider on the CoC documentation to calculate seed packing weights.

(a) The Trial Service Providers will use this information to calculate the amount of seed of each cultivar required per plot to achieve the target plant establishment rate indicated in APPENDIX H – CROP SPECIFIC PROTOCOLS.

(b) To calculate the amount of seed required: Target population per m^2 x thousand grain weight, divided by actual cultivar germination x target establishment = seed required per m^2 (this then needs to be multiplied by the sown plot area). Example calculation is provided below:



(2) Bare seed will be supplied. If this is not the case, it is essential to notify the NVT Manager to decide the appropriate course of action.

(3) The Trial Service Provider will be required to treat the seed with the appropriate seed dressing (APPENDIX H – CROP SPECIFIC PROTOCOLS).

(4) The Trial Service Provider must have operating systems in place to ensure that seed is accurately identified throughout this process.

(5) It will be the responsibility of the Trial Service Provider to ensure the seed is placed into packets or magazines appropriate for their sowing system.

(6) Seed of all cultivars in each trial must be treated in exactly the same manner.

(7) A 50g sample of each cultivar's seed must be retained and securely labelled by the Trial Service Provider for germination testing if required post NVT emergence, or in case there is any dispute over the genetic identity of plots sown.

(8) This sowing reference sample must be stored in a cool dry place for two (2) years following the sowing period.

2.7 Breeder Supplied Seed (General)

(1) To participate, Breeders will supply seed to NVT when the cultivar is:

(a) a canola or sorghum cultivar, and/or

(b) a hybrid, and/or

(c) Pre-commercial, and/or

(d) in its first year of commercialisation (noting in this scenario seed must be provided to both the Trial Service Provider and the NVT Research Seed Multiplication Provider).

(2) The Breeder must supply seed of a quality that enables those cultivars to perform to their full genetic potential.

(3) The Breeder must supply bare seed (no seed treatment) unless prior approval to send treated seed has been sought from the NVT Manager.

(4) The Breeder is also required to provide Trial Service Providers with accurate information on germination percentage and seed size (1000 grain weight) for each cultivar entry on the CoC documentation. It is the Breeder's responsibility to ensure accuracy of details provided.

(a) Seed quality audits will be conducted by GRDC to ensure the accuracy of the information provided in the CoC. Cultivars will be removed from the program if inaccurate CoC information results in incorrect seeding rates and plant populations. Breeders may be liable for Removed Entry associated costs if this occurs, as described in the NVT Breeder Participation Agreement.

(b) Accurate seed quality information needs to be provided to the TSP on or before the TSP Seed Delivery Deadline listed in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES. In the event no seed quality information is received the TSP will assume a germination percentage of 100% and a seed weight based on the average of all cultivars in that trial.

(c) The Trial Service Provider has the right to remove a cultivar if seed arrives after the TSP Seed Delivery Deadline specified in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES. The Breeder will be made aware of any cultivar removed in this manner.

(5) If the Breeder is aware that their cultivars have particular traits that may affect their performance in the trial (e.g. short plant structure, prone to lodging, develops brittle stems

post physiological maturity) the Breeder is required to notify the NVT Manager during nomination. The Breeder should also provide additional seed to the Trial Service Providers for sowing additional buffer plots for harvester set up.

(6) The Breeder must provide seed that is weed and disease free. Seed that is dirty or contaminated will not be included in NVT trials.

(a) For the purposes of biosecurity, contamination risks of seed include soil, live insects/snails, seed species that have been assessed as a weed risk, unidentified seeds, fungal mycelium (sclerotia), animal faecal matter, and plant material.

(7) Seed should be free of soil. Soil is not always readily visible, but 0.1% has been adopted as the standard maximum tolerance. Above this level the seed must be cleaned or disposed of.

(8) Each Breeder will advise the NVT Manager of its preferred method of excess seed disposal. The NVT Manager will provide this information direct to the Trial Service Provider. It may be that seed either be returned to the Breeder if requested or destroyed by confounding into a common container and delivered for rubbish disposal. Excess seed is not to be sown or used as stock feed.

(9) Trial Service Providers must comply with each Breeder's preferred method of seed disposal and keep records to confirm that they have employed the preferred method identified by each Breeder.

(10) Seed of entries accepted into the NVT Program must be delivered to the Trial Service Provider's designated location for seed receival by the TSP Seed Delivery Deadline listed in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES. This timeframe is designed to allow time for redistribution, packing and preparation as the germination window opens.

(11) Seed must be supplied in robust packaging. Paper packaging or envelopes are to be avoided as they can be damaged in transit or handling.

2.8 Breeder Supplied Seed (Genetically Modified Requirements)

(1) Genetically Modified (GM) cultivars

(a) Designated GM cultivars are admissible for testing in NVT trials subject to;
(i) The Acceptance Criteria being fulfilled; and
(ii) That Governing State and Commonwealth laws, at the time of first nomination, permit the commercialisation of the nominated cultivar to growers.

(b) Seed Providers are required to obtain all necessary documentation and permits in compliance with governing State and Commonwealth law prior to nominating GM entries for NVT trials.

(2) Non-GM cultivars

(a) When non-GM cultivars are supplied to NVT, the Seed Provider must take all reasonable precautions to guarantee the genetic purity of the provided seed in order to avoid any unintentional release of GM material.

(b) Adventitious Presence of GM Material (AP).

(i) State moratoria have accepted harvested seed to contain no more than 0.9% of AP in harvested grain and for sowing seed to contain no more than 0.5% of AP.

(ii) For canola, seed companies must provide declaration that AP testing for GM material has been conducted, and the detected limits are below GM thresholds relevant for each state.

2.9 NVT Supplied Seed

(1) A common seed source is used for all Commercial cultivars within each trial, excepting canola and sorghum cultivars. Seed of Commercial cultivars will be supplied in bulk to the Trial Service Provider for sowing.

(2) Additional supply of a specified Commercial cultivar can be supplied for use in situations where a filler is required.

2.10 Material Transfer Agreement

(1) All cultivar genetic material must be protected under a Material Transfer Agreement (MTA) between the Breeder supplying/distributing the seed for the purpose of NVT trials, and the Trial Service Provider (receiver) for the seed allotment.

(2) GRDC will provide NVT minimum terms that must be included as clauses within each MTA. These clauses are provided in APPENDIX D – MATERIAL TRANSFER AGREEMENT.

(3) Breeders may include additional clauses within the MTA by negotiation, as long as GRDC's specified minimum terms are not contradicted.

(4) Breeders are to execute an MTA with each Trial Service Provider receiving their seed/IP prior to the TSP Seed Delivery Deadline (APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES).

(5) MTAs are valid for the term of the NVT Trial Service Provider contract period.

(6) The Trial Service Provider will be responsible for collating and recording all required MTA documents. Once collated, or when requested by the NVT Manager, the Trial Service Provider will provide the NVT Manager with a copy of all executed MTAs in a single email confirming that all MTAs are accounted for and attached.

(7) Should the supply of a fully executed MTA be delayed beyond Milestone 1 date (APPENDIX A – DATA ENTRY, MILESTONES, KPI), the Trial Service Provider should advise the NVT Manager in advance.

2.11 Chain of Custody

(1) The Trial Service Provider is required to maintain and retain all documentation showing the full process of acquisition, transfer, handling, and disposal of all physical or electronic materials.

(2) The CoC form to be used in attached 11APPENDIX C – CHAIN OF CUSTODY FORM. An excel template is available from NVT on request.

(3) The Trial Service Provider will be responsible for collating and recording all required CoC documents. Once collated the Trial Service Provider will provide the NVT Manager with a copy of all executed CoCs in a single email confirming that all CoCs are accounted for and attached.

2.12 NVT Disease Ratings

(1) Cultivars included in the NVT Yield Program will be eligible for inclusion in the NVT Disease Ratings Program with the following conditions:

(a) Cultivars are accepted into the NVT Disease Ratings Program on a crop by disease basis, based on their commercialisation status and length of participation in the NVT Yield Program.

(2) APPENDIX M – NVT DISEASE RATINGS DISEASE SCREENING VARIETY INCLUSION LIST outlines cultivars accepted for each crop by disease combination.

(3) GRDC reserves the right to change the eligibility of cultivar inclusion in the NVT Disease Ratings Program and the crop by disease combinations.

3 SITE SELECTION, PREPARATION AND PROFILING

3.1 Trial Co-operator Agreement

(1) For each NVT site, where the trial site is on land belonging to a farmer or other third party ("Trial Co-operator"), a written agreement must be prepared and signed by both the Trial Co-operator and the Trial Service Provider to ensure clarity of arrangement for the trial site for any one year.

(2) If NVT trials are hosted by the same Trial Co-operator for multiple years, one agreement can be signed for the length of the current NVT contract period.

(3) Trial Service Providers will use their own template; however, this agreement must be made available to the NVT Manager when requested.

(4) The Trial Co-operator Agreement should include at a minimum, but not limited to, the following points;

(a) Ensure the Trial Co-operator agrees for the Trial Service Provider to meet obligations to provide all data required for the NVT Program (including data listed in APPENDIX A – DATA ENTRY, MILESTONES, KPI).

(b) Ensured access to the trial site for personnel approved by the Trial Service Provider and/or the NVT Manager.

(c) The Trial Co-operator grants permission to the Trial Service Provider, GRDC staff, NVT Participating Breeders, and third party researchers approved by the NVT Manager to fly Unmanned Aerial Vehicles (UAV/drones) over the NVT site to gather relevant images and data.

(d) The publication of data collected from the site, including but not limited to yield data, soil test results, Predicta B results, rainfall and weather.

(e) The publication of Trial Co-operator details in NVT and GRDC publications (e.g. NVT Harvest Reports).

3.2 Co-Location of Trials with NVT's

(1) Non-NVT trials can be co-located at an NVT trial site at the discretion of the NVT Trial Service Provider.

(2) When co-locating other trials at NVT sites the following should be considered:

(a) The NVT trial should be spatially distanced and clearly defined from other co-located trials. There should be no confusion about which trial is NVT.

(b) NVT signage should be prominent and separate from other trial signage to avoid confusion to the public.

(c) Management of the NVT trial should not be compromised. Timing of spraying, sowing, harvest etc., should be optimised for the best outcome for NVT.

(d) The NVT trial should not be co-located with any trials that present a risk to NVT delivery.

(e) In trial sites with multiple co-located NVT trials, there needs to be an NVT sign with QR code on each crop type. A single QR code can be re-used for all trials at the site.

(f) Where lentil and other pulse trials are co-located, if possible, the trials should be located in a lentil paddock.

3.3 Site Selection

(1) Sites should be within 25 km radius of the allocated site name unless otherwise approved by the NVT Manager.

(2) Sites must be accessible for trial operators, Breeders, field day personnel and attendees, and others who need to look at the trials. Sites must also be accessible for third party researchers to collect and remove samples from trials for research purposes approved by the NVT Manager. Visibility for local farmers is encouraged, however not at the expense of uniformity and relevance. Consequently, sites should be as near as practical to access roads but not be compromised by machinery turning areas, drainage lines or tree lines.

(3) It is recommended that the paddock be in the same phase of the local best practice rotation, as the crop(s) to be trialed.

(4) A trial area must not be compromised by weed, disease or pest competition. This may require a higher level of weed, disease, and pest management than the level considered acceptable to the landholder for the surrounding crop.

(5) In frost prone districts, avoid low paddock elevation if possible.

(6) Avoid areas where the use of UAVs is restricted, i.e., close to airports/airstrips, power lines, buildings etc.

(7) Co-locating NVT sites with local grower groups & field day locations is encouraged, provided all site selection rules are adhered to. Trial Service Providers should work with the local grower group to ensure they are aware of NVT requirements and to assist in site selection for future years. Suitable site selection and trial quality takes priority over co-location with grower groups, and it is the Trial Service Provider's responsibility to ensure quality trials are delivered. To that end NVT will always support the decision of the Trial Service Provider in site selection.

3.4 Site Accessibility

(1) Sites should be as near as practical to access roads, whether that be main council roads or internal farm tracks, however not at the expense of uniformity and relevance.

(2) All trials are to be readily accessible by 2WD vehicle.

(3) All trials must have the potential to be a field day site.

(4) All trial sites should enable visibility and access to local farmers, advisors, third party researchers (which may consist of research organisations and Government departments and agencies) and other NVT stakeholders including Breeder representatives.

(5) All sites should have an access/walking track with crop cut low to allow easy access and visibility.

(6) Be aware that wet conditions may block some access roads. Try to choose sites with all-weather access.

(7) Biosecurity and general site hygiene practices must be adhered to.

(8) All site visitors must contact the nominated Trial Service Provider and Trial Co-operator for permission to access the trial site. Permission may not be granted automatically by the Trial Service Provider.

(9) Any organisation or individual wishing to access an NVT site for the purpose of taking measurements or samples must do so in line with the *NVT Resource Sharing Key Requirements* and only after receiving all appropriate authorisations.

3.5 Site Uniformity

(1) The soil type of the selected site must be representative of the major cropping soil type in the district.

(2) The site must be visually and physically uniform in soil type and soil profile.

(3) The site must not be subject to excessive drainage from surrounding areas or at risk of flooding and be large enough to allow for machines to turn within any proposed fence line.

(4) The site must be free of any possible complications from the past practices or uses (leveling, compactions, wheel tracks, fertiliser rate, soil emolliate, livestock activity) or the proposed use during the NVT trial season.

(5) Residual of soil active herbicides must also be assessed and managed to avoid impact on the trial.

(6) Crop residue from previous crops must be evenly distributed across the trial site, including header trails, chaff rows etc.

(7) Where heavy stubble burdens, header tails, chaff rows etc., may jeopardize the establishment of a trial, crop residue must be managed or removed by raking, burning or other means necessary.

3.6 Paddock Rotation History

(1) The paddock history over the last three (3) years is to be recorded in the NVT database. The paddock history information should be entered according to the following capture fields in the database:

(a) Year: The year the paddock history information pertains to.

(b) Crop: Crop type/s grown in the paddock in the year.

(c) Herbicides: Name and application rate (if known) of any herbicides applied in the year that may pose a residue risk. This includes, but is not limited to, Imidazolinone (Group 2), Sulfonylurea (Group 2), and Triazine (Group 5) herbicides.

(d) Fertilisers: Name and application rate (if known) of any fertilisers applied in the year.

(2) All data is to be entered onto the NVT database as required by APPENDIX A – DATA ENTRY, MILESTONES, KPI.

3.7 Herbicide Use and Future Cropping Rotation

(1) Consideration of the host's future cropping rotation is required when deciding on herbicide use on NVT trials to ensure that future crops are not adversely affected.

(2) Should long residual herbicides be used on the NVT trials it is recommended that the host be informed in writing as to the herbicide applied and the rate and date of application to avoid conflicts.

3.8 Soil Testing Nutrition

(1) The cost of soil testing is to be covered by the Trial Service Provider.

(2) Soil testing (including Predicta B) should be carried out well prior to seeding to allow returned results to fine tune site selection from high levels of root disease and professional nutrient management.

(3) Nutrition testing depths and sampling process should be carried out as per APPENDIX F – STANDARD OPERATING PROCEDURES.

(4) Production targets.

(a) Yield target is to be the highest level expected for the site given the likely season.

(b) Nutrient applications should be targeted at levels so that the yields of the best performing lines in the trial are not limited.

(5) To meet nutritional requirements, it may require pre-sowing application of fertilizer as well as starter fertilizer at sowing as determined by soil tests and regional best practice.

(6) Soil cores across the site can be bulked into desired depths (minimum of three cores per range).

(7) All test results are to be entered on the NVT database required by APPENDIX A – DATA ENTRY, MILESTONES, KPI.

3.9 Predicta B Testing

(1) The cost of Predicta B testing at the lab is covered by GRDC/NVT. Trial Service Providers must cover the sampling and shipping costs.

(2) Predicta B sampling and testing must occur at all NVT sites.

(3) The Predicta B sample barcode number must be recorded and uploaded to the corresponding trial on the NVT database.

(4) In the NVT system, the aim of the Predicta B sampling and testing is to identify risk of soil borne disease impacting trial results and cultivar performance, and to provide a deeper insight into crop health and yield performance.

(a) It may also allow trial managers to identify potentially problematic sites which would therefore not suitable for NVT trails. The results may also provide some data for the genotype responses in NVT trials.

(5) A detailed description of the sampling method required can be found in APPENDIX F – STANDARD OPERATING PROCEDURES.

4 BIOSECURITY

4.1 Biosecurity for Visitors and Vehicles

(1) It is the responsibility of the Trial Manager and to work with the Trial Co-operator to minimise any potential biosecurity risks and ensure the continued delivery of successful NVT trials.

(a) The NVT Manager, Trial Manager, and/or Trial Co-operator reserve the right to refuse entry to the NVT site due to biosecurity concerns.

(2) Farm biosecurity plans must be respected and adhered to at all times. It is the Trial Service Provider's responsibility to monitor adherence and report any breaches to the Trial Co-operator and the NVT Manager.

(3) In the absence of a farm biosecurity plan, Trial Service Providers must comply with Trial Co-operator requirements. This may include:

(a) Notify the Trial Co-operator before entry to the farm.

(b) Ask the Trial Co-operator about weeds, plant pests, or restricted areas on the farm.

(c) Machinery, vehicles, and equipment are thoroughly inspected for insects, soil, and plant material prior to arriving and when entering the property.

(d) Designated parking areas are used for all non-farm vehicles and equipment.

(e) Movement of vehicles is kept to farm roads and laneways whenever possible.

(f) Farm gates are closed after opening and passing through them.

(g) Unfamiliar, unusual, or new plant pests reported to farmer, Agriculture Department or Exotic Plant Pest Hotline (1800 084 881).

(h) Consideration could/should be given to erecting "Biosecurity signage" alongside the GRDC NVT sign at entry to the trial site (APPENDIX O – FENCE SIGNS) with consultation with the Trial Co-operator.

5 TRIAL DESIGN AND MANAGEMENT

5.1 Trial Series Definitions

(1) Wheat trial series

(a) Wheat trial series types are defined by the:

i. species type tested,

ii. maturity groups of tested cultivars, and/or

iii. trial germination windows (see APPENDIX J.1 – TRIAL GERMINATION WINDOWS).

(b) "Goal post varieties" of known maturity define the boundaries of maturity groups for each trial series type (see APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS).

(c) Definitions of wheat trial series in the NVT Program:

(i) Main season: "Quick Spring" through to "Slow Spring" wheats.

(ii) Early season: "Slow Spring" through to "Slow -Very Slow Spring" wheats.

(iii) Early break: "Mid-Slow Spring" through to "Slow Spring" wheats and "Quick Winter" wheats.

(iv) Long season: "Very Slow Spring" wheats, and "Quick Winter", "Mid Winter", and "Slow Winter" wheats.

(v) Durum: Durum species.

(2) Canola trial series

(a) Canola trial series types are defined by the rainfall zone location of the trial. The canola series types have historically been named as "early" and "mid" series trials.

(b) Definitions of canola trial series in the NVT Program:

(i) Low to medium rainfall (early series trials): typically include quick to medium maturing cultivars.

(ii) Medium to high rainfall (mid series trials): typically include medium to slow maturing cultivars.

5.2 Trial Design

(1) Trial designs utilise the latest statistical methodology available and allow for site and subsequent across-site analysis by qualified NVT Biometricians.

(2) The NVT Manager will determine the list of cultivars tested in each trial after discussions with the Breeders, the NVT Management Team, Trial Service Providers, and the regional NVT Advisory Committees.

(a) Once the list of cultivars is determined and entered into the NVT database by the NVT Manager, the Trial Service Provider will use the NVT database to determine the shape and layout of the trial and enter this information into the NVT database to obtain a trial design.

(3) There will be sufficient Commercial cultivars, or trial standard cultivars, in each trial to allow growers to benchmark upcoming cultivars relative to a well-known cultivar in any region.

(4) There will be repeated cultivar entries from year to year to allow connectivity among trials. These numbers will be determined by the NVT Manager in consultation with the supporting Biometrician.

(5) Plot length must have a minimum harvestable length of 6m and ideally a maximum of 10m (longer plots require an excessive amounts of seed). The ideal harvestable length is 10m.

(6) Plot width must have a minimum width of 1.2m (outside row to outside row) and ideally a maximum of 2.0m.

(7) All plots at a site, including buffer plots, are to be the same width and length and have the same number of rows.

(8) The inter-row and inter-plot distance must be consistent across all plots within a trial.

(9) Inter-plot distance should be kept to a minimum in erect crop types, e.g. cereals, such that wheel tracks do not encroach adjoining plots and must be increased in crop types that spread or trail to improve ease of harvest e.g. peas and canola (APPENDIX H – CROP

SPECIFIC PROTOCOLS). Plants which are likely to, or have, intertwined between plots should be physically separated well prior to harvest, to avoid admixture and shattering issues likely at harvest.

(10) Trial pathways are to be straight, and plots are to be uniform.

(11) Where trials are located on properties where the Trial Co-operator use Controlled Traffic management, pathway widths should be adjusted to ensure that compacted wheel tracks fall into the pathway rather than within the plots. Wider pathway widths need to be recorded and entered into the database (preferred), and/or recorded in detail on the mud map to allow NVT Biometricians to spatially analyse the trials.

(12) Where header trails and/or chaff rows are present on the site, the site should be pegged, where possible, such that the concentrated crop residue lines and pathways coincide. This is to minimise the detrimental effects on crop establishment within plot.

(13) Additional replicates of a cultivar may be used in the place of fillers if the same seed source, sowing rate, and seed treatment is used.

(14) The distance between trial plots is to be determined by the Trial Service Providers. It must remain consistent. Design must be either three (3) or six (6) ranges unless approved by the NVT Manager.

(15) If co-location (for different crop species) is required, it is to be reported to the NVT Manager following sowing. When co-location of canola trials (different chemistry types) or chickpeas (Kabuli and Desi types) occurs, the distance between trials must be recorded and entered into the database (preferred), and/or detailed on the mud map. This is to allow NVT Biometricians to spatially analyse the trials.

(16) Additional buffer plots should be sown alongside trials of crop types that require extra harvester set up or if there are particular cultivars that have unique harvest requirements (e.g. short plant statue, low seed head/pods etc.).

5.3 Plot One Identification

(1) An identifying marker (e.g. white peg, plot sign etc.) is to be placed at the front of “Plot 1-1” (range 1, row 1) to allow ease of locating plot 1 and orientation of the field plan for field observations. If multiple trials occur at a site, an identifier for each NVT trial is required.

5.4 Fillers

(1) The use of “fillers” is considered not ideal and only to be used when absolutely necessary.

(2) Trials sown on six ranges require an even number of cultivars. Trial Service Providers may add a single filler cultivar to reach an even number.

(3) “Operational fillers” are fillers that may be necessary as part of the trial for randomisation to fit on the TSP’s preferred layout.

(a) Operational Fillers will not be reimbursed by NVT and will be a Trial Service Provider cost.

(b) NVT will still reimburse the Trial Service Provider for the cost of other fillers that occur due to:

i. Removed Entries

ii. Missing Plot

(4) Trials sown on three (3) ranges do not require the use of filler cultivars when designs are first generated.

(5) Fillers should only be added after consultation with the NVT Manager under the following conditions:

(a) Fillers must be a commonly grown Commercial cultivar and be an existing entry to the trial. NVT will supply additional seed of a cultivar that can be used as a filler.

(b) When there are seed supply issues through timing or quality and varieties need to be substituted.

(c) Are preferably from the same seed source and sowing density as other entries in the trial.

(i) When (c) above is true, fillers should be labelled on the database as the actual cultivar sown.

(ii) When (c) above is FALSE, a unique filler ID is used.

5.5 Timing of Operations

(1) The NVT Program will be guided by best-practice in each region where trials are conducted and facilitated by engaging with regional NVT Advisory Committees to recommend sowing times and seeding rates. These recommendations will be ratified and implemented by the NVT Management Committee and Participating Breeders for adoption.

5.6 Calibration and Checking of Weighing Devices (Scales)

(1) All weighing devices used for the NVT Program must be checked, and calibrated if required, to ensure accuracy and reliability under field/lab conditions. Trial Service Providers must provide details of how their recording devices have been calibrated, when, and by whom, to the NVT Manager when requested.

(2) All weighing devices used for the NVT Program must be checked on a regular basis during each operation within the NVT Program using the appropriate range of certified check weights according to an industry accepted protocol, to ensure accuracy and reliability under field/lab conditions. Trial Service Providers must provide details of how their weighing devices have been checked, when, and by whom, to the NVT Manager when requested.

(3) Should any weigh device fail to meet the check standard during any operation, the weighing device must not be used until it has been recalibrated and certified by a suitably qualified person.

5.7 Germination Windows

(1) Germination windows are outlined in APPENDIX J.1 – TRIAL GERMINATION WINDOWS- BY CROP and APPENDIX J.2 – TRIAL GERMINATION WINDOWS- BY STATE.

(2) Germination windows are the desired date range for the germination of seed for a specific trial series. Seed must be sown to ensure the germination date occurs within the preferred germination window.

(a) The sowing date is the date that seed is sown.

(b) The germination date is the first date when sown seed can be expected to have adequate moisture to germinate.

(i) When the seed is sown into adequate root zone soil moisture, sowing and germination will occur at the same date.

(ii) When the seed is dry sown, the germination date will be the date that seed receives adequate moisture from an adequate rainfall or irrigation event.

(c) The germination date is not defined by when the seed 'strikes' or emerges.

(3) Preferred germination windows have been determined via consultation with stakeholders as being representative of "best local practice" to reflect the expected performance of the goal post cultivars and cultivar entries for the specific trial series. Preferred germination windows may be adjusted from time to time.

(4) Unpreferred germination windows, pre- or post- the preferred germination window, are sub-optimal windows in which germination is acceptable if:

(a) Favorable environmental conditions have resulted in the majority of growers sowing early within the region.

(b) Environmental constraints outside the control of the Trial Service Provider mean the trial will be sown late. Note that management issues or other constraints that could have been avoided by the Trial Service Provider are not considered a valid reason to sow in the late unpreferred germination window without the application of KPI Service Credits.

(5) All trials should be sown to ensure the germination date occurs within the approved preferred germination windows unless express written permission is given by the NVT Manager (this includes sowing in the unpreferred germination window).

(6) If a sowing opportunity does not occur that will result in germination within the germination windows, the TSP may request written approval from the NVT Manager for trial planting at the earliest opportunity following the germination window. This includes dry sowing prior to the end of the germination window. Approval will be granted provided germination of the trials aligns with commercial crops in the surrounding district.

(a) This does not include early break wheat trials, given they can be supplementary watered to ensure germination.

(b) Breeders will be advised of any trials approved for germination outside the germination window. Breeders may choose to opt-out of trials germinated outside the germination window, by which cultivars unsuitable for later germination will be changed to fillers.

(i) No refund will be provided to Breeders for Pre-commercial cultivars which opt-out, as without this mechanism the trial would be abandoned, and abandonments have been factored into the initial Pre-commercial Line Fee.

(ii) Opted-out cultivars will still be eligible for a Commercialisation Credit.

(iii) As per normal process, all trials (including those sown outside the germination windows) will be included in the MET dataset for review by the NVT Biometricians and excluded from the analysis due to statistical reasons as required.

(iv) Grain quality testing will not be conducted on cultivars that have been opted-out.

5.8 Trial Sowing & Dry sowing

(1) Trials should be sown to germinate within +/- five (5) days of the same surrounding crop type (with the exception of early series wheat trials), unless agreed by the NVT Manager.

(a) It is recognised that the Trial Co-operator's surrounding crop may be sown in conditions suitable for commercial cropping but unsuitable for small plot cultivar trials (e.g. sown dry, or in sub-optimal conditions resulting in staggered or patchy establishment). In these situations, the KPI's pertaining to alignment of emergence with surrounding crop can be waived, provided the TSP has sufficient documentation of the issue and has flagged with the NVT Manager prior to harvest.

(2) The trial configuration must be sown according to the trial design obtained from the NVT database (after the number of entries and trial layout has been confirmed by the Trial Service Provider).

(3) Buffers must be included at the start and end of a trial block. Buffers do not need recording in the trial design on the NVT database.

(4) Packing and sowing plans are used to record alterations due to non-arrival of seed or mishaps in the field at sowing. Packing and sowing plans should be retained by the Trial Managers for a minimum of 18 months after sowing.

(5) The Trial Service Provider has the right to remove a cultivar if seed arrives after the TSP Seed Delivery Deadline specified in APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES. The Breeder will be made aware of any removed cultivars.

(6) The sowing date must be recorded and entered by the Trial Service Provider into the NVT database within 48 hours of sowing, as outlined in APPENDIX A – DATA ENTRY, MILESTONES, KPI.

(7) Trials require seed to be sown with adequate soil coverage to allow sufficient seed to soil contact thus ensuring even imbibing of moisture and subsequent germination across the trial site.

(8) Trial Service Providers should ideally use seeding equipment fitted with a 2cm GPS guidance system. Sowing equipment design must be so that it can sow into all stubble loads of all previous crops.

(9) Trials are to be sown with rows perpendicular to the Trial Co-operator's direction of sowing and pathways/ranges parallel to the Trial Co-operator's direction of sowing.

(10) Sowing rates vary across the NVT regions, but trial sowing rates and the resultant plant establishment must reflect local best practice as outlined in APPENDIX H – CROP SPECIFIC PROTOCOLS.

(a) Importantly, all trials should have a consistent and uniform plant establishment across the trial area.

(11) Seed establishment (measured in plants/m^2) by State, Region & Crop are to be recorded. Suggested plant densities and establishment rates are provided for the guidance of Trial Service Providers and can be found in APPENDIX H – CROP SPECIFIC PROTOCOLS.

(12) Dry Sowing

(a) Some trials may be sown dry if the Trial Co-operator has sown dry or is about to sow dry, but ideally this should be no earlier than three (3) days ahead of a promising germinating rain.

(b) If a promising germinating rain does not occur within the germination windows, the TSP can opt to sow outside the germination windows in line with clause 5.7(6) of the NVT Protocols.

(c) The NVT Manager is to be notified in writing of all cases where dry sowing is planned.

(d) The date of subsequent rainfall, that triggers germination, must be recorded as the "germination rain date" (sowing date) in the NVT database. The actual sowing date is also to be recorded in the NVT database.

(e) Trials that result in patchy establishment have a high chance of being compromised and declared unusable with associated abandonment risk.

(f) In seasons with a widespread late break, a departure from the dry sowing protocols may result in improved trial outcomes (e.g. dry sowing more than three (3) days ahead of a promising germinating rain). In these instances, Trial Service Providers are asked to submit a sowing plan to the NVT Manager detailing:

(i) the specific trials they recommend for sowing outside the protocols;

(ii) a justification for each trial as to why a better outcome should be expected by a departure from the dry sowing protocols (e.g. suitable soil type, soil moisture and weed burdens etc.); and

(iii) details of consultation (if any) undertaken in arriving at this decision.

The NVT Manager will approve trials on a case-by-case basis. Should the departure from the NVT Protocols lead to a poor outcome, Trial Service Providers will still be responsible for the abandonment risk and any relevant KPI's.

5.9 Wetting Agents

(1) Application of wetting agent to potentially non-wetting soils (including, but not limited to, sands with high organic matter content, sands with low clay content, forest gravels etc.) for dry sown trials is permitted with written approval from the NVT Manager.

(2) Wetting agents should be applied on-furrow as per industry best practice or as a blanket application PSPE at appropriate label rates in label recommended water rates to ensure even germination and establishment of the crop. The use of a wetting agent must have prior approval by the NVT Manager.

5.10 Sowing of Early Series Wheat Trials

(1) Early season wheat trials

(a) Where the germination window for an early season wheat trial overlaps with the germination window for a long/main season wheat trial, and a sowing opportunity eventuates, both trials can be planted simultaneously. However, long season trials should be sown at the first opportunity once the germination window is open.

(2) Early break wheat trials

(a) These trials must be established within the germination window. If a sowing opportunity does not eventuate, or supplementary watering does not occur, within the germination window, the early break trial at a site may be abandoned.

(b) These trials are designed to be reflective of the local environment if germinating rainfall occurs and conditions are suitable for sowing within the germination window. However, if germinating rains do not occur, the following options are available (subject to NVT Manager approval):

(i) Shifting of trial location within the region to a site that has received adequate rainfall for germination, or

(ii) Supplementary watering during the preferred germination window provided significant rainfall is not forecast during the 2-week preferred germination window.

5.11 Supplementary Watering of Trials and Irrigated Trials

(1) Definitions:

(a) Supplementary watering -Water applied to trials to initiate germination and establishment or to ensure survival of plants in trials sown in traditional winter rainfed crop zones.

(b) Irrigated trials -These trials occur where irrigation of crops is commonplace and are designed to be irrigated on a regular basis as the primary supply for their water requirements throughout their growing period.

(2) Supplementary watering of trials may be considered to ensure trials survive where severe post emergent drought is threatening plant survival. NVT Manager approval must be granted before supplementary watering.

(3) When supplementary water is applied to a trial: the method of application, date of application and mm rainfall equivalent must be recorded and uploaded to the database within 14 days of application.

(4) Irrigation dates and quantities applied to trials that are planned as irrigated trials are to be recorded and uploaded to the database within seven (7) days of harvest.

(5) The preferred method of supplementary watering is with pressure compensated drip tape, post sowing. Minimum supplementary watering amounts are 10-25mm on light soils and 20-40mm on heavy soils. Alternative supplementary watering types, where they have been used successfully in the past, may be used with the approval of the NVT Manager. Supplementary watering must be uniform across all plots in the trial.

5.12 GPS Data Collection

(1) Entrance gateway GPS coordinate collection

(a) The GPS coordinates of the paddock entrance gateway must be recorded for all trials and entered directly into the NVT database by the Trial Service Provider within seven (7) days of sowing, as outlined in APPENDIX A – DATA ENTRY, MILESTONES, KPI.

(i) These coordinates should represent the access point off the public roadway where the NVT gate sign is located.

(ii) The same set of coordinates should be used for all trials relevant to that entrance point.

(b) GPS coordinates must be provided in decimal degrees format.

(c) The GPS position must be recorded to an accuracy of six (6) decimal places using an instrument which provides decimal degrees.

(2) Plot 1-1 GPS coordinate collection

(a) The GPS coordinates of “Plot 1-1” (Range 1, Row 1) of every trial must be recorded and entered directly into the NVT database by the Trial Service Provider within seven (7) days of sowing, as outlined in APPENDIX A – DATA ENTRY, MILESTONES, KPI.

(b) GPS coordinates must be provided in decimal degrees format.

(c) The GPS position must be recorded to an accuracy of six (6) decimal places using an instrument which provides decimal degrees.

5.13 KML File Collection

(1) KML (Keyhole Markup Language) is a coding language used to express geographic visualisation, including annotation of maps and images.

(2) Pathway from entrance gateway to trial site:

(a) A KML file that maps the pathway from the entrance gateway to Plot 1-1 of the trial, or the first trial at a multi-trial site, must be recorded and uploaded to the NVT database by the Trial Service Provider within seven (7) days of sowing, as outlined in APPENDIX A – DATA ENTRY, MILESTONES, KPI.

(b) The same KML file should be used for all co-located trials relevant to that entrance point (if applicable).

(c) Trial Service Providers should use an appropriate KML recording device/software to begin “recording” at the access gateway and continue recording as they drive or walk on the most appropriate route to Plot 1-1.

(3) Trial boundary

(a) A KML file that maps the trial boundary GPS coordinates is to be collected on each individual trial and uploaded to the NVT database by the Trial Service Provider within seven (7) days of sowing, as outlined in APPENDIX A – DATA ENTRY, MILESTONES, KPI.

(b) Trial Service Providers should use an appropriate KML recording device/software to begin “recording” at the LEFT corner of Plot 1-1 of the trial and continue recording as they walk the perimeter of the trial in a clockwise direction.

(c) Do not include the buffer plots.

(d) Save the file name as “TrialCode.KML” (e.g. WMaA21BREN5.KML), in KML format.

(4) General information

(a) KML files can be generated using various available smart phone apps or alternative devices. Please contact NVT if you require further information on this.

(b) Measurements must be captured in “metric” units.

(i) Where applicable (device depending), device settings must be configured to “GPS measuring” to collect “Area” data.

5.14 NVT Signage

(1) GRDC NVT and Biosecurity (if required) corflute signs are to be placed on a secure, prominent position on the roadside where access from a public road to the NVT trial is gained. NVT signs are to be placed at the paddock access point to the trial site, or at fence-line adjacent to trial where the trial is visible from the road. The aim being to enhance the exposure of the NVT Program.

(2) They should be installed on the day of sowing and remain in place until the trial is harvested.

(3) Visitors must be able to find the trial of interest at a multi trial location and in these situations an overall site map identifying NVT trials should be present at the site.

(4) TSPs will be responsible for sourcing their own NVT signs based on the details in APPENDIX O – FENCE SIGNS.

(5) Further instructions and details of NVT signage can be found in APPENDIX O – FENCE SIGNS.

5.15 Site Maps/Mud Maps

(1) Trial Service Providers must provide a mud map indicating the location of the trial in relation to the nearest town or main access roads as per the template supplied by GRDC NVT. Contact the NVT Manager for a copy of the template if required.

(2) The mud map should indicate the location of the NVT trial in relation to other trials at the same site (if relevant) and indicate the distance including any buffer rows between co-located trials.

(3) The mud map should include a text description of access to the trial site, with relevant landmarks and distances from the closest major town and roads. It should also include a marked line that indicates the best access to the trial through the paddock or farm and location of NVT signs.

(4) Mud maps must include the GPS coordinates of the site (in decimal degrees format) including coordinates of all Plot 1-1, the gate access off the road and contact numbers for both the Trial Service Provider and the Trial Co-operator, and any site-specific requirements e.g. biosecurity measures, contact farmer etc.

(5) The mud maps are to be loaded onto the NVT database as required by APPENDIX A – DATA ENTRY, MILESTONES, KPI. This is to allow easy access to trial sites by Breeders and site auditors.

5.16 Site Check in and QR Codes

(1) **All visitors** to NVT are required to log their visit using the QR Code system in place when accessing trial sites.

(2) NVT QR codes are to be available in a waterproof container at Plot 1-1 at every NVT trial site.

(3) TSPs may use the QR codes in other locations (e.g. site access point, fence signs, newsletters, etc.), provided the QR code is also present at Plot 1-1.

(4) All visitors will be required to use the QR code to access the trial plans for the site.

(5) In areas of low mobile phone reception, a QR code will still need to be displayed on site, however the Trial Service Provider must either:

(a) Leave the trial plan on site with the QR code for visitors to access upon arrival, or

(b) Provide the trial plan directly to visitors at the time they request authorisation prior to visiting the site.

(6) The following naming convention should be used by Trial Service Providers when creating QR Code Title Descriptions:

Situation	Convention	Example
If a single trial or crop type is present	Location Name and Crop	*Beckom Barley*
If multiple crops are present from the same crop group	Location Name and Crop Group	*Beckom Cereals*, *Beckom Pulses*
If multiple crops are present from different crop groups	Location Name and List Crops/Crop Groups	*Beckom Cereals and Canola*, *Beckom Canola and Lupin*, *Beckom Pulses and Canola*

5.17 Trial Management

(1) Trial Service Providers are required to deliver on time, all aspects of trial management in accordance with the conditions as agreed to in the Service Provider contracts. Any unforeseen problems must be brought to the attention of the NVT Manager immediately and a course of action initiated as soon as possible thereafter.

(2) A trial site must not be compromised by weed, disease, insect, or pest competition.

(3) An outbreak of a pest or disease may offer an opportunity for assessment of the resistance/tolerance level of the lines in the trial. The Trial Service Provider should notify the NVT Manager of such opportunities so that the NVT Manager can organise for the trials to be inspected by a pathologist.

(4) Trial Service Providers are responsible to ensure that all treatments, including but not limited to, herbicides, pesticides, fungicides, fertilisers and soil treatments, applied to NVT trials must comply with all relevant label registration requirements. For crop specific trial management information please refer to APPENDIX H – CROP SPECIFIC PROTOCOLS.

(5) NVT recognises that off-label use of fungicides sometimes occurs to adequately control disease in trials given the wide spectrum of maturities. In instances where off-label use of fungicides does occur, the use must be reported to the NVT Manager, details accurately captured in the database (as per any other chemical use), and an appropriate management plan put in place to ensure correct disposal of harvested grain.

(6) Fertiliser management should aim to achieve the highest expected yield for the site given the seasonal forecast. Fertiliser management should include fertiliser application at sowing and top dressing with appropriate application rates and timings based on seasonal forecasts. Trace element fertilisers should also be applied. For crop specific trial management information please refer to APPENDIX H – CROP SPECIFIC PROTOCOLS.

(7) Trial Service Providers must ensure all treatments to NVT trials are applied by a fully qualified staff member or contractor.

(8) The use of plant growth regulators (PGRs) on NVT trials is prohibited unless approved by the NVT Manager. PGR treatments must be applied at the same growth stage for all cultivars in the trial. This may require hand-spraying selected plots of similar maturity groups. Trial Service Providers must provide the NVT Manager with a copy of their Standard Operating Procedure for applying PGRs before approval will be granted. Use of PGRs may be necessary in high-rainfall and/or long-season environments such as Tasmania.

5.18 Trial Monitoring

(1) The site must be regularly monitored by the Trial Service Provider for weeds, pests, diseases, or other incidents such as grazing or storm damage.

(2) The site must be inspected by the Trial Service Provider (at a minimum):

(a) four (4) weeks after sowing (establishment/emergence check),

(b) two (2) weeks after each herbicide application,

(c) at flowering, and

(d) prior to harvest.

(3) A record is to be made of each inspection, including the name of the individual who conducted the inspection.

(4) Each trial must have a Trial Rating uploaded to the NVT database as per APPENDIX A – DATA ENTRY, MILESTONES, KPI.

(a) The Trial Rating should indicate the potential outcome of the trial, incorporating the seasonal and management quality of the trial.

(b) The Trial Rating should be conducted using a 5-1 scale, where;

5 = Excellent trial, no issues.

4 = Good trial, should produce ok results.

3 = Average trial, site has issues and needs work for the results to be meaningful.

2 = Poor trial, site has issues and is unlikely to produce meaningful results.

1 = Trial has been abandoned.

(c) The Trial Rating may change for individual trials as the season progresses. Multiple ratings may be entered for each trial TSP milestone; ratings should be updated after each visit.

(d) The Trial Rating will be used to communicate the potential outcome of the trial throughout the growing season and assess if any actions are required to improve the outcome of a trial.

(5) The Trial Co-operator may be prepared to assist in monitoring, by reporting any incidents or problems to the Trial Service Provider. However, this does not replace the responsibility of the Trial Service Provider to monitor the site.

(6) Measurements specific to each crop are covered in APPENDIX H – CROP SPECIFIC PROTOCOLS.

(7) Establishment counts/scores are required as per APPENDIX F – STANDARD OPERATING PROCEDURES.

(8) Yield-limiting factors such as frost, disease, weeds, nutrient deficiency/toxicity, and drought are to be recorded and reported. Where required, plot scale observations are to be taken on the trial and entered directly into the NVT database as per APPENDIX F – STANDARD OPERATING PROCEDURES.

(9) The NVT Protocols and the standard operating procedures described in APPENDIX F – STANDARD OPERATING PROCEDURES for individual agronomic or disease characteristics are to be followed when taking plot observations.

(10) All trials should have Zadoks or NVT approved growth ratings. For specific details, refer to the activity “growth stage” in the Trial Measurements Table of section F.4 of APPENDIX F – STANDARD OPERATING PROCEDURES.

(11) Any incident, accident or other factor that could impact the accuracy or reliability of the trial, especially anything that differentially affects Pre-commercial cultivars or standard cultivars, must be reported to the NVT Manager immediately. These include frost and heat shock.

(12) The Trial Service Provider must notify the NVT Manager of any trials and/or plots that have been compromised that could lead to possible abandonment, or partial abandonment, within 24 hours of detection.

(a) For plot specific issues, the affected plots are to be designated as “missing”, and plot yield set to “N/A” within the database. An identifiable reason as to why the plot has been set to N/A must be attached to the trial in the NVT database. Plots with general patchiness are not to be N/A.

(13) If plot lengths are required to be adjusted, all plot lengths in that range must be adjusted to remain the same.

5.19 Trial Measurements and Plot Observations

(1) Plot observations recorded by the Trial Service Provider can be either variates or covariates.

(a) **Variates** relate to a cultivar (height, flowering time, etc.) and allow information on the agronomy of a cultivar to be collected to allow a validity check that a cultivar is in the correct location. Variates are generally cultivar specific traits.

(b) **Covariates** are location based, independent of cultivar, and influence the accuracy in cultivar performance. Covariates include uneven establishment within a trial, weed infestation, blocked or missing rows, etc. Covariates are very important and, when taken, are required for every plot, not just one replicate. Covariates are important in analysis and hence must be accurately measured and well described within the database.

(2) A list of NVT acceptable covariate and variates have been included within APPENDIX F – STANDARD OPERATING PROCEDURES. All covariate data should be entered on the NVT database within seven (7) days after sampling/recording as outlined in APPENDIX A – DATA ENTRY, MILESTONES, KPI and must accompany harvest yield data when a trial is flagged as “Ready for Biometrician Analysis”.

(3) All plot measurements collected are tested by the NVT Biometricians for non-genetic dependence (true covariate) and significance of measurement.

5.20 Plot Pathways

(1) Pathways between ranges should be managed to provide easy access to visitors during the season. This may necessitate desiccant spraying or slashing prior to anthesis. Bearing in mind this management must not cause erosion risk on light soils.

(2) The preferred timing of pathway management is before stem elongation, unless approved by the NVT Manager.

(3) Pathways must be straight (perpendicular to plot row direction) to ensure uniform plot length and if pathways are not straight, individual plot lengths must be measured and recorded.

(4) Pathways must be trimmed to ensure any staggering of rows and plot ends are removed.

5.21 Weather Data Recording and Use

(1) Temperatures experienced by the growing crop are to be recorded using a temperature logger, installed and managed as per APPENDIX F – STANDARD OPERATING PROCEDURES.

(2) Trial Service Providers are responsible for the supply, maintenance, and accuracy of all data recording devices including the annual replacement of temperature logger batteries and associated costs.

(3) Trial Service Providers are required to collect minimum and maximum temperature data for each site (not each trial at each site). However, trials in different paddocks within the same locality require data collection in each paddock.

  (a) At sites with multiple trails, the temperature data is to be collected when the first trial is harvested.

(4) A temperature logger should be installed on the day of sowing the first trial at each location where a logger is required. The temperature logger should be removed immediately prior to harvest.

(5) Trial Service Providers are required to ensure calibration, positioning and downloading of these loggers as per APPENDIX F – STANDARD OPERATING PROCEDURES.

(6) Minimum and maximum temperature at 15-minute intervals are to be taken as per explanation in APPENDIX F – STANDARD OPERATING PROCEDURES.

(7) Temperature logger and/or weather station data is to be loaded onto the NVT database with seven (7) days of harvest as per APPENDIX A – DATA ENTRY, MILESTONES, KPI.

5.22 Rainfall

(1) Monthly rainfall measurements must be captured for all NVT trials, including those that are abandoned throughout the season.

(2) Monthly rainfall totals must be captured for a full 12-month period as per the following:

  (a) Winter crops: Monthly rainfall totals must be entered into the NVT database for all 12 months of the calendar year (Jan-Dec) for each trial.

(3) Rainfall Data Source

  (a) Rainfall totals should be captured from localised rain gauge at the trial site or from a gauge monitored by the Trial Co-operator (“Farmer Records”).

  (b) If (a) above is not possible, rainfall data from the nearest BOM station can be used.

  (c) Paddock Gauge records may be supplemented with BOM data for those months where it’s not possible to capture rain gauge data in the field (i.e. outside the growing season). The appropriate “Rainfall Data Source” field must be selected on the NVT database.

(4) If the monthly rainfall total is zero, then zero (0) must be specified in the database, rather than being left blank.

(5) Rainfall data is to be entered on the NVT database by January 31st (winter crops) as per APPENDIX A – DATA ENTRY, MILESTONES, KPI.

5.23 Field Days (Public)

(1) It is highly desirable for public field days to be held on most sites, to promote the NVT Program and to enable local growers and advisers to see the cultivars and trials firsthand.

(2) The Trial Service Provider is responsible for ensuring that the NVT trial at a field day site is presentable and safe. The Trial Service Provider is not responsible for hosting field days unless prior arrangements have been made with the NVT Manager.

(3) If a Breeder wishes to speak at the field day, the same opportunity must be given to all Breeders with cultivars sown at the site.

(4) The Trial Service Provider MUST NOT accept sponsorship, or money, or any product from a sponsor or Breeder participant.

(5) At a field day, one replicate (usually the first range) is to be signposted with the names of Released cultivars, local check cultivars, and the Breeder's code number.

(6) If a cultivar has been commercialised prior to the field day, its commercial name is to be signposted.

(7) Signage is to be of the same type and size for all cultivars, with all companies equally displayed.

(8) The use of larger or more colourful company specific signage for cultivars is prohibited for both Trial Service Providers and Breeder representatives.

(9) The Trial Service Provider may be asked to present at a field day summarising the agronomic management to the visiting group. This is at the Trial Service Providers discretion.

  (a) It is not the responsibility of the Trial Service Provider to create or execute field days for NVT sites unless otherwise stipulated in a separate contract based around extension and communication.

(10) No destructive handling of any plants in any plots may occur at a field day. The field day manager must maintain the field day guests to pathways and ensure no plot access occurs to avoid site trampling.

(11) If a Breeder wishes to access a site, this is not viewed as a field day. Breeders have full access to all sites at any point deemed to be safe for the visitor. Breeders must contact the Trial Service Provider to allow the Trial Co-operator to be notified and the Trial Service Provider to inform the Breeder of any reasons it is unsafe to access a site at that point (e.g. just been sprayed by a pesticide, and a breach of withholding periods).

(12) Abandoned trials/trial sites must not be shown or made available for field days. Plots must be obscured of the abandoned trial prior to the holding of a field day where the trial is co-located with other remaining viable trials (see Management of Abandoned Trials/Trial Sites).

5.24 Breeder Use of Trial Sites

(1) NVT Participating Breeders may want to utilise NVT sites for extension, promotion, or training purposes. Use of NVT sites is contingent on the following:

  (a) Authorisation for access and use has been received by the Trial Manager and Trial Co-operator.

  (b) All instructions provided are obeyed, including those pertaining to:

(i) Entry and exit from the site.
(ii) Farm biosecurity requirements.

(c) There is no impact or damage caused to trial plots.

(d) All traffic is kept to approved walkways.

(e) No information (traits, data, NVT results) is shared on Unreleased cultivars in the trials. This includes NVT results of the Breeder's own Unreleased cultivars.

(f) Social media use while on site is allowed however any issues identified should be raised directly with the Trial Manager and NVT Management Team (not via public forums).

(g) All trial and agronomic issues identified should be raised directly with the Trial Manager and the NVT Manager.

(h) Breeder branded signage is permitted, however it cannot obstruct any NVT or Trial Service Provider signage already in place. All signage must be removed following completion of the event.

(i) The NVT Program, the GRDC, and Trial Service Providers should be acknowledged in all communications and documents relating to any events.

(j) Use of drones to capture images is permitted provided CASA regulations are followed and permission is granted by the Trial Manager and Trial Co-Operator.

(k) Any data or measurements collected from the trial site must be done so according to the *NVT Data and Resource Sharing Key Requirements*.

6 UNMANNED AERIAL VEHICLES

(1) Unmanned aerial vehicles (UAVs/drones) are not to be flown over NVT sites without express permission of the Trial Co-operator, the Trial Service Provider, and the NVT Manager.

(2) NVT Participants (Participating Breeders, Trial Service Providers, NVT Managers and authorised third party researchers) are permitted to fly UAVs over NVT sites for the purpose of recording images and/or videos of the trials, providing the pilot is suitably qualified or certified.

(3) Upon request, an NVT Manager must be provided access to all images and video recorded over NVT sites.

(4) No images or data collected via the use of UAVs are to be used publicly without the express written permission of the GRDC and the NVT Manager.

7 HARVEST AND GRAIN QUALITY

7.1 Harvesting

(1) The harvesting equipment should be well maintained, and any staff involved well trained, to minimise grain or oilseed loss and to minimise grain damage such as cracking and splitting. At least one staff member on site at harvest should be experienced with harvesting each crop type at the site and proficient at setting the harvester for optimum efficacy of grain harvest, ensuring all heads/pods are captured by the harvester, heads/pods are completely threshed without excessive grain damage, and the minimum amount of grain lost out the back of the harvester.

(2) Harvester settings - including, but not limited to, cutter bar height, reel height and speed, drum speed and concave settings, sieves and wind - must be adjusted to suit each crop type prior to harvesting trial plots by harvesting buffer plots. During harvester set up (and throughout harvesting each trial) harvester efficiency should be checked to ensure all grain is collected by the harvester. Adjustments to harvester should be made to ensure all plants and parts thereof are collected by the harvester and fully threshed before exiting the harvester. Do not assume that standard harvester settings will be sufficient for each different crop type and different maturities of crop type through the season.

(3) Each trial must be harvested at the earliest opportunity after physiological maturity, including the late goal post cultivars (where included) and expiration of any withholding period of herbicide applied as crop topping or desiccation, to minimise grain losses through wind, insect, rain, or pest damage. Do not delay harvesting trials that are ready to harvest to coincide with harvesting later trials at the site. Trial Service Providers must advise the NVT Manager before harvesting in sub-optimal conditions in order to avoid grain losses (e.g. wind, insect, rain, or pest damage).

(4) Timing of harvest and crop topping/desiccation will be determined by the desiccation standard and goal post cultivars specified in the crop specific protocols. Harvest should not be compromised by waiting for the last cultivar/s to ripen if that cultivar/s are later maturing than the late goal post cultivars. Any late maturing cultivars that were crop topped/desiccated early should be recorded and the NVT Manager notified. In the absence of desiccation standards and/or goal post cultivars, the desiccants should be applied after the majority of cultivars have reached physiological maturity where yield and quality will not be compromised.

(5) Application of desiccants as a harvest aid to control late regrowth, weeds etc., is permitted where the NVT Manger grants permission in writing. All cultivars in the trial must be mature and individual cultivar's yields must not be adversely influenced by the application of the harvest aid desiccant. Only registered products are to be applied to each specific crop. All appropriate withholding periods must be adhered to.

(6) All plant rows within a plot must be harvested, including all outside and middle rows.

(7) All trials are to be harvested in one direction (not a serpentine pattern) and that direction is at the discretion of the TSP. A direction of harvest must be selected that optimises the capture of grain for the majority of cultivars within each trial.

(8) Harvester set up and operation must endeavour to capture all the grain from each plot – including short cultivars, lodged cultivars, early maturing cultivars, and hard-to-thresh cultivars. Sometimes this will be at the expense of grain sample cleanliness. It is an expectation that grain from plots will be cleaned to an adequate standard prior to grain quality testing which may necessitate re-threshing and cleaning of samples.

(9) The harvester set up, operations and timings must allow for adequate cleaning of the harvester between plots to ensure no carry-over of grain between plots.

(10) Observations of any damage to plots prior to harvest are to be recorded by the Trial Service Provider and reported to the NVT Manager. Observations prior to harvest include but are not limited to head loss, shattering, weak straw or lodging, as described in the crop specific protocols.

(11) Any losses of grain that may have occurred at, prior to, or during harvest must be recorded and reported. Plots should be inspected immediately post-harvest to ensure no excessive grain loss has occurred during harvest. Where differences in grain losses are observed between plots the whole trial should be scored for that factor e.g. grain/pod loss and captured as a pre-harvest assessment to be considered for use in the statistical analysis (refer to APPENDIX F – STANDARD OPERATING PROCEDURES).

(12) The decision of what harvest method to use is determined by the Trial Service Provider, but the outcome must be that grain loss is minimised and that there is NO variation in grain loss between cultivars.

(13) The Trial Service Provider is to ensure all harvesting equipment is cleaned after completion of harvesting trials and before leaving the site.

(14) The Trial Service Provider must retain a **minimum** of 500-gram sample of each cereal plot and **minimum** of 300-gram sample from each canola and pulse plot harvested grain for auditing purposes (e.g. confirmation of genetic identify) until the following sowing time, or as deemed necessary by the NVT Manager. Grain samples must be kept in a permanently labelled sample bag and stored in a cool, dry place.

(15) Additional grain must be retained at harvest to ensure that the **minimum** weight of composite cleaned grain sample for quality assessment and audit is also retained. See table below for minimum sample quantities:

		REP1	REP2	REP3	
CEREALS	composite	1 kg			retain for up to one year
	plot	0.5 kg	0.5 kg	0.5 kg	retain until seeding
CANOLA & PULSES	composite	0.5 kg			retain for up to one year
	plot	0.3 kg	0.3 kg	0.3 kg	retain until seeding

(16) Any remaining grain after sample collection from Pre-commercial cultivars must be handled in accordance with the signed MTA. If no specific instructions are provided in the MTA, grain from Pre-commercial cultivars should be handled the same as grain from Commercial cultivars in accordance with the NVT Manager's instructions, which will include the mixing of grain into a bulk that obscures the genetic identity of Pre-commercial cultivars. The Trial Service Provider must keep a record of the method and date of the destruction. Bulked grain must not be replanted or distributed to Breeders or seed suppliers.

(17) Harvested grain from each plot must be separately and accurately weighed, preferably on-site. If grain is to be weighed off-site, then a robust system of bagging and labelling must be instituted. Any grain from plots that may be contaminated with dirt, rocks straw etc. must be cleaned before weighing and recording the harvested grain weight.

(18) Data pertaining to harvesting must be uploaded to the NVT database by the Trial Service Provider within seven (7) days of harvest date as outlined in APPENDIX A – DATA ENTRY, MILESTONES, KPI.

7.2 Grain Quality

(1) Cultivars included in the NVT Yield Program will be eligible for grain quality testing with the following conditions:

(a) Cultivars are accepted for grain quality assessment on a crop by measurement type basis as tabled in APPENDIX G – GRAIN QUALITY ASSESSMENTS AND SOPS.

(b) Commercial cultivars included in the NVT trials will be eligible for all relevant crop by measurement assessments.

(c) Pre-commercial cultivars included in the NVT trials will be eligible for all relevant crop by measurement assessments.

(d) GRDC may exclude any cultivar from the grain quality assessment.

(2) Grain quality assessments are conducted only on trials that are deemed suitable for MET inclusion and are included in the Long Term Yield Reporter (LTYR) dataset. Grain quality assessments are **NOT** required for trials that are deemed unsuitable for inclusion in the Long Term Yield Reporter dataset, as identified on the NVT database by MET Include status "NO".

(3) Grain quality assessment samples are to be cleaned (aspirated) without removal of whole grain i.e. free of chaff, awns, cracked grain and other impurities. Barley is to be de-awned prior to testing.

(a) Remaining impurities must be measured and recorded in the NVT database (e.g. % of cracked grain in the screenings sample).

(4) Testing is to be conducted according to APPENDIX G – GRAIN QUALITY ASSESSMENTS AND SOPS.

(5) Testing is to be conducted using the approved equipment referred to in APPENDIX G – GRAIN QUALITY ASSESSMENTS AND SOPS (any alternatives from the approved equipment listed requires approval by the NVT Manager).

(6) All the test results are to be entered onto the NVT database by the Trial Service Provider within 60 days of harvest date, or by Jan 31st (whichever is sooner).

(7) Facilities undertaking NVT grain quality assessment must have evidence that annual calibration of ALL grain quality measuring equipment has been conducted by an approved third party. Evidence may be in the form of certification from calibration service technician/company and should be provided to the NVT Manager on request.

(8) The Trial Service Provider must retain a **minimum** of 1000 g **cleaned** grain sample for cereals, 500 g **cleaned** grain for canola and pulses, for the determination of grain quality and/or for auditing purposes for one year, or as deemed necessary by the NVT Manager. The retained sample should be the same sample as used for the quality assessments.

(9) The NVT Management Team reserves the right to access facilities undertaking NVT grain quality assessments for auditing purposes.

(10) It is a requirement of all facilities undertaking NVT Delivery Standard Determination to provide a member of staff to participate in Grain Assessment Training when determined and provided by GRDC.

(11) Grain quality measurements are to be conducted to the approved standards as outlined in APPENDIX G – GRAIN QUALITY ASSESSMENTS AND SOPS.

7.3 Grain Quality Assessment Audits

(1) Trial Service Providers will identify the grain quality laboratory/s being used at the commencement of each contract period. The Trial Service Provider shall immediately notify the NVT Manager of any changes to the nominated laboratory/s used during a contract period.

(2) The NVT Manager will identify the samples the Trial Service Provider will be requested to forward for auditing each year. Primary crops of interest are wheat, barley, and canola; however, grain samples of other crops may be requested.

(3) At the request of the NVT Manager, the Trial Service Provider will forward the specified retained samples per 7.2(8) 43to the designated independent accredited grain quality laboratory via the freight company nominated by the NVT Manager, noting these may change from time to time.

(4) Requests for samples will commence by January 31st with the delivery to the independent laboratory within two (2) weeks of the request.

(5) The cost of testing and freight of the audit samples to the accredited laboratory will be covered by the Trial Service Provider.

7.4 Site Clean-Up

(1) If the site requires clean-up, including removal of fencing, it must be done as soon as practical after harvest to ensure good relations with the Trial Co-operator and local community. Details of any arrangements regarding site clean-up should form part of the Co-operator Agreement.

(2) Sites that have been abandoned should be maintained or cleaned up in accordance with any arrangement with the Trial Co-operator.

7.5 Grain Sample Requests and Access (Breeders and Third Party Researchers)

(1) The NVT Manager may request the Trial Service Provider to provide grain harvested from NVT trials to NVT Participating Breeders or Third Party Researchers.

(a) The Trial Service Provider can only supply grain after receiving written authorisation to do so by the NVT Manager.

(b) The Trial Service Provider has the right to negotiate and recover all reasonable costs for supply of this grain from the receiver.

(2) All applications for post-harvest grain samples must be submitted to GRDC prior to July 31st each year.

(3) Further information on accessing NVT grain samples can be found in the *NVT Data and Resource Sharing Key Requirements* document.

8 ADMINISTRATION

8.1 NVT Database

(1) All information from any aspect of the NVT Program should be stored on the secure NVT controlled database.

(2) Relevant dates for the entry of data and associated milestones are outlined in APPENDIX A – DATA ENTRY, MILESTONES, KPI, and may be subject to change following consultation between the NVT Manager and Trial Service Providers.

(3) Access to the NVT database is provided to Trial Service Providers for the purpose of managing NVT trials.

(4) Training in the use of the database will be coordinated by the NVT Manager.

(5) User guides for growers and advisors, Breeders and Trial Service Providers are available on the web site at www.nvt.grdc.com.au.

8.2 Data Entry to NVT Database

(1) All Trial Service Providers are required to enter all data as required as per APPENDIX A – DATA ENTRY, MILESTONES, KPI and APPENDIX F – STANDARD OPERATING PROCEDURES.

(2) All Trial Service Providers are to report any potential delay in data entry to the NVT Manager in writing prior to the specified data delivery time.

(3) NVT database user issues, bugs, errors and help requests can be emailed to nvt.help@grdc.com.au.

8.3 Auditing

(1) An audit of all trials will be conducted periodically during the growing season to monitor achievement against required outcomes and overall progress of the trial.

(2) The aim of such audits is to reinforce stakeholder confidence in the NVT Program and its systems.

(3) An example of the trial audit template is found in APPENDIX E – NVT TRIAL AUDITING.

8.4 Abandoned Trials

(1) If a Trial Service Provider finds that a trial has been compromised and/or may generate poor results for any reason, the NVT Manager must be notified within 24 hours. The NVT Manager will decide a plan of action for the trial, which may include abandonment.

(2) The NVT Manager retains the option to obtain other expert opinion around options for a trial before the final decision on a trial's abandonment will be made.

(3) The NVT Manager retains the authority to abandon any NVT trial. The NVT Trial Manager will provide direction in writing to the Trial Service Provider in this case.

8.5 Management of Abandoned Trials/Trial Sites

(1) Where post-sowing trial abandonment occurs for a trial, trial plans, plot markers, and any other identifier must be immediately removed from the site including removal from the site plan and map stored on site if the abandoned trial is co-located with other remaining viable trials.

(2) Abandoned trials need to be destroyed as soon as practical after the abandonment decision has been made.

(3) Trials may be destroyed by being sprayed out with appropriate herbicides, mechanically slashed, or over sown with same crop type to ensure that no cultivar can be individually identified/obtained. Plots are obscured by whichever method is preferred by the Trial Co-operator.

(4) Trials abandoned post-flowering have the option to be bulk harvested with all harvested cultivars mixed to obscure their genetic identity. Individual plot grain weights must not be recorded.

(5) Abandoned trial sites need to be managed to ensure that weeds are controlled throughout the season to ensure that the site is returned to the Trial Co-operator in a satisfactory and clean condition.

(6) Where all trials located at the site have been abandoned, the NVT roadside sign must be removed as soon as practical after the abandonment decision has been made.

8.6 Trial Outcomes

(1) Individual trials will be assessed by the NVT Manager to fit into one (1) of three (3) possible outcomes:

(a) Released – trials that meet the NVT quality standards are harvested, and results are published. Trials that meet these standards are uniform and are not affected by severe yield-limiting factors.

(b) Unreleased – trials that do not meet the NVT quality standards are published in the NVT quarantine trial report. These trials may be affected by the following:
    (i) Site mean yield below 0.3 t/ha.
    (ii) P value >0.2.
    (iii) F value <1.
    (iv) Seasonal agronomic issues that unduly change cultivar rankings, such as frost, shattering, animal damage, herbicide damage, or management not in accordance with the NVT Protocols.

(c) Abandoned – trials that are not harvested. These trials have been compromised by high trial variability and covariates scores cannot be applied to an effective level. These trials are not considered to be a representative comparison between cultivars in the trial and the data has no value for genetic comparison.

(2) Trials are assessed for inclusion or exclusion in the Multi Environment Trial (MET) analysis.

(a) MET excluded – trials are excluded from the MET analysis where:
    (i) Trials are affected by seasonal agronomic issues that unduly change cultivar rankings. Issues may include frost, shattering, animal damage, herbicide damage or management not in accordance with the NVT Protocols.
    (ii) Trials are abandoned.
    (iii) Trials are genetically bound (as determined in the MET analysis by SAGI).

(b) MET included – all other trials are included in the MET analysis.

(c) Not all trials assessed as unreleased at the single site reporting level are excluded from the MET analysis. MET analysis can overcome some of the issues with single site reporting.

(3) Trial outcome decisions will be made by the NVT Manager, and outcomes will be communicated to Participating Breeders and relevant Trial Service Providers at the earliest, appropriate opportunity.

(4) Assessing trials for release after high disease pressure season.

(a) Trial results will be released and included in the MET analysis if;
    (i) Two or more (≥2) fungicide applications have been applied at an appropriate timing to manage the goal post cultivars.
    (ii) Less than two (<2) fungicides have been applied where appropriate e.g. low rainfall, no disease pressure environments if seasonal district practice did not require fungicide.

(b) Trial results will be quarantined and excluded from the MET analysis if;
    (i) The above conditions are met, but;
    (ii) Cultivars rated MRMS or above have significant yield loss (greater than 50%) determined by in-trial observations and post-harvest analysis.

(5) Trial stakeholders are invited to provide feedback regarding single site trial outcomes, MET datasets and analysis methodology, before analysis and publication. Final decisions and outcomes are at the discretion of the NVT Manager. The review periods include:

(a) Single site analysis review period - five (5) working days beginning from the date of analysis before single site results are published.

(b) MET preliminary review period - two (2) working days before the MET analysis begins.

(c) MET review period - five (5) working days from the date MET analysis results and report are circulated before the MET results are published.

8.7 Trial Service Provider's End of Season Report

(1) An 'end of season' summary report is required from the Trial Service Provider outlining delivery against requirements and including any otherwise unrecorded issues.

(2) The Trial Service Provider's end of season report must be provided to the NVT Manager in MS Excel or MS Word format prior to the final season payment.

(3) The document should report on all compromised trials. The column headings should be:

Location	Trial ID.	Sow Date	Harvest date	General Comments

(4) 'General Comments' should include a summary of all environmental and management issues occurring, including:

(a) **Environmental factors affecting trial** – Outline any environmental factors that impacted successful delivery or impacted trial quality (cause, extent of impact).

(b) **Response to environmental factors** - Actions taken to salvage trials, actions taken to avoid similar issues occurring in future.

(c) **Management factors affecting trial** – Outline any management factors that impacted successful delivery or impacted trial quality (cause, extent of impact).

(d) **Response to management factors** - Actions taken to salvage trials, actions taken to mitigate future occurrence.

8.8 Reporting to NVT Manager

(1) Trial Service Providers are required to notify the NVT Manager of any issue affecting potential trial rigour or trial viability within 24 hours, and as per APPENDIX A – DATA ENTRY, MILESTONES, KPI.

(2) Trial Service Providers are to immediately report to the NVT Manager by phone and email of any issue that arises that could potentially impact or implicate on GRDC's reputation.

8.9 Milestone Reporting

(1) All milestones are to be completed by their due date specified in APPENDIX A – DATA ENTRY, MILESTONES, KPI.

(2) If any milestone requirement cannot be complied with then the NVT Manager is to be notified in writing prior to the specified milestone completion timeframe.

(3) The correspondence must clearly identify non-compliance and the reason for the non-compliance.

8.10 Quality Assurance

(1) All Trial Service Providers must have appropriate Standard Operating Procedures and/or Quality Assurance procedures, to ensure the outcomes established in this document.

(2) All staff must be adequately trained to accurately achieve these outcomes before they are permitted to undertake any activity on NVT trials.

8.11 Trial Service Providers Key Performance Indicators

(1) The assessment criteria, with minimum service standards are described in APPENDIX A – DATA ENTRY, MILESTONES, KPI.

8.12 Data Terms of Use

(1) All data is the ownership of GRDC and only data that is published by GRDC can be used, replicated, published, supplied or communicated to anyone other than GRDC unless requested by GRDC with an express written request.

8.13 Data and Resource Use Agreement for External Researchers

(1) It is recognised that there may be opportunities to deliver greater returns from the GRDC NVT sites, data, and other resources, whilst still delivering against the core GRDC NVT objectives. E.g., NVT trials could be used for the development and validation of non-destructive measurements of phenotypic reactions.

(2) The use of any NVT trials or data will require written approval from GRDC. Researchers should contact the NVT Manager with requests in line with the *NVT Resource Sharing Key Requirements*. Approvals will be granted on a case-by-case basis.

9 APPENDIX A – DATA ENTRY, MILESTONES, KPI

A.1 TSP Data Entry Requirements

Activity	Date for completion (uploaded to NVT database or provided to NVT)
Chain of Custody documents	April 30
Material Transfer Agreement documents	April 30
Predicta B results	April 30 – Predicta B barcodes uploaded to NVT database (results provided directly to GRDC by the testing laboratory)
Sowing date	48 hours after sowing
Effective germination rain date	7 days after rain event
GPS coordinates	7 days after sowing
KML file	7 days after sowing
Trial maps (mud-maps)	Canola – May 31 Other crops – June 15
Trial Rating (1-5 scale)	July 1; (post-sowing) August 15 October 1 Nov 15 - Jan 15; (at harvest)
Paddock history	July 31
Seeding rate	July 31
Soil test results	July 31
Soil characterisation	July 31
Missing plots, and sowing/layout changes	July 31
Trial management applications (fertiliser, herbicide, fungicide, insecticide, irrigation)	July 31
Trial Co-operator Agreement declaration	July 31
Trial and plot measurements	10 days after measurement taken; or within 7 days of harvest; or at the time the trial is flagged as “Ready for Biometrician Analysis”. (whichever is earliest)
Temperature and/or weather station data	7 days after harvest (or at the time the trial is sent to biometricians for analysis)
Rainfall Data Jan- Oct	December 31
Rainfall data Oct - Dec	January 31
Irrigation and supplementary watering	January 31 or 1 month after harvest whichever is earliest
Trial management applications (fertiliser, herbicide, fungicide, insecticide)	January 31 or 1 month after harvest whichever is earliest
Harvest date	48 hours after harvest
Harvest data	7 days after harvest
Grain quality data	60 days after harvest, or by Jan 31 (whichever is earliest)
Notification of compromised vigour of trial or need to abandon site	24 hours
Notification of potential compromised GRDC reputation	24 hours
End of season report	60 days after harvest or by 31 March (whichever is earliest)

A.2 Milestones

Milestone	Description	Recurring
1	(a) Trials designed, and sites prepared for sowing for early sown wheat by April 7th. (b) Trials designed, and sites prepared for sowing for main season crops (relevant by region) by April 21st. (c) NVT MTAs executed in accordance with the agreement. (d) NVT seed allocation received, and all seed transfer documentation finalised with copies sent to the NVT manager.	30 April 25% Payment
2	(a) All trials planted as per district grower practice and within the NVT germination window for each crop within each region; or as directed by the NVT Manager. * (b) Sowing date and GPS coordinates to be entered on the NVT database within 7 days of trial sowing date. (c) Variations to trial randomisations reported to the NVT Manager and modified in the NVT database ASAP after sowing each year and no later than 31 July each year. (d) Site details, soil moisture, soil characterisation (test results), target seeding rate and sowing depth and paddock history details entered on the NVT database for each trial site in accordance with the NVT Protocols. (e) Predicta B sampling completed for each trial site in accordance with the Predicta B sampling protocols, and samples mailed to the Predicta B laboratory at SARDI. (f) Fertiliser usage, and chemical applications to date, entered onto the NVT database. (g) Confirmation of all co-operator acceptance of trials.	31 July (*specific germination windows provided in the NVT Protocols) 25% Payment
3	(e) Contract representative to attend the NVT Management Committee meeting (held between July and September each year). (f) Provision of opportunistic observations in relation to agronomic traits, i.e. plant height, Growth Stage, etc, to the NVT database. (g) Provision of fungicide application data, and other fertiliser and chemical treatments to date to the NVT database. (h) Covariate and variate measurements taken and reported into NVT database as per the NVT protocols.	30 November 10% Payment

4	(i)	All trials harvested in their optimal window.	31 December (*specific harvest timing provided in the NVT Protocols) 25% Payment
	(j)	All yield data entered onto the NVT database for each trial within 7 days of harvest date.	
	(k)	All covariate measurements entered onto the NVT database 10 days after measurement taken; or within 7 days of harvest; or at the time the trial is flagged as 'Ready for Biometrician Analysis'. (whichever is earliest)	
	(l)	Weather logging data loaded onto the NVT database within 7 days of harvest date (targeting the same date harvest data is entered).	
	(m)	Laboratory equipment used for conducting grain quality analysis is calibrated to industry standards outlined in the NVT protocols. Evidence of calibration is provided to GRDC.	
5	(n)	Grain quality measurements taken in accordance with the NVT protocols and submitted to the NVT database.	28th February 15% Payment
	(o)	End of season report submitted to NVT Manager outlining delivery against the required service levels.	

A.3 Key Performance Indicators

No.	Assessment Criteria	Expected standard
1.	Trials are sown at Sites as allocated by the NVT Manager	Trials are sown within 25 kms of the allocated Site name (unless otherwise approved by the NVT Manager).
2.	Trials are sown at correct time as directed by the NVT Manager	Trials sown in the appropriate germination window (as per NVT Protocols).
3.	Plot one identification	Plot one, Range 1 clearly identifies the crop and Trial series.
4.	QR codes	QR codes located at Trial Sites.
5.	Use of Trial Co-operator Agreement	Trial Manager has provided a declaration that trial co-operator agreements are in place, in line with the requirements of the NVT Protocols. Upon request of the NVT Manager, the Trial Service Provider is able to provide a copy of individual Trial Co-operator Agreements, as needed.
6.	The GRDC investment in NVT is acknowledged and noticeable at all NVT Sites	Trials are readily visible from the closest road (including formed and stable in-farm access routes) unless negotiated otherwise with the NVT Manager prior to sowing. Visible GRDC/NVT signage is displayed.
7.	Site selection and uniformity	Adequate Site selection in line with NVT Protocols.
8.	Trial layout within paddock	Trial appropriately positioned within paddock to align with Site constraints, including alignment of plot pathways with grower wheel tracks, and in line with the requirements of the NVT Protocols.
9.	Trials are established as per target plants/m2	Trials have a uniform plant establishment in accordance with the nominated plant density numbers.
10.	Trials with uniform plot spacings	Trials with all plots having a uniform plot spacing.
11.	Trials with uniform number of rows per plot NOTE: Dry sown trials affected by lack of rain are discounted.	All plots in a Trial with the same number of rows.
12.	Disease management of Trials	Managed in line with minimum requirements as per NVT Protocols.
13.	Nutrition management of Trials	Managed in line with minimum requirements as per NVT Protocols.
14.	Pest management of Trials	Managed in line with minimum requirements as per NVT Protocols.
15.	Weed management of Trials	Managed in line with minimum requirements as per NVT Protocols.
16.	Weed management of Trial pathways and headlands	Trial pathways or headlands to be effectively management for weeds.
17.	Visitor access to Sites facilitated	Access track is required if more than 100m from the access gate/road. Visitors can easily find the trial of interest at a multi-trial Site. Trials are readily visible from the closest road (including formed and stable in-farm access routes) unless negotiated otherwise with the NVT manager prior to sowing. Visible GRDC/NVT signage is displayed.

18.	Trial pathway management	Trial pathways are sprayed/slashed, are straight, and harvestable plot lengths are accurately measured and are of uniform length in line with the requirements of the NVT Protocols.
19.	Trial plot lengths	Harvestable plot lengths are measured, and data entered in to the NVT database in line with the requirements of the NVT Protocols.
20.	Canola Trials are desiccated or windrowed	Canola Trials are desiccated or windrowed in accordance with agreed benchmark maturity cultivars in line with the requirements of the NVT Protocols.
21.	Required Soil test data captured and uploaded for each trial as per the NVT protocols	Soil test and Predicta B results uploaded to the NVT database in line with the requirements of the NVT Protocols.
22.	Temperature data provided for all Sites captured and uploaded for each trial	Tiny tag temperature data is provided for all sites in line with the requirements of the NVT Protocols.
23.	Flowering growth stage data is collected as per the NVT Protocols	Days to flowering/heading data (50% flowering/heading) to be recorded and uploaded to the NVT database in line with the requirements of the NVT Protocols. Growth stage data to be recorded and uploaded to the NVT database in line with the requirements of the NVT Protocols
24.	Trial harvest direction is uniform	Trials are to be harvested in the one direction, not serpentine or circular.
25.	Trial harvest management	Harvest is conducted to ensure all cultivars are adequately harvested in line with the requirements of the NVT Protocols.
26.	Trial abandonment indication	Trials to be considered for abandonment due to quality control concerns are immediately flagged to the NVT Manager in line with the requirements of the NVT Protocols.
27.	Self-reporting trial issues impacting trial outcomes, e.g. establishment, pests, chemical damage, harvest issues	Trial Service Provider notifies NVT of compromised trials that have the potential to result in invalid cultivar comparisons, trial abandonment or reputational risk to GRDC in line with the requirements of the NVT Protocols.
28	Management of abandoned Trials	Abandoned Trials managed in line with the requirements of the NVT Protocols.
29.	Data Entry Dates	Data is entered to the NVT database in line with the requirements of the NVT Protocols.
30.	Data Entry Completeness	Data is entered to the NVT database in line with the requirements of the NVT Protocols.
31.	Data Entry Quality	Data entered into the NVT database is accurate and free of errors.
32.	Engagement with NVT Advisory Committee (NAC) and NVT Management Committee	Attendance at NVT Advisory Committee and NVT Management Committee.
33.	Grain quality Data	Grain quality analysis conducted in line with the requirements of the NVT Protocols.
34.	Grain Quality Laboratory equipment serviced and calibrated annually.	Grain quality laboratory equipment serviced and calibrated annually in line with the requirements of the NVT Protocols.
35.	Trial is successfully completed in accordance with all NVT Protocols	All critical Trial Data is delivered in accordance with Service standards and as per NVT Protocols.

36.	Covariate Capture – Trial Service Provider identified	Trial Service Provider identifies and captures relevant covariates and enters into database for inclusion in the analysis. Covariates are captured accurately.
37.	Covariate Capture – NVT requested	Where directed by the NVT Manager, the Trial Service Provider captures relevant covariates and enters into database for inclusion in the analysis. Covariates are captured accurately.

10 APPENDIX B – NVT NOMINATION AND SEED DELIVERY DATES

Crop and Series	MCA Expression of Interest Deadline*	Commercialisation Deadline**	Nominations Open	Nominations Close	Nominations Finalised (confirmation to dispatch seed)	TSP Seed Delivery Deadline***	Research Seed Multiplication Delivery Deadline****	First Potential trial sown
Wheat – long, early season, early break	N/A	1-Feb	20-Feb	1-Mar	7-Mar	20-Mar	1-Apr	1-Apr
Wheat - main	N/A	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	22-Apr
Wheat - durum	31-Oct	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	22-Apr
Barley	N/A	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	15-Apr
Oat	31-Oct	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	22-Apr
Canola	N/A	1-Feb	20-Feb	1-Mar	7-Mar	25-Mar	N/A	7-Apr
Chickpea	31-Oct	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	22-Apr
Faba Bean	31-Oct	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	15-Apr
Field Pea	31-Oct	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	1-May
Lentil	31-Oct	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	1-May
Lupin	31-Oct	1-Feb	20-Feb	1-Mar	7-Mar	1-Apr	1-Apr	15-Apr

* To be eligible for MCAs in the upcoming season.
** To be eligible for Commercialisation Credits and GRDC-funded testing in the upcoming season.
*** TSP has right to sow without cultivars if seed is delivered late.
**** Breeders are required to supply Seed of newly commercialised open pollinated cultivars to the NVT Research Seed Multiplication Providers at the quantity requested by the Provider.

11 APPENDIX C – CHAIN OF CUSTODY FORM

NVT CHAIN OF CUSTODY FORM

Commercial Durum Lines

COC Con Note/Tracking #	
Freight/Courier Co:	

TRANSFER FROM		**TRANSFER TO**	
Organisation Name:	**0**	NVT Service Provider :	
Seed Dispatch Address:	**0**	Contact Person:	
Suburb:	**0**	Seed Receival Address:	
State/Territory:	**0**	Address 1	
Postal Code:	**0**	Address 2	
Contact Person(s):	**0**	Phone#:	Email address:
Phone#: 0	Email address 0	NVT Contact Person(s):	Ben O'Connor ben.oconnor@grdc.com.au

Prepared by:	date	time	Received by:	date	time
Sent by:	date	time	Authorised Service Provider Representative:	date	time
Authorised Company Representative:	date	time	NVT Manager Confirmation:	date	time

Comments/Irregularities observed relevant to NVT Trials by Receiver:

SAMPLE INFORMATION								SAMPLE QUALITY ASSURANCE (Attach relevant documentation)			
Seed Package Identifier	**Crop Species**	**Crop Type (eg Clearfield)**	**Germplasm Identifier**	**GMO (Yes/No)**	**OGTR DIR#**	**Phytosanitary Compliance with recipient state law**	**Seed Purity Declaration (presence of weeds)**	**Germination (%)**	**1000 Seed Weight**	**Seed Vol (kg)**	**NOTES**

NVT Online www.nvtonline.com.au grdc.com.au

NVT Material Transfer Agreement – Key Terms

The following terms must be incorporated into any Material Transfer Agreement used for the purposes of the NVT program. Breeders and Service Providers are able to agree on additional terms or use their own templates on condition that the terms specified below are incorporated and not contradicted.

1.1 Definitions

Breeder means the entity that provides the Material.

Chain of Custody Form means the Chain of Custody Form included in the NVT Protocols.

Material means the Material provided to the Service Provider and specified in the Chain of Custody Form.

NVT means National Variety Trials being the national program of evaluation trials for commercially bred crops administered by GRDC.

NVT Manager means the person nominated by the GRDC from time to time as being responsible for overall management of NVT.

Protocols means the guidelines and protocols for the management of NVT as published on the GRDC web site www.grdc.com.au from time to time.

Service Provider means the entity that receives the Materials for evaluation.

Third party researcher means research organisations, Government agencies and departments.

1.2 The Breeder warrants:

(1) it is the owner of the Material or has the necessary authority to provide the Material to the Service Provider;

(2) it will provide the Material to the Service Provider as specified in the Chain of Custody Form;

(3) the Material has been accepted into the NVT in accordance with the Protocols.

1.3 The Service Provider must:

(1) issue a receipt to the Breeder, detailing the Material received from the Breeder, within a reasonable time period after receiving the Material;

(2) only use the Material for the purposes of evaluation undertaken in relation to NVT, where directed by GRDC provide the Material to Third party researchers to undertake research approved by the NVT Manager, and otherwise use the Material in accordance with the Protocols;

(3) treat reports and other data relating to the evaluation as confidential and only provide such reports and data to the NVT Manager;

(4) store and maintain the Material at its own expense from the date of transfer;

(5) comply with all applicable laws, regulations and codes of conduct relating to use of the Material;

(6) ensure the Material is covered under its normal insurance arrangements;

(7) destroy or return the Material, and seed progeny of the Material, as directed by the Breeder, in accordance with the Protocols.

1.4 The Service Provider acknowledges that:

(1) this Agreement does not transfer any intellectual property or ownership rights in the Material, or its genetic parts or components; and

(2) it will be responsible for the Material received from the Breeder and will ensure the Material is managed in accordance with the Protocols.

1.5 The Parties acknowledge that:

(1) The Service Provider will not be liable for any claims or losses to the extent they are caused by the Breeder's negligence or breach of its warranties.

(2) The Breeder will not be liable for any claims or losses to the extent they are caused by the Service Provider's negligence, breach of the Material Transfer Agreement or breach of the Protocols.

13 APPENDIX E – NVT TRIAL AUDITING

E.1 Audit Process

(1) Every trial will be audited at least once by the GRDC NVT regional manager or a nominated contracted expert on behalf of GRDC. All auditors undertake the audits in the strictest of independence. The findings of the audit will determine inclusion or exclusion of a trial to the data set, and additionally inform milestone achievement and KPI delivery of Trial Service Providers.

E.2 NVT Site Audit Sheet

The site audit sheet is to assess trial accessibility, operational management and factors that will affect the quality of the trial. Circle a value for each criterion, where **9 = very good** and **1 = very poor**.

Assessor: _____ **Date:** _____

Crop/Trial ID: _____ **Trial Location:** _____

Site Selection

a) Appropriate signage at site TRUE / FALSE
NVT signage displayed at roadside or entry point

b) GPS coordinates supplied, accurate TRUE / FALSE
GPS coordinates accurate to reach trial site

c) Site Location 9 8 7 6 5 4 3 2 1 NA
Trials are easily accessible and not too far from main/access road. Access not limited by 4WD only, or waterway crossing, etc.
Trials are sown within 25km of specified town/location.

d) Site Selection 9 8 7 6 5 4 3 2 1 NA
Trials are not inhibited by site selection issues e.g. sown near tree line, sown on headland, uneven soil type or topography

e) Plot one identified TRUE / FALSE
White peg or similar in plot one

f) Tinytag in place TRUE / FALSE
Tinytag/Weather station in place with weather shield

Sowing

a) Timing 9 8 7 6 5 4 3 2 1 NA
Trials sown within appropriate germination window or within 10 days of farmer/district crops

b) Driving Accuracy 9 8 7 6 5 4 3 2 1 NA
Trial has uniform plot spacing between rows, i.e. not too close together of far apart. Trial pathways are straight

c) Missing Rows 9 8 7 6 5 4 3 2 1 NA
All plots have same number of rows planted, with no blocked hoses.
*Provide details of number of reps/plots and number of rows missing plants in General Comments.

d) Tripping 9 8 7 6 5 4 3 2 1 NA
Evenness of tripping across trial. Issues where seed runs into next plot or where issue cannot be corrected with plot trimming

e) Emergence 9 8 7 6 5 4 3 2 1 NA
Even emergence, uniform establishment across trial and within plots, appropriate plant density. Trials are established as per target plants/m^2

f) Sowing Errors 9 8 7 6 5 4 3 2 1 NA
Varieties in trial match those shown in Plot Layout field plan. Laminated Plot Layout/Field Plan provided at trial site

Management

a) Disease Control 9 8 7 6 5 4 3 2 1 NA
Trials are free of diseases that can be actively managed i.e. stripe rust in wheat, leaf rust in barley, etc.

b) Pest Control 9 8 7 6 5 4 3 2 1 NA
Trials are free of pests that can be actively managed i.e. snails and slugs, aphids, mice, etc.

c) Weed Control 9 8 7 6 5 4 3 2 1 NA
Trials are weed free, relative to the farmers surrounding crop, headlands are also managed appropriately

d) Plot Trimming 9 8 7 6 5 4 3 2 1 NA
Either slashed or sprayed. Issues may be not straight paths (uneven plot lengths), spray drift into plots.

e) Crop Health 9 8 7 6 5 4 3 2 1 NA
Trial is in good condition, adequate nutrients applied, healthy colour, height, vigour, etc.

f) Site Cleanup 9 8 7 6 5 4 3 2 1 NA
Trial site has been left in clean, tidy condition. Weeds minimised in surrounding areas

General Comments:

Please return via email to a GRDC/NVT staff member or l

14 APPENDIX F – STANDARD OPERATING PROCEDURES

F.1 Temperature Data Loggers

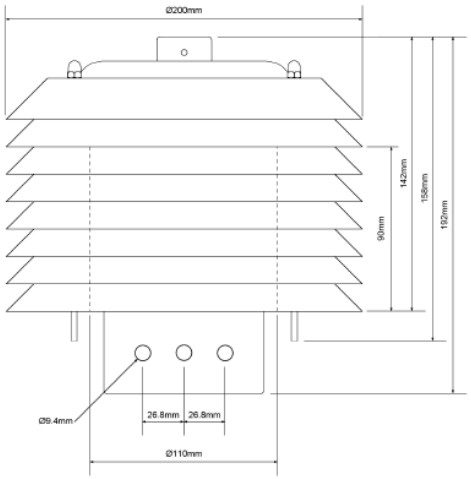
(1) Aim: To obtain minimum and maximum temperature data at NVT trial sites to assist in assessing heat stress.

Unit: Tinytag Data Logger, Model # TGP-4017

(2) A Stevenson type screen is required to protect temperature loggers and must be supplied by the Trial Service Provider. The ACS-5050 Stevenson Type Screen is designed to protect data loggers from adverse conditions when used in outdoor monitoring applications. The screen protects units from radiant heat (direct sunlight) and precipitation, whilst allowing air to circulate freely.

(3) Temperature loggers are to be mounted within a trial at a standard height of 1.2 meter to give uniformity over all NVT sites. The stake must be of robust construction to ensure it can be supported firmly in the soil to avoid wind causing damage to loggers and mounts, maintaining an upright position for the duration of the season.

(4) Loggers should be set to take a temperature reading at 15-minute intervals when in the field. Temperature data must be captured from day of sowing to harvest date. Data should be retrieved, saved, and then cleared off the temperature logger every season. All temperature loggers need to be clearly labelled with the site name before being placed in the field.



F.2 Predicta B Sampling

Winter rainfall cropping regions

The following guidelines have been prepared by the Predicta B laboratory at SARDI to assist researchers collecting soil samples from the Southern Region, Western Region and Northern Region south of Dubbo.

Materials

NVT Barcoded sample bags supplied by SARDI

PREDICTA B approved soil corer **10 mm X 100 mm**, can be obtained from Russell.burns@sa.gov.au

Clean bucket

Esky, no ice

Express post or courier samples to;

Attn Russell Burns, SARDI Plant Research Centre, 2B Hartley Grove, URRBRAE SA 5064

Site characterisation

(1) Ensure corer is clean before use. Re-clean before moving to a new site.

(2) Use PREDICTA B Research soil bags assigned to the NVT program; the barcode is linked to this activity.

(3) Make sure you record the barcode and site details.

(4) Select **15** locations on a grid to represent the site (Figure 1), and at each location collect **3** cores targeting rows of previous crop if visible (Figure 2). The site sample will comprise **45** cores.

(5) Ensure each core is full before adding to the bucket; discard part-filled cores and repeat.

(6) At each location add **1** piece of cereal stubble **5** cm long from the base of the plant; stubble may be 1 to 4 years old

(7) Retain all material collected in the core; do NOT clear soil surface before coring.

(8) Pool the 45 cores and 15 pieces of stubble in the same bucket, then transfer to the barcoded sample bag; if sampling instructions are followed the sample dry weight should be around 500g (without sub-sampling).

(9) Store samples in an empty esky (no ice) to protect from direct sunlight.

(10) Dispatch samples to SARDI as soon as possible, if short term storage necessary, store at 5°C, do not freeze.

Plot sampling

If sampling individual plots, refer to sampling protocols on PIRSA website, https://www.pir.sa.gov.au/research/services/molecular_diagnostics/predicta_research. Larger diameter 14 mm X 100 mm soil corer can be used to collect 20 cores per plot and can be obtained from Russell.burns@sa.gov.au

Characterising a trial site

Select the trial site and identify 15 locations on a grid to represent the site (Figure 1). At each of the 15 locations collect 3 cores (Figure 2).

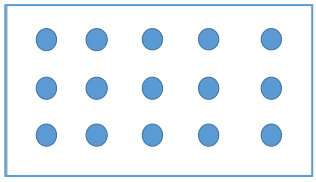


Figure 1.

Choose 15 locations on a grid that best represents designated trial site; example displayed for a rectangle site.

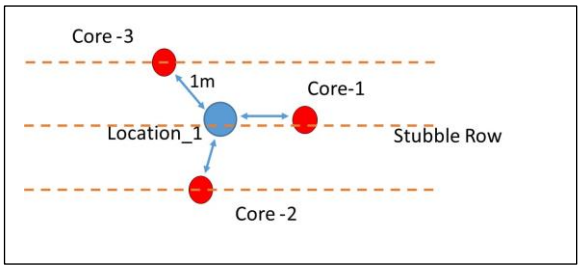


Figure 2.

Take three cores at each grid location; locate each core about 1 meter from the central location and target previous rows if visible.

Summer rainfall cropping regions

The following guidelines have been prepared by the Predicta B laboratory at SARDI to assist researchers collecting samples from the Northern Region (north of Dubbo) prior to sowing a pulse crop in order to obtain a consistent measure of disease risk.

Materials

Barcoded sample bags supplied by SARDI in 2020

PREDICTA B approved soil corer **10 mm X 150 mm**; Foot stomper or AccuCore contact Russell.burns@sa.gov.au

Clean bucket

Esky, no ice

Express post or courier samples to;

Attn Russell Burns, SARDI Plant Research Centre, 2B Hartley Grove, URRBRAE SA 5064

Site characterisation

(1) Ensure corer is clean before use. Re-clean before moving to a new site.

(2) Use PREDICTA Research soil bags assigned to the NVT program in 2020; the barcode is linked to this activity.

(3) Make sure you record the barcode and site details.

(4) Select **15** locations on a grid to represent the site (Figure 1), and at each location collect **2** cores targeting rows of previous crop if visible (Figure 2). The total site sample will comprise **30** cores.

(5) Ensure each core is full before adding to the bucket; discard part-filled cores and repeat.

(6) At each location add **1** piece of cereal stubble **5**cm long from the base of the plant; stubble may be 1 to 4 years old

(7) Retain all material collected in the core; do NOT clear soil surface before coring.

(8) Pool the 30 cores and 15 pieces of stubble in the same bucket, then transfer to the barcoded sample bag; if sampling instructions are followed the sample dry weight should be around 500g (without sub-sampling).

(9) Store samples in an empty esky (no ice) to protect from direct sunlight.

(10) Dispatch samples to SARDI as soon as possible, if short term storage necessary, store at 5°C, do not freeze.

Plot sampling

If sampling individual plots, refer to sampling protocols on PIRSA website, https://www.pir.sa.gov.au/research/services/molecular_diagnostics/predicta_research . Larger diameter AccuCore 12 mm X 150 mm cores can be used to collect 20 cores per plot; can be obtained from Russell.burns@sa.gov.au.

Characterising a trial site

Select the trial site and identify **15** locations on a grid to represent the site (Figure 1). At each of the **15** locations collect **2** cores (Figure 2).

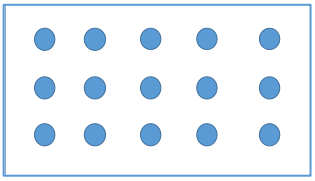


Figure 1.

Choose 15 locations on a grid that best represents designated trial site; example displayed for a rectangle site.

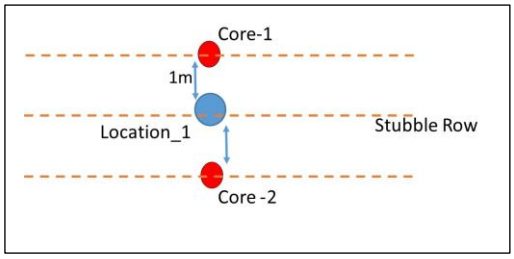


Figure 2.

Take two cores at each grid location; locate each core about 1 meter from the central location and target previous rows if visible.

F.3 Soil Testing

(1) The site must have a uniform soil depth and texture and representative soil samples must be taken.

(2) Follow Fertcare guidelines for soil testing.

(a) A guide for fit for purpose soil sampling produced by Fertcare provides all the necessary detail on creating a representative sample for analysis.

(3) A soil test is required at every site

(4) The soil testing depths required per region are:

NORTH & SOUTH & WEST
0- 10cm,
10-60cm,

(5) Tests required

(a) Top 10cm
- (i) Colour and texture
- (ii) Gravel (%)
- (iii) Ammonium N, Nitrate N
  Phosphorus (Colwell)
  Phosphorus Buffer Index (PBI)
- (iv) Potassium (Colwell)
- (v) Exchangeable Cations (Ca, K, Mg, Na)
- (vi) Exchangeable Aluminium
- (vii) Sulphur (KCl 40^{O}C)
- (viii) pH (1:5 water) & pH (1:5 CaCl2)
- (ix) Electrical Conductivity (1:5 water)
- (x) Organic Carbon (Walkley & Black)
- (xi) Boron

(b) Deep soil 10-60cm
- (i) Texture and Colour
- (ii) Gravel (%)
- (iii) Ammonium N, Nitrate N
- (iv) Exchangeable cations (Ca, K, Mg, Na)
- (v) Exchangeable Aluminium
- (vi) Sulphur (KCl 40^{O}C)
- (vii) pH (1:5 water) & pH (1:5 CaCl2)
- (viii) Electrical Conductivity (1:5 water)
- (ix) Boron

F.4 Trial Measurements Table

Activity	Description	Measurement unit	Requirement	Potential Covariate? (Y or N)
Bird or animal damage (pre-harvest)	A visual assessment is to be made based on total plot area of those plants that have been affected by vermin damage. Timing must be taken just prior to harvest.	% of total plot	As required	Y
Chemical damage	A visual assessment is to be made based on total plot area suffering from chemical damage that will likely affect yield 100%= is total expected yield loss.	% severity	As Required	Y
Disease	A visual assessment is to be made based on total plot area suffering from the disease that will affect yield Capture and report disease incidence type. If required, send to relevant approved pathology for accurate diagnostics via plating or pathology. *Note all sites should be managed as per trial management in the NVT 2020 document noting that a trial should not be compromised by disease damage 100%= is total expected yield loss.	% severity Disease type	As Required	Y
Establishment	A visual assessment is to be made based on what percentage of the target total plant population has been achieved Use maximum internal % of 5 Timing of this measurement prior to tillering.	% of target population	Every trial	Y
Establishment plant count	Physically count 3 x 1m randomly selected rows within each individual plot Convert plants per metre count based on row spacing into number of plants per square metre.	Number/square metre	As requested by NVT Manager when trial issue	Y
Grain Quality Impurities	A visual assessment is to be made based on the percentage of impurities that remain in the grain quality sample. For example, % of cracked grain in the screenings sample.	% of grain quality sample	As required – if any seasonal or management factors have influenced the trial results.	N

Activity	Description	Measurement unit	Requirement	Potential Covariate? (Y or N)
Growth stage	Take a single Zadoks or growth stage rating for each plot in the period from the beginning of flowering up until the start of early dough in cereals or beginning of early pod fill in pulses/canola of the quickest goalpost cultivar.	Zadoks for cereals, BBCH decimal for other crops	Every trial	N
Harvest desiccation	If a trial is to be desiccated, it is to be done at the appropriate time and in accordance with the chemical manufacturers' instructions. The correct time for desiccation is when 70–80% of seeds have changed colour in middle pods. The crop will be ready to harvest within 4–7 days after the desiccant is applied, depending on the size and density of the crop.			N
Harvest Direction	Trials are to be harvested in the same direction, not in a serpentine or 'up and back' direction.			N
Harvest Length	The longest two sides of a plot (that must be equal) and must be measured with a GPS or hand measuring tape and document into the NVT database.	Metres	Every trial	N
Harvest Width	This will be calculated by the measurement between plot centres, and the whole plot is harvested.	Metres	Every trial	N
Head loss	A visual assessment is to be made based upon the total amount of heads lost to the ground This measurement is to be taken at harvest. 100% = no heads being left on plants for harvest.	% of affected heads per plot	As required	Y
Height	Choose a representative area of the plot to take the height measurement. With a measuring device (ruler, tape measure, infrared tool, etc.) capture the average plant height. The height measurement will be taken between full head emergence and harvest.	cm	Opportunistic	N
Insect damage	A visual assessment is to be made based on total plot area suffering from the pest that will affect yield.	% severity Insect type	As Required	Y

Activity	Description	Measurement unit	Requirement	Potential Covariate? (Y or N)
	Capture and report insect type. *Note all sites should be managed as per trial management in the NVT 2020 document noting that a trial should not be compromised by pest damage 100%= is total expected yield loss.			
Lodging score	If any lodging has occurred at the site a rating must be taken of all plots. Provide a % score of plants in the plot that have lodged (not fully erect) and % score of severity of lodging. 100% of plants lodged = every plant lodged 100% severity = lodged plants lying flat on ground 50% severity = lodged plants are at 45 degree angle Timing to be done at harvest.	% of plants of the total plot that have lodged. % severity	As required	N
Missing Row length Per Plot	Where part or all of any row in a plot is missing due to seeder malfunction or no emergence, measure the length of the missing row, or rows added together.	Metres	As Required	Y
Number of rows in a plot	Enter into the NVT database simply the number of rows in the width of the plot (as row spacings may be different between crops).	Number	Every trial	N
Other Trial Measurements	Detail what is being measured in Comments 100%= is total expected yield loss.	% plot affected or severity		
Plot integrity Capturing Patchiness & uniformity	A visual assessment is to be made based on total plot area. 100%= no factors have affected the plot other than the expression of genetics.	% area of totally effective plot	As Required	Y
Rainfall	Report into the NVT Database as a monthly rainfall measurement. Ideally the nearby growers rain gauge should be used to collect monthly rainfall and proximity from the actual site noted in kilometres from trial in a straight line. As a last resort the local BOM records can be used.	Monthly mm	Every trial	N

Activity	Description	Measurement unit	Requirement	Potential Covariate? (Y or N)
Shattering score	Take a visual assessment of how much grain has fallen out of the heads prior to harvest and not able to be captured at harvest. 100% = all grain in the plot is on the ground Data to be captured at harvest.	% of total grain loss onto the ground for the area of plot	As Required	Y
Waterlogging	A visual assessment is to be made based on total plants within plot area suffering from waterlogging that may affect yield Measurement to be taken during or immediately after waterlogging event. 100%= is total expected yield loss.	% severity	As Required	Y
Weed contamination	A visual assessment is to be made based on total impact of weed presence has had on possible yield potential of the total plot Capture and report weed type *Note all sites should be managed as per trial management in the NVT 2020 document noting that a trial should not be compromised by weed damage 100%= is total expected yield loss.	% severity	As Required	Y
Yield of trial	Harvest and weigh the total area of the nominated plot size. Report the weight of the plot. Harvested grain from each plot must be separately and accurately weighed, preferably on site, but if off site then a foolproof system of bagging and labelling must be instituted. Data pertaining to harvesting must be uploaded to the NVT database by the NVT Service Provider immediately following and no longer than 7 days following harvest date.	Kg per plot	Every trial	N

15 APPENDIX G – GRAIN QUALITY ASSESSMENTS AND SOPS

G.1 Sampling Notes

(1) Grain quality assessment within NVT will be largely based on assessment relative to trade/market specifications, as developed and published by Grain Trade Australia (GTA).

(2) Prior to grain quality assessment, samples are to be cleaned (aspirated) without removal of whole grain i.e. free of chaff, awns, cracked grain and other impurities. Barley is to be de-awned prior to testing.

(a) Remaining impurities must be measured and recorded in the NVT database (e.g. % of cracked grain in the screenings sample).

(3) Quality testing is to be conducted using equipment and procedures approved for the relevant trade specification by GTA. (Use of any alternatives equipment requires approval by the NVT manager).

G.2 Quality Analysis Testing Required for NVT

Crop	Protein	Oil	Moisture	Test Weight	Screenings	Retention	Grain Weight	Colour
Wheat	% “as is”		% “as is”	kg/hl	%<2.0mm sieve		g/1000 seeds	
Oat	% “as is”		% “as is”	kg/hl	%<2.0mm sieve		g/1000 seeds	
Barley	% “as is”		% “as is”	kg/hl	%<2.2mm sieve	%>2.5mm sieve	g/1000 seeds	Minolta L*
Canola	% “as is”	% “as is”	% “as is”					
Pulses							g/100 seeds	

G.3 Moisture Assessments

Wheat, Barley, Oats and Canola

(1) Definition

(a) This describes the NIR method for determination of moisture in cereal and canola grains.

(2) Apparatus

(a) NIR instrument approved by the National Measurement Institute for use for trade urposes under the conditions stipulated in:

(i) NMI V10 (Uniform Test Procedures for the Verification, Certification and In-Service Inspection of Protein Instruments for Grain.

(ii) NMI M8 (Pattern Approval Specifications for Protein Measuring Instruments for Grain.

(3) Procedure

(a) Sample will be cleaned (aspirated) without removal of whole grain i.e. free of chaff, awns, cracked grain and other impurities.

(b) Individual manufacturer instructions and procedures should be followed for operation and maintenance of NIR instruments used to determine grain moisture.

(c) Report result to the nearest 0.1% on 'as is' basis.

(4) References.

(a) NMI M 8 Pattern Approval Specifications for Protein Measuring Instruments for Grain.

(b) NMI V10 Uniform Test Procedures for the Verification, Certification and In-Service Inspection of Protein Instruments for Grain.

G.4 Protein Assessments

Wheat, Barley, Oats and Canola.

(1) Definition

(a) This describes the NIR method for determination of protein in cereal and canola grains.

(2) Apparatus

(a) NIR instrument approved by the National Measurement Institute for use for trade purposes under the conditions stipulated in:

(i) NMI V10 (Uniform Test Procedures for the Verification, Certification and In-Service Inspection of Protein Instruments for Grain.

(ii) NMI M8 (Pattern Approval Specifications for Protein Measuring Instruments for Grain.

(3) Procedure

(a) Sample will be cleaned (aspirated) without removal of whole grain i.e. free of chaff, awns, cracked grain and other impurities.

(b) Individual manufacturer instructions and procedures should be followed for operation and maintenance of NIR instruments used to determine Protein.

(c) Report result to the nearest 0.1% on 'as is' basis.

(4) References.

(a) NMI M 8 Pattern Approval Specifications for Protein Measuring Instruments for Grain.

(b) NMI V10 Uniform Test Procedures for the Verification, Certification and In-Service Inspection of Protein Instruments for Grain.

G.5 Oil Assessment of Canola

(1) Definition

(a) This describes the NIR method for determination of oil in canola.

(2) Apparatus

(a) NIR instrument approved by the National Measurement Institute for use for trade purposes under the conditions stipulated in:

(i) NMI V10 (Uniform Test Procedures for the Verification, Certification and In-Service Inspection of Protein Instruments for Grain.

(ii) NMI M8 (Pattern Approval Specifications for Protein Measuring Instruments for Grain.

(3) Procedure

(a) Sample will be cleaned (aspirated) without removal of whole grain i.e. free of chaff, cracked grain and other impurities.

(b) Individual manufacturer instructions and procedures should be followed for operation and maintenance of NIR instruments used to determine Oil.

(c) Report result to the nearest 0.1% on 'as is' basis.

G.6 Test Weight Assessment - Schopper Chondrometer

Schopper Chondrometer Reference Method

Wheat, Barley and Oats

(1) Definition

(a) This describes the chondrometer methods for determination of test weight (bushel weight/hectolitre weight) in cereal grains.

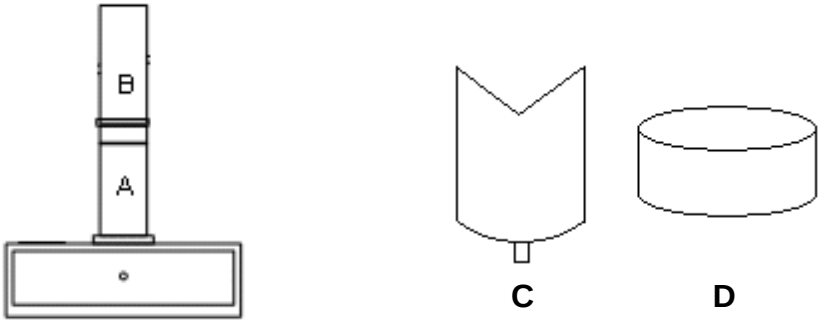
(2) Apparatus

(a) 1L Schopper Calibrated Chondrometer (cylinders)

(b) Plastic bowl

(c) Analytical balance accurate to at least 0.01g

(3) Procedure



(a) Secure bottom half of cylinder A to base plate on the chondrometer box.

(b) Ensure the sliding divider C is in the slot on cylinder A.

(c) Place weight D on top of sliding divider.

(d) Secure top half of cylinder B to the bottom half A.

(e) Ensure the slider is closed and pour grain in the cylinder at a constant rate until full to the top.

(f) Pull the sliding divider out and the weight will move down, drawing the grain down with it (you will hear it moving down).

(g) Once the weight D is at the bottom, replace the sliding divider back in the slot.

(h) Carefully tip the cylinder upside down and tip out all the grain remaining above the divider. Make sure to catch the weight D as it drops down.

(i) Place a plastic container on the electric balance and tare to read zero.

(j) Remove the blade from the chondrometer and tip the measured litre of grain into the plastic container and weigh.

(k) The weight is in grams and needs to be multiplied by 0.1 (divided by 10) to obtain a density in kg/hl.

(l) Always undertake analysis in duplicate and average results.

(m) Report the result to two decimal places.

(4) References

(a) Test Weight Per Bushel - AACC Method 55-10

(b) National Measurement Institute General Certificate of Approval No 4/10/0A

G.7 Test Weight Assessment - Franklin Mark II Chondrometer

Franklin Mark II Chondrometer Reference Method

(1) Definition

(a) This is the Franklin Mark II Chondrometer reference method to determine the density of cereal grains (otherwise known as the test weight) expressed as kilograms per hectolitre.

(2) Apparatus

(a) Franklin Mark 11 Chondrometer Drop Weight Trade Certified Chondrometer

(b) Pre Filling Cup

(3) Procedure

(a) Assemble the instrument together and place the calibration weight onto the top of the measuring cylinder.

(b) Place the measuring cylinder with weight on the hook at the end of the measuring beam.

(c) Calibrate the instrument by moving the sliding weight to the position corresponding to 40kg/hl on the measuring beam. The beam should balance equidistantly between the top and bottom of the square space at the other end of the beam.

(d) If the beam is not balanced, turn the calibration screw at the other end of the beam until the correct setting is achieved.

(e) Remove the calibration weight. The instrument is then calibrated.

(f) Insert the cutter bar into the bottom measuring cylinder and place the drop weight on top of the cutter bar.

(g) Fit the top filling cylinder onto the measuring cylinder.

(h) Fill the prefilling cup with grain.

(i) Steadily pour the grain from the prefilling cup with one hand into the top filling cylinder until it is full whilst holding both cylinders together.

(j) Withdraw the cutter bar in a single swift motion.

(k) Re-insert the cutter in the slit and push it through the grain with a single firm stroke.

(l) Remove the top filling cylinder from the measuring cylinder and discard the grain remaining above the cutter, while holding the cutter in place.

(m) Remove the cutter and suspend the measuring container from the measuring beam of the chondrometer.

(n) Adjust the sliding weight on the beam until the instrument is balanced.

(o) Read the test weight of the graduated balance beam at the point indicated by the sliding weight and record the result in kilograms per hectolitre.

(p) Report the result to two decimal places.

(4) References

(a) Test Weight Per Bushel - AACC Method 55-10

(b) ISO7971-2

(c) National Measurement Institute General Certificate of Approval No 4/10/0A

G.8 Test Weight Assessment - Kern 222 Chondrometer

Kern 222 Chondrometer Reference Method

(1) Definition

(a) This is the Kern 222 Trade Certified Chondrometer reference method to determine the density of cereal grains (otherwise known as the test weight) expressed as kilograms per hectolitre.

(2) Apparatus

(a) Kern 222 Trade Certified Chondrometer with valid Regulation 13 certificate.

(b) Analytical balance accurate to at least 0.01g

(3) Procedure

(a) Assemble the measuring container with the grain cutter inserted in the slit. Place the brass piston on top of the cutter blade. Connect the filling hopper securely on the top of the measuring container.

(b) Fill the pre-filling cup with grain.

(c) Steadily pour the grain from the pre-filling cup into the filling hopper until the filling hopper is full.

(d) Grasp the measuring container firmly with one hand and with the other hand withdraw the cutter in a single swift motion.

(e) Re-insert the grain cutter in the slit and push it through the grain with a single firm stroke.

(f) Remove the filling hopper from the measuring container and discard the grain remaining above the cutter, while holding the cutter in place.

(g) Remove the cutter and return the base bucket to an upright position and then withdraw the cutter.

(h) Place the Steel Bowl onto the balance and press the T (Tare) button, ensure Zeros are displayed.

(i) Pour the grain from the bucket into the steel bowl.

(j) The weight in grams will appear on the display of the balance. This figure is referred to as the weight in grams per litre.

(k) All numerical results are to be written down to two decimal places.

(4) References

(a) ISO Method 7971-2

(b) National Measurement Institute General Certificate of Approval No 4/10/0A

G.9 Screenings Assessment - Wheat, Oats and Sorghum

(1) Definition

(a) This is the reference method used to determine the percentage by weight of Screenings (%grain <2.0mm wide).

(2) Apparatus

(a) Agtator Shaking Device.

(b) Analytical balance accurate to at least 0.01g.

(c) 2.00mm Screen displaying annual certification sticker with the following specifications:

(d) 300mm diameter discs x 0.9mm stainless steel, perforated with 12.7mm x 2.00mm slots, hit and miss on ends with 4.77mm end bar and 2.0mm side bar.

(3) Procedure

(a) Obtain a certified half litre sample of grain.

(b) Place the 2.00mm screen on top of the Agtator platform with the slots aligned toward the front of the Agtator. Ensure the screen is clean, smooth, dry and free of grain residues in the slots.

(c) Ensure the Agtator is set to perform 40 to and fro movements over a period of approximately 68 seconds.

(d) Pour the half litre of grain in one movement onto the screen surface. No additional movement or spreading of the sample over the screen is to occur.

(e) Turn on the Agtator and allow it to run until the 40 movements have been completed.

(f) Gently remove the screen and pan from the Agtator and detach the screen from the pan.

(g) Calculate Screenings percentage - Weigh the contents of the pan on an appropriate top pan balance and calculate the percentage as follows:

$$\text{Screenings by wt (\%)} = \frac{\text{Screenings Weight X 100}}{\text{Total Weight}}$$

(h) Report all results to the nearest 0.1%.

G.10 Screenings Assessment - Barley

(1) Definition

(a) This is the reference method used to determine the percentage by weight of Unmillable Material Below the 2.2mm Screen (Screenings), including Small Foreign Seeds and reference method used to determine grain retained above the 2.50mm screen, referred to as retention (plumpness).

(2) Apparatus

(a) Agtator Shaking Device.

(b) Analytical balance accurate to at least 0.01g.

(c) Combination of two screens – top 2.50mm top screen and 2.20mm bottom screen displaying annual certification sticker with the following specifications:

(i) 300mm diameter discs x 0.9mm stainless steel, perforated with 25.40mm x 2.50mm slots, hit and miss on ends with 4.77mm end bar and 2.0mm side bar.

(iii) 300mm diameter discs x 0.9mm stainless steel, perforated with 25.40mm x 2.20mm slots, hit and miss on ends with 4.77mm end bar and 2.0mm side bar.

(3) Procedure

(a) Obtain a certified half litre sample of grain.

(b) Place the 2.20mm and 2.50mm screens on top of the Agtator platform with the slots aligned toward the front of the Agtator. Ensure the barley screen is clean, smooth, dry and free of grain residues in the slots.

(c) Ensure the Agtator is set to perform 40 to-and-fro movements over a period of approximately 68 seconds.

(d) Pour the half litre of grain in one movement onto the screen surface. No additional movement or spreading of the sample over the screen is to occur.

(e) Turn on the Agtator and allow it to run until the 40 movements have been completed.

(f) Gently remove the screen and pan from the Agtator and detach the screen from the pan.

(g) Calculate Screenings:

(i) **For all states:** (<2.2 mm sieve) percentage - Weigh the contents of the pan from below the 2.2 mm sieve on an appropriate top pan balance and calculate the percentage as follows:

Screenings (<2.2 mm sieve) by wt (%) = (Screenings Weight/Total Weight)x100

Report all results to the nearest 0.1%.

(h) Calculate Retention percentage (all states) - Weigh the grain remaining above the 2.5 mm screen on an appropriate top pan balance and calculate the percentage as follows:

Retention by wt (%) = (grain above the 2.5mm sieve/total weight) x100

Report all results to the nearest 0.1%.

G.11 Thousand Grain Weight Assessment – Cereals

Wheat, Barley and Oats

(1) Definition

(a) Thousand grain weight (TGW) is an important grain characteristic. The traditional measurement method relies on manual steps:

(2) Apparatus

(a) Counting

(i) As manual counting is time-consuming and labor-intensive with subjective results, electronic counting devices can be used e.g. Contador Seed counter

(b) Weighing

(i) Analytical balance accurate to at least 0.01g.

(3) Procedure

(a) Program equipment for a total of 1,000 grains/kernels.

(b) Capture 1,000 grains.

(c) Place weighing container on appropriate top pan balance and tare to zero.

(d) Pour 1,000 grains into container and record weight to 0.01g

G.12 Hundred Grain Weight Assessment – Pulses

Chickpea, Faba Bean, Field Pea, Lentil and Lupins.

(1) Definition

(a) Hundred grain weight (HGW) is an important grain characteristic. The traditional measurement method relies on manual steps:

(2) Apparatus

(a) Counting

(i) As manual counting is time-consuming and labor-intensive with subjective results, electronic counting devices can be used e.g. Contador seed counter.

(b) Weighing.

(i) Analytical balance accurate to at least 0.01g to be used for weighing.

(3) Procedure

(a) Program equipment for a total of 100 grains/kernels.

(b) Capture 100 grains.

(c) Place weighing container on appropriate top pan balance and tare to zero.

(d) Pour 100 grains into container and record weight to 0.01g.

G.13 Colour Assessment - Barley (WA Only)

Barley grain colour is an important trait in assessing grain quality, indicating the extent of bleaching and staining due to preharvest weather conditions.

(1) Definition

(a) This describes the NIR method for determination of grain colour in barley (WA).

(2) Apparatus

(a) NIR instrument available for hire by Co-Operative Bulk Handling Ltd. (CBH)

(i) CBH annually certified and calibrated to colour reference samples.

(b) Other NIR instruments able to be calibrated for colour determination using CBH calibration algorithms (as supplied by CBH).

(3) Procedure

(a) Sample must be de-awned and cleaned (aspirated) without removal of whole grain i.e. free of chaff, cracked grain and other impurities.

(b) Individual manufacturer instructions and procedures should be followed for operation and maintenance of NIR instruments used to determine grain colour.

(c) Report results to the nearest whole number.

16 APPENDIX H – CROP SPECIFIC PROTOCOLS

Crop Specific Protocol tables are designed to be a template whereby the Regional NVT Committee, and other NVT stakeholders, can provide input (where required) to determine the best agronomic framework for managing trials. These are likely to be updated as needed (at least yearly).
The purpose of the crop specific protocol is to provide a standardised national approach to key management criteria specific to a crop type.
If intending to work outside any of these guidelines seek input from your Regional NVT Committee and seek approval from your GRDC NVT Regional Manager.

H.1 Barley

Criteria	Comments
Nutrition	Nutrition application to be informed by soil testing. The trial must not be limited by any nutrient. Nitrogen to be managed to achieve 11% protein. Phosphorus not to be limited. Zinc & Manganese to be applied in high pH soils >pH 7 in $CaCl_2$. Zinc amended fertiliser in SA, VIC and WA. Apply K and foliar trace elements (Zn, Mn, Cu) at mid-tillering as required.
Site selection	Preferable pH >5.5 (minimum pH >4.5) and no acid sub soils. Avoid barley-on-barley rotation. To avoid trial issues caused by residual presence of chemical, consider plant back restrictions of previously used herbicides and how they differ with soil type and rainfall.
Sowing date	Refer to main NVT Protocol document.
Inter-plot distance at sowing	Inter-plot distance should be kept to a minimum, but sufficient to ensure that wheel tracks do not encroach upon adjoining plots.
Seed dressing	Use regional best practice. Systiva and Gaucho as per label.
Seeding fungicide	In-furrow fungicide: • Uniform as per label recommendation (WA). • Impact as per label recommendation (SA, VIC, NSW, QLD).
Target plant establishment (use local practice within population range)	All rainfall zones: 120 - 180 plants/m^2. Target: 150 plants/m^2 ± 30 plants/m^2 on district best practice.
Required herbicide/insecticides/fungicides notes (best practice)	All products must be applied as per label recommendation. Overwatch (bixlozone) herbicide should not be applied to NVT barley trials given elevated sensitivities of some lines. If resistant ryegrass is expected to be present, use a pre-emergent residual grass herbicide. Monitor and measure insect and weed populations and apply pesticide/herbicide according to best local practice for individual crop types. Multiple fungicide applications will be required for disease control and timings should be aimed at both early and late goal post varieties to

Criteria	Comments
	ensure the range of maturities are covered at optimal timings within the trial.
Harvest notes	Desiccation not required; harvest at 12.5% moisture; avoid skinning at harvest.

H.2 Canola

Criteria	Comments
Nutrition	Nutrition application to be informed by soil testing. The trial must not be limited by any nutrient. Nitrogen management to aim for 80 kg of available Nitrogen per forecast tonne of yield. No Nitrogen fertiliser with the seed – must be placed away from the seed, preferred spread or deep banded. Maximum of 15 kg of P at seeding, preferred spread or deep banded. Apply S and foliar trace elements (Zn, Mn, Cu) as required.
Site selection	Preferable pH >5.5 (minimum pH >4.5) and no acid sub soils. To avoid trial issues caused by residual presence of chemical, consider plant back restrictions of previously used herbicides and how they differ with soil type and rainfall.
GMO presence outside of Glyphosate trials	Where a Glyphosate canola trial series is not present at a location, it is the responsibility of the TSP to ensure an appropriate management plan is in-place with the agreement of the Trial Co-operator, for the presence of genetically modified cultivars from stacked lines in the IMI or TT trials.
Sowing dates	Refer to main NVT Protocol document.
Seed dressing	Sow bare seed - without fungicide seed dressing.
Seeding fungicide	In-furrow fungicide. Flutriafol as per label recommendation.
Inter-plot distance at sowing	Inter-plot distance should be increased to 500 mm to minimise cross plot entanglement and ease harvest, particularly in potentially high yield situations.
Target plant establishment	Low-Med Rainfall – 40 plants/m^2 Med-High Rainfall – 50 plants/m^2
Required herbicide/insecticide/fungicide notes	Glyphosate canola trial series are to be managed using the standards suitable for Roundup Ready® Canola systems, i.e. the lowest level of glyphosate tolerance. Imidazolinone and triazine trial series should use relevant herbicides as per label. Use a bare earth PSPE insecticide. Apply snail/slug/mouse pellets where appropriate use moisture resistant baits at max label rate for longevity of treatment. Reapply when required. If resistant ryegrass is expected to be present, use a pre-emergent residual grass herbicide request resistance test if available. Clethodim timing no later than: • *Rates are for 240g/L formulations • Low-Med Rainfall trials – 500mL* rate – no later than 4 leaf.

Criteria	Comments
	• Low-Med Rainfall trials – 250mL* rate – no later than 6 leaf. • Med-High Rainfall trials – 500mL* rate – no later than 6 leaf. • Med-High Rainfall trials – 250mL* rate – no later than 8 leaf. Clethodim timing based on quick cultivar maturity standards: • Low-Med Rainfall – Hyola 350 TT. • Med-High Rainfall – InVigor T4510. All products must be applied as per label recommendation. Apply fungicides in a pre-emptive strategy for sclerotinia and aerial blackleg prone regions. Multiple fungicide applications may be required to ensure all cultivar maturities are adequately managed within the goal post varieties (APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS). If resistant ryegrass is expected to be present, use a pre-emergent residual grass herbicide. Monitor and measure insect and weed populations and apply pesticide/herbicide according to best local practice for individual crop types.
Harvest Methods	(1) Windrowing, If a trial is to be windrowed it must be done at the appropriate growth stage and in such a way that crop material is not carried between plots or blown away in strong wind events. (2) Desiccation, and (3) Direct heading: Where a trial is to be direct headed, great care must be taken to prevent excessive yield or quality loss during harvest. The application of products that reduce shattering of pods at harvest may be beneficial.
Desiccation & harvest notes	Apply desiccant (Diquat) at appropriate timing for desiccation cultivar standard APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS). Label withholding periods must be strictly adhered to Harvest at 8% moisture or less. Pod Ceal® or equivalent product is recommended in high-risk shattering environments.

H.3 Chickpea, Faba Bean, Field Pea, Lentil

Criteria	Comments
Nutrition	Nutrition application to be informed by soil testing. The trial must not be limited by any nutrient. Alkaline fertiliser such as DAP are preferred as they have less impact on seed inoculants and fertiliser should be separated from the seed at sowing. A minimum of 10kg/ha of P to be applied. Ensure adequate Zn, S and Mn at sowing.
Site selection	Preferable pH > 6 (minimum pH > 5.5). Plots to be rolled after seeding as this reflects commercial operations, particularly in cloddy and stony soils. Where lentil and other pulse trials are co-located, if possible, the trials should be located in a lentil paddock. To avoid trial issues caused by residual presence of chemical, consider plant back restrictions of previously used herbicides and how they differ with soil type and rainfall.
Sowing dates	Refer to main NVT Protocol document.
Seed dressing	Follow regional best practice for individual Pulse crop types for individual seasons as outlined by GRDC or state agricultural research department. Apply both a fungicide and an insecticide registered seed dressing.
Rhizobial Inoculation	Apply 2 times recommended rate of either liquid in furrow inoculant or dry granular inoculant (weighed at seed packing, distributed evenly in cone of seeder). Seed coated inoculant is not recommended.
Seeding notes	Inter-plot distance should be kept to a minimum, but sufficient to ensure that wheel tracks do not encroach upon adjoining plots for erect crop types. Inter-plot distance should be increased to 500 mm in spreading crop types, e.g. field peas, to ease harvest and especially in potentially high yield situations. Where situations may result in a cloddy seedbed, surface rolling after seeding is recommended. This may improve herbicide efficacy, e.g., Metribuzin, but will assist harvest of field peas and lentils where very low harvest cutter bar height is needed.
Target plant establishment	Chickpea Desi: 35-45 plants/m^2 Chickpea Kabuli: 30 plants/m^2 Faba bean: 25-35 plants/m^2 Field pea: 55 plants/m^2 Lentil: 120 plants/m^2
Required herbicide/ insecticide/fungicide	All products must be applied as per label recommendation.

Criteria	Comments
	Multiple fungicide applications may be required as should ensure all cultivar maturities (fastest and slowest) are adequately managed. Monitor and measure insect and weed populations and apply pesticide/herbicide according to best local practice for individual crop types. Follow BMP for disease management strategies for individual crop types. Apply fungicides in a pre-emptive strategy for prevalent diseases with multiple fungicide application required for optimal timing for goal post varieties. Pay particular attention to Native budworm /Heliothis control in spring. For the IMI tolerant lentil trial series, it is recommended that IMI herbicide is applied, however in sites of low weed pressure, or residue it is not mandatory and will be left at TSP discretion.
Pre-Harvest plot check	All trailing type and spreading crops (e.g. field peas) trials should be checked for potential cross plot entanglement at the commencement of pod fill. Where cross plot entanglement is evident, the vines should be “rolled/flicked” back into the respective plot using a broom stick or something similar that does not knock off pods or break plant parts in the morning when plants are flaccid and more malleable. Regular walking up and down the plot rows in pea trials and separating gently with hands or boots during the growing season helps to prevent complex and severe entanglement in most cases and can reduce the need for late season disentanglement practices.
Harvest notes	Pulse crop harvest is one of the most critical elements of producing accurate and reliable pulse data due to inherent limitations and fragilities of the individual crop species when compared with some cereals e.g. wheat. A high level of competent operator experience to set up and conduct harvesting operations is required along with appropriate plot harvesting machinery and/or modifications for each individual crop species. Standard wheat harvesting machinery and operations are not sufficient. Desiccation/crop topping is recommended, and must be applied as per label recommendation and strictly adhering to MRL levels. Harvest should ensure all grain is harvested, including low pods. Avoid harvest contamination including soil and other foreign material. If required, harvest samples should be cleaned and reweighed. Refer to 7.1 for further harvest details.

H.4 Lupin

Criteria	Comments
Nutrition	Nutrition application to be informed by soil testing. The trial must not be limited by any nutrient. No P or K fertiliser to be sown with the seed. No lime applied before sowing. P preferably banded below seed. On manganese responsive soils (sandy soils) apply manganese fertiliser with the P fertiliser (banded below the seed) and/or spray manganese foliar when the pods on the primary stem are 2.5cm long.
Site selection	Select sites with low broadleaf weed burden. Preferably sow into cereal stubble. To avoid trial issues caused by residual presence of chemical, consider plant back restrictions of previously used herbicides and how they differ with soil type and rainfall.
Sowing dates	Refer to main NVT Protocol document.
Seed dressing	Iprodione (e.g. Rovral) + Thiram as per label recommendation.
Rhizobial Inoculation	Apply 2x recommended rate of either liquid in furrow inoculant or dry granular inoculant (weighed at seed packing, distributed evenly in cone of seeder). Seed coated inoculant is not recommended.
Inter-plot distance at sowing	Inter-plot distance should be kept to a minimum, but sufficient to ensure that wheel tracks do not encroach upon adjoining plots and cross plot entanglement does not occur especially in potentially high yield situations.
Target minimum plant establishment	Lupin: 45 plants/m^2 Avoid sowing lupins too deep on heavier soil types.
Required herbicide/insecticide/fungicide notes	All products must be applied as per label recommendation. No grass selective herbicides later than 2 weeks prior to first flower. Pay particular attention to Native budworm / Heliothis control in spring. Metribuzin can only be applied if Regional NVT Manager confirms that no Metribuzin sensitive varieties are present in trials. Monitor and measure insect and weed populations and apply pesticide/herbicide according to best local practice for individual crop types.

Criteria	Comments
	Where fungicides are recommended for disease control, multiple applications will be required to optimise timings for the goalpost varieties APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS).
Harvest notes	Where desiccation required, apply Diquat at crop maturity. Harvest at <14% moisture.

H.5 Oat

Criteria	Comments
Nutrition	Nutrition application to be informed by soil testing. The trial must not be limited by any nutrient. Nitrogen to be managed to achieve 11% protein. Phosphorus not to be limited. Zinc amended fertiliser in SA, VIC and WA; and Copper in WA. Apply K and foliar trace elements (Zn, Mn, Cu) at mid-tillering as required.
Site selection	Preferably pH >5.5 (minimum pH > 4.5) and no acid sub soils. To avoid trial issues caused by residual presence of chemical, consider plant back restrictions of previously used herbicides and how they differ with soil type and rainfall.
Sowing dates	Refer to main NVT Protocol document.
Seed dressing	Use regional best practice. Evergol Energy and Gaucho as per label rates.
Seeding fungicide	As required, use regional best practice. In-furrow fungicide: • Uniform as per label recommendation (WA). • Impact as per label recommendation (SA, VIC, NSW, QLD).
Inter-plot distance at sowing	Inter-plot distance should be kept to a minimum, but sufficient to ensure that wheel tracks do not encroach upon adjoining plots.
Target plant establishment (use local practice within population range)	LRZ (<350 mm): 110 – 160 plants/m^2 MRZ: 160 – 200 plants/m^2 HRZ (>500 mm): 200 – 240 plants/m^2
Required herbicide/insecticide/fungicide notes (best practice)	All products must be applied as per label recommendation. Use industry best practice however avoid use of trifluralin. If resistant ryegrass is expected to be present, use a pre-emergent residual grass herbicide. Monitor and measure insect and weed populations and apply pesticide/herbicide according to best local practice for individual crop types. Apply fungicides in a pre-emptive strategy for prevalent diseases, multiple applications of fungicides will be required to achieve optimal timing for the range of maturities within the goal post varieties APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS).
Harvest notes	Desiccation not required; harvest at 12.5% moisture.

H.6 Wheat

Criteria	Comments
Nutrition	Nutrition application to be informed by soil testing. The trial must not be limited by any nutrient. Nitrogen to be managed to achieve 12% protein. Phosphorus not to be limited. Zinc amended fertiliser in SA, VIC and WA; and Copper in WA. Apply K and foliar trace elements (Zn, Mn, Cu) at mid-tillering as required.
Site selection	Preferably pH >5.5 (minimum pH >4.5) and no acid sub soils. To avoid trial issues caused by residual presence of chemical, consider plant back restrictions of previously used herbicides and how they differ with soil type and rainfall.
Sowing dates	Refer to main NVT Protocol document.
Seed dressing	Evergol Energy as per label rate. Gaucho as per label rate. Apply insecticide for management of RWA.
Seeding fungicide	In-furrow fungicide: • Uniform as per label recommendation (WA). • Impact as per label recommendation (SA, VIC, NSW, QLD).
Inter-plot distance at sowing	Inter-plot distance should be kept to a minimum, but sufficient to ensure that wheel tracks do not encroach upon adjoining plots.
Target plant establishment (use local practice within population range)	LRZ (<350 mm): 100 – 160 plants/m^2 MRZ: 160 – 200 plants/m^2 HRZ (>500 mm): 200 – 240 plants/m^2
Required herbicide/insecticide/fungicide notes (best practice)	All products must be applied as per label recommendation. If resistant ryegrass is expected to be present, use a pre-emergent residual grass herbicide. Monitor and measure insect and weed populations and apply pesticide/herbicide according to best local practice for individual crop types. Apply fungicides in a pre-emptive strategy for prevalent diseases, multiple applications of fungicides will be required to achieve optimal timing for the range of maturities within the goal post varieties (see APPENDIX H – CROP SPECIFIC PROTOCOLS).
Harvest notes	Desiccation not required; harvest at 12.5% moisture.

17 APPENDIX I – GOAL POST VARIETIES (MATURITY WINDOWS).

The following table provides details of the target maturity windows for each NVT trial type and region for all crops and desiccation standards where appropriate.

State	Crop	Season/Type	Region	Desiccation Standard	Quick Boundary	Slow Boundary
VIC	Barley	Long	South West		RGT Planet	Oxford/Alestar
SA	Barley	Long	South East		RGT Planet	None
TAS	Barley	Long	Northern Midlands		RGT Planet	Oxford/Alestar
NSW	Barley	Main	N/E		Compass / Spartacus	Westminster/Oxford
NSW	Barley	Main	N/W		None	Commander
NSW	Barley	Main	S/E		Compass / Spartacus	Westminster/Oxford
NSW	Barley	Main	S/W		Compass / Yeti	Commander/RGT Planet
QLD	Barley	Main	CQ - Dawson		Compass / Yeti	Rosalind/Laperouse
QLD	Barley	Main	CQ - Highland		Compass / Yeti	Rosalind/Laperouse
QLD	Barley	Main	SEQ		Compass	Westminster/Oxford
QLD	Barley	Main	SWQ		Compass	Westminster/Oxford
SA	Barley	Main	Lower EP		Compass	Westminster/Oxford
SA	Barley	Main	Mid North		None	Westminster/Oxford
SA	Barley	Main	Murray Mallee		None	Commander/RGT Planet
SA	Barley	Main	South East - Lower		Compass/Spartacus	Westminster/Oxford
SA	Barley	Main	South East - Upper		Compass/Spartacus	Westminster/Oxford
SA	Barley	Main	Upper EP		Compass	Commander/RGT Planet
SA	Barley	Main	Yorke P		Compass	Westminster/Oxford
VIC	Barley	Main	Mallee		Compass	Commander
VIC	Barley	Main	North Central		Compass	Westminster/Oxford
VIC	Barley	Main	North East		Compass	Westminster/Oxford
VIC	Barley	Main	Wimmera		Compass	Westminster/Oxford
WA	Barley	Main	Agzone1		Spartacus	Commander/RGT Planet
WA	Barley	Main	Agzone2		Spartacus	Commander
WA	Barley	Main	Agzone3		Compass/Spartacus	Westminster/Oxford
WA	Barley	Main	Agzone4		Spartacus	Commander/RGT Planet

State	Crop	Season/Type	Region	Desiccation Standard	Quick Boundary	Slow Boundary
WA	Barley	Main	Agzone5		Spartacus	Westminster/Oxford
WA	Barley	Main	Agzone6		Compass/Spartacus	Westminster/Oxford
ALL	Canola	Low-Med Rainfall	ALL	Invigor T4510	N/A	N/A
ALL	Canola	Med-High Rainfall	ALL	HyTTech Trifecta	N/A	N/A
NSW	Chickpea	Desi	N/E	PBA HatTrick	CBA Captain	PBA Drummond
NSW	Chickpea	Desi	N/W	PBA HatTrick	CBA Captain	PBA Drummond
NSW	Chickpea	Desi	S/W	PBA Slasher	PBA Striker	PBA Boundary
QLD	Chickpea	Desi	CQ	Kyabra	PBA Pistol	PBA Drummond
QLD	Chickpea	Desi	SEQ	PBA HatTrick	CBA Captain	PBA Boundary
QLD	Chickpea	Desi	SWQ	PBA HatTrick	CBA Captain	PBA Boundary
SA	Chickpea	Desi	Yorke P	PBA Slasher	PBA Striker	
VIC	Chickpea	Desi	Mallee	PBA Slasher	PBA Striker	
VIC	Chickpea	Desi	Wimmera	PBA Slasher	PBA Striker	
WA	Chickpea	Desi	Agzone1	PBA Slasher	PBA Striker	
WA	Chickpea	Desi	Agzone2	PBA Slasher	PBA Striker	
WA	Chickpea	Desi	Agzone4	PBA Slasher	PBA Striker	
WA	Chickpea	Desi	Agzone5	PBA Slasher	PBA Striker	
WA	Chickpea	Desi	Ord	PBA HatTrick	PBA Pistol	PBA Drummond
NSW	Chickpea	Kabuli	N/W	Genesis - 090	PBA Monarch	Genesis Kalkee
SA	Chickpea	Kabuli	Yorke P	Genesis - 090	PBA Monarch	Genesis Kalkee
VIC	Chickpea	Kabuli	Mallee	Genesis - 090	PBA Monarch	Genesis Kalkee
VIC	Chickpea	Kabuli	Wimmera	Genesis - 090	PBA Monarch	Genesis Kalkee
WA	Chickpea	Kabuli	Ord	Genesis - 090	PBA Monarch/Kimberley Large	Genesis Kalkee
NSW	Faba Bean	Main	N/E	PBA Zahra	PBA Nanu	
NSW	Faba Bean	Main	N/W	PBA Zahra	PBA Nanu	
NSW	Faba Bean	Main	S/W	PBA Zahra	PBA Marne	PBA Zahra
QLD	Faba Bean	Main	SWQ	PBA Zahra	PBA Nanu	
SA	Faba Bean	Main	Lower EP	PBA Zahra	PBA Marne	PBA Zahra

State	Crop	Season/Type	Region	Desiccation Standard	Quick Boundary	Slow Boundary
SA	Faba Bean	Main	Mid North	PBA Zahra	PBA Marne	PBA Zahra
SA	Faba Bean	Main	Murray Mallee	PBA Zahra	PBA Marne	PBA Zahra
SA	Faba Bean	Main	South East	PBA Zahra	PBA Marne	PBA Zahra
SA	Faba Bean	Main	Yorke P	PBA Zahra	PBA Marne	PBA Zahra
VIC	Faba Bean	Main	North East	PBA Zahra	PBA Marne	PBA Zahra
VIC	Faba Bean	Main	South West	PBA Zahra	PBA Marne	PBA Zahra
VIC	Faba Bean	Main	Wimmera	PBA Zahra	PBA Marne	PBA Zahra
WA	Faba Bean	Main	Agzone3	PBA Zahra	PBA Marne	PBA Zahra
WA	Faba Bean	Main	Agzone5	PBA Zahra	PBA Marne	PBA Zahra
NSW	Field Pea	Main	S/E	PBA Butler	GIA Kastar	Kaspa
NSW	Field Pea	Main	S/W	PBA Butler	GIA Kastar	Kaspa
SA	Field Pea	Main	Lower EP	PBA Butler	GIA Kastar	Kaspa
SA	Field Pea	Main	Mid North	PBA Butler	GIA Kastar	Kaspa
SA	Field Pea	Main	Murray Mallee	PBA Butler	GIA Kastar	Kaspa
SA	Field Pea	Main	South East	PBA Butler	GIA Kastar	Kaspa
SA	Field Pea	Main	Upper EP	PBA Butler	GIA Kastar	Kaspa
SA	Field Pea	Main	Yorke P	PBA Butler	GIA Kastar	Kaspa
VIC	Field Pea	Main	Mallee	PBA Butler	GIA Kastar	Kaspa
VIC	Field Pea	Main	Wimmera	PBA Butler	GIA Kastar	Kaspa
WA	Field Pea	Main	Agzone1	PBA Butler	GIA Kastar	Kaspa
WA	Field Pea	Main	Agzone2	PBA Butler	GIA Kastar	Kaspa
WA	Field Pea	Main	Agzone3	PBA Butler	GIA Kastar	Kaspa
WA	Field Pea	Main	Agzone4	PBA Butler	GIA Kastar	Kaspa
WA	Field Pea	Main	Agzone5	PBA Butler	GIA Kastar	Kaspa
NSW	Lentil	Main	S/E	PBA Hurricane XT	PBA Blitz	PBA Ace
SA	Lentil	Main	Lower EP	PBA Hurricane XT	PBA Blitz	PBA Ace
SA	Lentil	Main	Mid North	PBA Hurricane XT	PBA Blitz	PBA Ace
SA	Lentil	Main	Murray Mallee	PBA Hurricane XT	PBA Blitz	PBA Ace

State	Crop	Season/Type	Region	Desiccation Standard	Quick Boundary	Slow Boundary
SA	Lentil	Main	South East	PBA Hurricane XT	PBA Blitz	PBA Ace
SA	Lentil	Main	Yorke P	PBA Hurricane XT	PBA Blitz	PBA Ace
VIC	Lentil	Main	Mallee	PBA Hurricane XT	PBA Blitz	PBA Ace
VIC	Lentil	Main	Wimmera	PBA Hurricane XT	PBA Blitz	PBA Ace
WA	Lentil	Main	Agzone1	PBA Hurricane XT	PBA Blitz	PBA Ace
WA	Lentil	Main	Agzone2	PBA Hurricane XT	PBA Blitz	PBA Ace
WA	Lentil	Main	Agzone3	PBA Hurricane XT	PBA Blitz	PBA Ace
WA	Lentil	Main	Agzone5	PBA Hurricane XT	PBA Blitz	PBA Ace
NSW	Lupin	Narrow Leafed	N/W	Coyote	Mandellup	Wonga
NSW	Lupin	Narrow Leafed	S/E	Coyote	Mandellup	Wonga
SA	Lupin	Narrow Leafed	Lower EP	Coyote	Mandellup	Wonga
SA	Lupin	Narrow Leafed	Mid North	Coyote	Mandellup	Wonga
SA	Lupin	Narrow Leafed	Murray Mallee	Coyote	Mandellup	Wonga
SA	Lupin	Narrow Leafed	South East	Coyote	Mandellup	Wonga
VIC	Lupin	Narrow Leafed	Mallee	Coyote	Mandellup	Wonga
WA	Lupin	Narrow Leafed	Agzone1	Coyote	Mandellup	Wonga
WA	Lupin	Narrow Leafed	Agzone2	Coyote	Mandellup	Wonga
WA	Lupin	Narrow Leafed	Agzone4	Coyote	Mandellup	Wonga
NSW	Oat	Main	N/E		Yallara	Koala/Bannister
NSW	Oat	Main	S/E		Yallara	Koala/Bannister
NSW	Oat	Main	S/W		Yallara	Koala/Bannister
SA	Oat	Main	Mid North		Yallara	Koala/Bannister
SA	Oat	Main	Murray Mallee		Yallara	Koala/Bannister
SA	Oat	Main	South East		Yallara	Koala/Bannister
SA	Oat	Main	Upper EP		Yallara	Koala/Bannister
SA	Oat	Main	Yorke P		Yallara	Koala/Bannister
VIC	Oat	Main	North Central		Yallara	Koala/Bannister
VIC	Oat	Main	North East		Yallara	Koala/Bannister

State	Crop	Season/Type	Region	Desiccation Standard	Quick Boundary	Slow Boundary
VIC	Oat	Main	South West		Yallara	Koala/Bannister
WA	Oat	Main	Agzone2		Yallara	Koala/Bannister
WA	Oat	Main	Agzone3		Yallara	Koala/Bannister
WA	Oat	Main	Agzone4		Yallara	Koala/Bannister
WA	Oat	Main	Agzone5		Yallara	Koala/Bannister
WA	Oat	Main	Agzone6		Yallara	Koala/Bannister
NSW	Wheat	Early Season	N/E		Gregory/Coota	Sunmax
NSW	Wheat	Early Season	N/W		Gregory/Coota	Sunmax
NSW	Wheat	Early Season	S/E		Reliant/Trojan	Sunmax/Illabo
NSW	Wheat	Early Season	S/W		Reliant/Trojan	Sunmax/Illabo
QLD	Wheat	Early Season	SEQ		Gregory/Coota	Sunmax
QLD	Wheat	Early Season	SWQ		Gregory/Coota	Sunmax/Illabo
SA	Wheat	Early Break	Murray Mallee		Yitpi/Gregory	Sunmax/Illabo
SA	Wheat	Early Season	South East - Lower		Yitpi/Gregory	Sunmax/Illabo
SA	Wheat	Early Break	Upper EP		Yitpi/Gregory	Sunmax/Illabo
VIC	Wheat	Early Break	Mallee		Yitpi/Gregory	Sunmax/Illabo
VIC	Wheat	Early Break	North Central		Yitpi/Gregory	Sunmax/Illabo
VIC	Wheat	Early Season	North East		Yitpi/Gregory	Sunmax/Illabo
VIC	Wheat	Early Season	South West		Yitpi/Gregory	Sunmax/Illabo
VIC	Wheat	Early Break	Wimmera		Yitpi/Gregory	Sunmax/Illabo
WA	Wheat	Early Break	Agzone1		Yitpi/Gregory	Sunmax/Illabo
WA	Wheat	Early Break	Agzone2		Yitpi/Gregory	Sunmax/Illabo
WA	Wheat	Early Break	Agzone3		Yitpi/Gregory	Sunmax/Illabo
WA	Wheat	Early Break	Agzone4		Yitpi/Gregory	Sunmax/Illabo
WA	Wheat	Early Break	Agzone5		Yitpi/Gregory	Sunmax/Illabo
WA	Wheat	Early Break	Agzone6		Yitpi/Gregory	Sunmax/Illabo
NSW	Wheat	Long	N/E		Sunmax/Illabo	N/A
NSW	Wheat	Long	S/E		Sunmax/Illabo	N/A

State	Crop	Season/Type	Region	Desiccation Standard	Quick Boundary	Slow Boundary
TAS	Wheat	Long	Northern Midlands		Sunmax/Illabo	N/A
SA	Wheat	Long	S/E		Sunmax/Illabo	N/A
VIC	Wheat	Long	South West		Sunmax/Illabo	N/A
NSW	Wheat	Main	N/E		Vixen/Sunprime	Yitpi/Gregory/Coota
NSW	Wheat	Main	N/W		Vixen/Sunprime	Yitpi/Gregory/Coota
NSW	Wheat	Main	S/E		Vixen/Sunprime	Reliant/Trojan
NSW	Wheat	Main	S/W		Vixen/Sunprime	Reliant/Trojan
QLD	Wheat	Main	CQ - Dawson		Vixen/Sunprime	Reliant/ Trojan/ Coota
QLD	Wheat	Main	CQ - Highland		Vixen/Sunprime	Reliant/Trojan/ Coota
QLD	Wheat	Main	SEQ		Vixen/Sunprime	Reliant /Trojan/ Coota
QLD	Wheat	Main	SWQ		Vixen/Sunprime	Reliant/Trojan/ Coota
SA	Wheat	Main	Lower EP		Vixen	Reliant/Sheriff/Trojan/ Rockstar
SA	Wheat	Main	Mid North		Vixen	Reliant/Sheriff/Trojan/ Rockstar
SA	Wheat	Main	Murray Mallee		Vixen	Reliant/Sheriff/Trojan/ Rockstar
SA	Wheat	Main	South East - Lower		Vixen	Reliant/Sheriff/Trojan/ Rockstar
SA	Wheat	Main	South East - Upper		Vixen	Reliant/Sheriff/Trojan/ Rockstar
SA	Wheat	Main	Upper EP		Vixen	Reliant/Sheriff/Trojan/ Rockstar
SA	Wheat	Main	Yorke P		Vixen	Reliant/Sheriff/Trojan/ Rockstar
VIC	Wheat	Main	Mallee		Vixen	Reliant/Sheriff/Trojan/ Rockstar
VIC	Wheat	Main	North Central		Vixen	Reliant/Sheriff/Trojan/ Rockstar
VIC	Wheat	Main	North East		Vixen	Reliant/Sheriff/Trojan/ Rockstar
VIC	Wheat	Main	Wimmera		Vixen	Reliant/Sheriff/Trojan/ Rockstar
WA	Wheat	Main	Agzone1		Vixen	Reliant/Sheriff/Trojan
WA	Wheat	Main	Agzone2		Vixen	Reliant/Sheriff/Trojan
WA	Wheat	Main	Agzone3		Vixen	Reliant/Sheriff/Trojan
WA	Wheat	Main	Agzone4		Vixen	Reliant/Sheriff/Trojan
WA	Wheat	Main	Agzone5		Vixen	Reliant/Sheriff/Trojan
WA	Wheat	Main	Agzone6		Vixen	Reliant/Sheriff/Trojan

State	Crop	Season/Type	Region	Desiccation Standard	Quick Boundary	Slow Boundary
NSW	Wheat	Durum	N/E		Jandaroi	Caparoi
NSW	Wheat	Durum	N/W		Jandaroi	Caparoi
NSW	Wheat	Durum	S/W		Jandaroi	Caparoi
QLD	Wheat	Durum	SEQ		Jandaroi	Caparoi
QLD	Wheat	Durum	SWQ		Jandaroi	Caparoi
SA	Wheat	Durum	Mid North		Saintly	DBAArtemis
SA	Wheat	Durum	Yorke P		Saintly	DBAArtemis
VIC	Wheat	Durum	Wimmera		Saintly	DBAArtemis

18 APPENDIX J.1 – TRIAL GERMINATION WINDOWS- BY CROP

Further information can be found in the NVT Protocols under 5.7 Germination Windows.

Note: The first three boxes in a month represent week-long increments (e.g. the first 'Apr' box represents the 1st – 7th, inclusive, of April).

Note: The fourth box in a month represents the days remaining in that month (e.g. the fourth 'Apr' box represents the 22nd – 30th, inclusive, of April; the fourth 'May' box represents the 22nd – 31st, inclusive, of May).

Legend: Preferred **germination** window (darker squares)

Legend: Unpreferred **germination** window (lighter squares)

J.1.1 Barley

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Barley	Long	SA	South East												
Barley	Long	TAS	Northern Midlands												
Barley	Long	VIC	South West												
Barley	Main	NSW	N/E												
Barley	Main	NSW	N/W												
Barley	Main	NSW	S/E												
Barley	Main	NSW	S/W												
Barley	Main	QLD	CQ - Dawson												
Barley	Main	QLD	CQ - Highland												
Barley	Main	QLD	SEQ												
Barley	Main	QLD	SWQ												
Barley	Main	SA	Lower EP												
Barley	Main	SA	Mid North												
Barley	Main	SA	Murray Mallee												
Barley	Main	SA	South East - Lower												
Barley	Main	SA	South East - Upper												
Barley	Main	SA	Upper EP												

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Barley	Main	SA	Yorke P												
Barley	Main	VIC	Mallee												
Barley	Main	VIC	North Central												
Barley	Main	VIC	North East												
Barley	Main	VIC	Wimmera												
Barley	Main	WA	Agzone1												
Barley	Main	WA	Agzone2												
Barley	Main	WA	Agzone3												
Barley	Main	WA	Agzone4												
Barley	Main	WA	Agzone5												
Barley	Main	WA	Agzone6												

J.1.2 Canola

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Canola	Low-Med Rainfall	NSW	N/E												
Canola	Low-Med Rainfall	NSW	N/W												
Canola	Low-Med Rainfall	NSW	S/E												
Canola	Low-Med Rainfall	NSW	S/W												
Canola	Low-Med Rainfall	SA	Mid North												
Canola	Low-Med Rainfall	SA	Murray Mallee												
Canola	Low-Med Rainfall	SA	Upper EP												
Canola	Low-Med Rainfall	SA	Yorke P												
Canola	Low-Med Rainfall	VIC	Mallee												
Canola	Low-Med Rainfall	VIC	North Central												
Canola	Low-Med Rainfall	VIC	Wimmera												
Canola	Low-Med Rainfall	WA	Agzone1												
Canola	Low-Med Rainfall	WA	Agzone2												
Canola	Low-Med Rainfall	WA	Agzone3												
Canola	Low-Med Rainfall	WA	Agzone4												
Canola	Low-Med Rainfall	WA	Agzone5												
Canola	Low-Med Rainfall	WA	Agzone6												
Canola	Med-High Rainfall	NSW	N/E												
Canola	Med-High Rainfall	NSW	N/W												
Canola	Med-High Rainfall	NSW	S/E												
Canola	Med-High Rainfall	NSW	S/W												
Canola	Med-High Rainfall	SA	Lower EP												
Canola	Med-High Rainfall	SA	Mid North												
Canola	Med-High Rainfall	SA	South East												
Canola	Med-High Rainfall	SA	Yorke P												
Canola	Med-High Rainfall	VIC	North Central												
Canola	Med-High Rainfall	VIC	North East												
Canola	Med-High Rainfall	VIC	South West												
Canola	Med-High Rainfall	VIC	Wimmera												

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Canola	Med-High Rainfall	WA	Agzone1												
Canola	Med-High Rainfall	WA	Agzone2												
Canola	Med-High Rainfall	WA	Agzone3									`			
Canola	Med-High Rainfall	WA	Agzone4												
Canola	Med-High Rainfall	WA	Agzone5												
Canola	Med-High Rainfall	WA	Agzone6												

J.1.3 Pulses

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Chickpea	Main	NSW	N/E												
Chickpea	Main	NSW	N/W												
Chickpea	Main	NSW	S/E												
Chickpea	Main	NSW	S/W												
Chickpea	Main	QLD	CQ - Dawson												
Chickpea	Main	QLD	CQ - Highland												
Chickpea	Main	QLD	SEQ												
Chickpea	Main	QLD	SWQ												
Chickpea	Main	SA	Lower EP												
Chickpea	Main	SA	Mid North												
Chickpea	Main	SA	Murray Mallee												
Chickpea	Main	SA	South East												
Chickpea	Main	SA	Upper EP												
Chickpea	Main	SA	Yorke P												
Chickpea	Main	VIC	Mallee												
Chickpea	Main	VIC	Wimmera												
Chickpea	Main	WA	Agzone1												
Chickpea	Main	WA	Agzone2												
Chickpea	Main	WA	Agzone3												
Chickpea	Main	WA	Agzone4												
Chickpea	Main	WA	Agzone5												
Chickpea	Main	WA	Agzone6												
Faba Bean	Main	NSW	N/E												
Faba Bean	Main	NSW	N/W												
Faba Bean	Main	NSW	S/E												
Faba Bean	Main	NSW	S/W												
Faba Bean	Main	SA	Lower EP												
Faba Bean	Main	SA	Mid North												
Faba Bean	Main	SA	Murray Mallee												

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Faba Bean	Main	SA	South East - Lower												
Faba Bean	Main	SA	South East - Upper												
Faba Bean	Main	SA	Upper EP												
Faba Bean	Main	SA	Yorke P												
Faba Bean	Main	VIC	North East												
Faba Bean	Main	VIC	South West												
Faba Bean	Main	VIC	Wimmera												
Faba Bean	Main	WA	Agzone3												
Faba Bean	Main	WA	Agzone5												
Field Pea	Main	NSW	N/E												
Field Pea	Main	NSW	N/W												
Field Pea	Main	NSW	S/E												
Field Pea	Main	NSW	S/W												
Field Pea	Main	SA	Lower EP												
Field Pea	Main	SA	Mid North												
Field Pea	Main	SA	Murray Mallee												
Field Pea	Main	SA	South East												
Field Pea	Main	SA	Upper EP												
Field Pea	Main	SA	Yorke P												
Field Pea	Main	VIC	Mallee												
Field Pea	Main	VIC	North Central												
Field Pea	Main	VIC	South West												
Field Pea	Main	VIC	Wimmera												
Field Pea	Main	WA	Agzone1												
Field Pea	Main	WA	Agzone2												
Field Pea	Main	WA	Agzone3												
Field Pea	Main	WA	Agzone4												
Field Pea	Main	WA	Agzone5												
Field Pea	Main	WA	Agzone6												

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Lentil	Main	NSW	S/E												
Lentil	Main	NSW	S/W												
Lentil	Main	SA	Lower EP												
Lentil	Main	SA	Mid North												
Lentil	Main	SA	Murray Mallee												
Lentil	Main	SA	South East												
Lentil	Main	SA	Upper EP												
Lentil	Main	SA	Yorke P												
Lentil	Main	VIC	Mallee												
Lentil	Main	VIC	North Central												
Lentil	Main	VIC	South West												
Lentil	Main	VIC	Wimmera												
Lentil	Main	WA	Agzone1												
Lentil	Main	WA	Agzone2												
Lentil	Main	WA	Agzone4												
Lentil	Main	WA	Agzone5												
Lupin	Main	NSW	N/E												
Lupin	Main	NSW	N/W												
Lupin	Main	NSW	S/E												
Lupin	Main	NSW	S/W												
Lupin	Main	SA	Lower EP												
Lupin	Main	SA	Mid North												
Lupin	Main	SA	Murray Mallee												
Lupin	Main	SA	South East												
Lupin	Main	SA	Upper EP												
Lupin	Main	SA	Yorke P												
Lupin	Main	VIC	Mallee												
Lupin	Main	VIC	North East												
Lupin	Main	VIC	South West												

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Lupin	Main	VIC	Wimmera												
Lupin	Main	WA	Agzone1												
Lupin	Main	WA	Agzone2												
Lupin	Main	WA	Agzone3												
Lupin	Main	WA	Agzone4												
Lupin	Main	WA	Agzone5												
Lupin	Main	WA	Agzone6												
Lupin	Main	WA	Agzone7												
Lupin	Main	WA	Agzone8												

J.1.4 Oat

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Oat	Main	NSW	N/E												
Oat	Main	NSW	N/W												
Oat	Main	NSW	S/E												
Oat	Main	NSW	S/W												
Oat	Main	SA	Lower EP												
Oat	Main	SA	Mid North												
Oat	Main	SA	Murray Mallee												
Oat	Main	SA	South East - Lower												
Oat	Main	SA	South East - Upper												
Oat	Main	SA	Upper EP												
Oat	Main	SA	Yorke P												
Oat	Main	VIC	Mallee												
Oat	Main	VIC	North Central												
Oat	Main	VIC	North East												
Oat	Main	VIC	South West												
Oat	Main	VIC	Wimmera												
Oat	Main	WA	Agzone2												
Oat	Main	WA	Agzone3												
Oat	Main	WA	Agzone4												
Oat	Main	WA	Agzone5												
Oat	Main	WA	Agzone6												

J.1.5 Wheat

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Wheat	Durum	NSW	N/E												
Wheat	Durum	NSW	N/W												
Wheat	Durum	NSW	S/W												
Wheat	Durum	QLD	CQ - Dawson												
Wheat	Durum	QLD	CQ - Highland												
Wheat	Durum	QLD	SEQ												
Wheat	Durum	QLD	SWQ												
Wheat	Durum	SA	Mid North												
Wheat	Durum	SA	Yorke P												
Wheat	Durum	VIC	Wimmera												
Wheat	Early	NSW	N/E												
Wheat	Early	NSW	N/W												
Wheat	Early	NSW	S/E												
Wheat	Early	NSW	S/W												
Wheat	Early	QLD	CQ - Dawson												
Wheat	Early	QLD	CQ - Highland												
Wheat	Early	QLD	SEQ												
Wheat	Early	QLD	SWQ												
Wheat	Early	SA	South East - Lower												
Wheat	Early	VIC	North East												
Wheat	Early	VIC	South West												
Wheat	Early Break	SA	Murray Mallee												
Wheat	Early Break	SA	Upper EP												
Wheat	Early Break	VIC	Mallee												
Wheat	Early Break	VIC	North Central												
Wheat	Early Break	VIC	Wimmera												
Wheat	Early Break	WA	Agzone1												
Wheat	Early Break	WA	Agzone2												
Wheat	Early Break	WA	Agzone3												

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Wheat	Early Break	WA	Agzone4												
Wheat	Early Break	WA	Agzone5												
Wheat	Early Break	WA	Agzone6												
Wheat	Long	NSW	N/E												
Wheat	Long	NSW	S/E												
Wheat	Long	SA	S/E												
Wheat	Long	TAS	Northern Midlands												
Wheat	Long	VIC	South West												
Wheat	Main	NSW	N/E												
Wheat	Main	NSW	N/W												
Wheat	Main	NSW	S/E												
Wheat	Main	NSW	S/W												
Wheat	Main	QLD	CQ - Dawson												
Wheat	Main	QLD	CQ - Highland												
Wheat	Main	QLD	SEQ												
Wheat	Main	QLD	SWQ												
Wheat	Main	SA	Lower EP												
Wheat	Main	SA	Mid North												
Wheat	Main	SA	Murray Mallee												
Wheat	Main	SA	South East - Lower												
Wheat	Main	SA	South East - Upper												
Wheat	Main	SA	Upper EP												
Wheat	Main	SA	Yorke P												
Wheat	Main	VIC	Mallee												
Wheat	Main	VIC	North Central												
Wheat	Main	VIC	North East												
Wheat	Main	VIC	Wimmera												
Wheat	Main	WA	Agzone1												
Wheat	Main	WA	Agzone2												

Crop	Series	State	Region	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
Wheat	Main	WA	Agzone3												
Wheat	Main	WA	Agzone4												
Wheat	Main	WA	Agzone5												
Wheat	Main	WA	Agzone6												

19 APPENDIX J.2 – TRIAL GERMINATION WINDOWS- BY STATE

Further information can be found in the NVT Protocols under 5.7 Germination Windows.

Note: The first three boxes in a month represent week-long increments (e.g. the first 'Apr' box represents the 1st – 7th, inclusive, of April).

Note: The fourth box in a month represents the days remaining in that month (e.g. the fourth 'Apr' box represents the 22nd – 30th, inclusive, of April; the fourth 'May' box represents the 22nd – 31st, inclusive, of May).

Legend: Preferred **germination** window (darker squares)

Legend: Unpreferred **germination** window (lighter squares)

J.2.1 New South Wales

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
NSW	N/E	Barley	Main												
NSW	N/W	Barley	Main												
NSW	S/E	Barley	Main												
NSW	S/W	Barley	Main												
NSW	N/E	Canola	Low-Med Rainfall												
NSW	N/W	Canola	Low-Med Rainfall												
NSW	S/E	Canola	Low-Med Rainfall												
NSW	S/W	Canola	Low-Med Rainfall												
NSW	N/E	Canola	Med-High Rainfall												
NSW	N/W	Canola	Med-High Rainfall												
NSW	S/E	Canola	Med-High Rainfall												
NSW	S/W	Canola	Med-High Rainfall												
NSW	N/E	Chickpea	Main												
NSW	N/W	Chickpea	Main												
NSW	S/E	Chickpea	Main												
NSW	S/W	Chickpea	Main												
NSW	N/E	Faba Bean	Main												
NSW	N/W	Faba Bean	Main												
NSW	S/E	Faba Bean	Main												

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
NSW	S/W	Faba Bean	Main												
NSW	N/E	Field Pea	Main												
NSW	N/W	Field Pea	Main												
NSW	S/E	Field Pea	Main												
NSW	S/W	Field Pea	Main												
NSW	S/E	Lentil	Main												
NSW	S/W	Lentil	Main												
NSW	N/E	Lupin	Main												
NSW	N/W	Lupin	Main												
NSW	S/E	Lupin	Main												
NSW	S/W	Lupin	Main												
NSW	N/E	Oat	Main												
NSW	N/W	Oat	Main												
NSW	S/E	Oat	Main												
NSW	S/W	Oat	Main												
NSW	N/E	Wheat	Durum												
NSW	N/W	Wheat	Durum												
NSW	S/W	Wheat	Durum												
NSW	N/E	Wheat	Early												
NSW	N/W	Wheat	Early												
NSW	S/E	Wheat	Early												
NSW	S/W	Wheat	Early												
NSW	N/E	Wheat	Long												
NSW	S/E	Wheat	Long												
NSW	N/E	Wheat	Main												
NSW	N/W	Wheat	Main												
NSW	S/E	Wheat	Main												
NSW	S/W	Wheat	Main												

J.2.2 Queensland

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
QLD	CQ - Dawson	Barley	Main												
QLD	CQ - Highland	Barley	Main												
QLD	SEQ	Barley	Main												
QLD	SWQ	Barley	Main												
QLD	CQ - Dawson	Chickpea	Main												
QLD	CQ - Highland	Chickpea	Main												
QLD	SEQ	Chickpea	Main												
QLD	SWQ	Chickpea	Main												
QLD	CQ - Dawson	Wheat	Durum												
QLD	CQ - Highland	Wheat	Durum												
QLD	SEQ	Wheat	Durum												
QLD	SWQ	Wheat	Durum												
QLD	CQ - Dawson	Wheat	Early												
QLD	CQ - Highland	Wheat	Early												
QLD	SEQ	Wheat	Early												
QLD	SWQ	Wheat	Early												
QLD	CQ - Dawson	Wheat	Main												
QLD	CQ - Highland	Wheat	Main												
QLD	SEQ	Wheat	Main												
QLD	SWQ	Wheat	Main												

J.2.3 South Australia

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
SA	South East	Barley	Long												
SA	Lower EP	Barley	Main												
SA	Mid North	Barley	Main												
SA	Murray Mallee	Barley	Main												
SA	South East - Lower	Barley	Main												
SA	South East - Upper	Barley	Main												
SA	Upper EP	Barley	Main												
SA	Yorke P	Barley	Main												
SA	Mid North	Canola	Low-Med Rainfall												
SA	Murray Mallee	Canola	Low-Med Rainfall												
SA	Upper EP	Canola	Low-Med Rainfall												
SA	Yorke P	Canola	Low-Med Rainfall												
SA	Lower EP	Canola	Med-High Rainfall												
SA	Mid North	Canola	Med-High Rainfall												
SA	South East	Canola	Med-High Rainfall												
SA	Yorke P	Canola	Med-High Rainfall												
SA	Lower EP	Chickpea	Main												
SA	Mid North	Chickpea	Main												
SA	Murray Mallee	Chickpea	Main												
SA	South East	Chickpea	Main												
SA	Upper EP	Chickpea	Main												
SA	Yorke P	Chickpea	Main												
SA	Lower EP	Faba Bean	Main												
SA	Mid North	Faba Bean	Main												
SA	Murray Mallee	Faba Bean	Main												
SA	South East - Lower	Faba Bean	Main												
SA	South East - Upper	Faba Bean	Main												
SA	Upper EP	Faba Bean	Main												

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
SA	Yorke P	Faba Bean	Main												
SA	Lower EP	Field Pea	Main												
SA	Mid North	Field Pea	Main												
SA	Murray Mallee	Field Pea	Main												
SA	South East	Field Pea	Main												
SA	Upper EP	Field Pea	Main												
SA	Yorke P	Field Pea	Main												
SA	Lower EP	Lentil	Main												
SA	Mid North	Lentil	Main												
SA	Murray Mallee	Lentil	Main												
SA	South East	Lentil	Main												
SA	Upper EP	Lentil	Main												
SA	Yorke P	Lentil	Main												
SA	Lower EP	Lupin	Main												
SA	Mid North	Lupin	Main												
SA	Murray Mallee	Lupin	Main												
SA	South East	Lupin	Main												
SA	Upper EP	Lupin	Main												
SA	Yorke P	Lupin	Main												
SA	Lower EP	Oat	Main												
SA	Mid North	Oat	Main												
SA	Murray Mallee	Oat	Main												
SA	South East - Lower	Oat	Main												
SA	South East - Upper	Oat	Main												
SA	Upper EP	Oat	Main												
SA	Yorke P	Oat	Main												
SA	Mid North	Wheat	Durum												
SA	Yorke P	Wheat	Durum												
SA	South East - Lower	Wheat	Early												

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
SA	Murray Mallee	Wheat	Early Break												
SA	Upper EP	Wheat	Early Break												
SA	South East	Wheat	Long												
SA	Lower EP	Wheat	Main												
SA	Mid North	Wheat	Main												
SA	Murray Mallee	Wheat	Main												
SA	South East - Lower	Wheat	Main												
SA	South East - Upper	Wheat	Main												
SA	Upper EP	Wheat	Main												
SA	Yorke P	Wheat	Main												

J.2.4 Tasmania

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
TAS	Northern Midlands	Barley	Long												
TAS	Northern Midlands	Wheat	Long												

J.2.5 Victoria

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
VIC	South West	Barley	Long												
VIC	Mallee	Barley	Main												
VIC	North Central	Barley	Main												
VIC	North East	Barley	Main												
VIC	Wimmera	Barley	Main												
VIC	Mallee	Canola	Low-Med Rainfall												
VIC	North Central	Canola	Low-Med Rainfall												
VIC	Wimmera	Canola	Low-Med Rainfall												
VIC	North Central	Canola	Med-High Rainfall												
VIC	North East	Canola	Med-High Rainfall												
VIC	South West	Canola	Med-High Rainfall												
VIC	Wimmera	Canola	Med-High Rainfall												
VIC	Mallee	Chickpea	Main												
VIC	Wimmera	Chickpea	Main												
VIC	North East	Faba Bean	Main												
VIC	South West	Faba Bean	Main												
VIC	Wimmera	Faba Bean	Main												
VIC	Mallee	Field Pea	Main												
VIC	North Central	Field Pea	Main												
VIC	South West	Field Pea	Main												
VIC	Wimmera	Field Pea	Main												
VIC	Mallee	Lentil	Main												
VIC	North Central	Lentil	Main												
VIC	South West	Lentil	Main												
VIC	Wimmera	Lentil	Main												
VIC	Mallee	Lupin	Main												
VIC	North East	Lupin	Main												
VIC	South West	Lupin	Main												

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
VIC	Wimmera	Lupin	Main												
VIC	Mallee	Oat	Main												
VIC	North Central	Oat	Main												
VIC	North East	Oat	Main												
VIC	South West	Oat	Main												
VIC	Wimmera	Oat	Main												
VIC	Wimmera	Wheat	Durum												
VIC	North East	Wheat	Early												
VIC	South West	Wheat	Early												
VIC	Mallee	Wheat	Early Break												
VIC	North Central	Wheat	Early Break												
VIC	Wimmera	Wheat	Early Break												
VIC	South West	Wheat	Long												
VIC	Mallee	Wheat	Main												
VIC	North Central	Wheat	Main												
VIC	North East	Wheat	Main												
VIC	Wimmera	Wheat	Main												

J.2.6 Western Australia

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
WA	Agzone1	Barley	Main												
WA	Agzone2	Barley	Main												
WA	Agzone3	Barley	Main												
WA	Agzone4	Barley	Main												
WA	Agzone5	Barley	Main												
WA	Agzone6	Barley	Main												
WA	Agzone1	Canola	Low-Med Rainfall												
WA	Agzone2	Canola	Low-Med Rainfall												
WA	Agzone3	Canola	Low-Med Rainfall												
WA	Agzone4	Canola	Low-Med Rainfall												
WA	Agzone5	Canola	Low-Med Rainfall												
WA	Agzone6	Canola	Low-Med Rainfall												
WA	Agzone1	Canola	Med-High Rainfall												
WA	Agzone2	Canola	Med-High Rainfall												
WA	Agzone3	Canola	Med-High Rainfall												
WA	Agzone4	Canola	Med-High Rainfall												
WA	Agzone5	Canola	Med-High Rainfall												
WA	Agzone6	Canola	Med-High Rainfall												
WA	Agzone1	Chickpea	Main												
WA	Agzone2	Chickpea	Main												
WA	Agzone3	Chickpea	Main												
WA	Agzone4	Chickpea	Main												
WA	Agzone5	Chickpea	Main												
WA	Agzone6	Chickpea	Main												
WA	Agzone3	Faba Bean	Main												
WA	Agzone5	Faba Bean	Main												
WA	Agzone1	Field Pea	Main												
WA	Agzone2	Field Pea	Main												

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
WA	Agzone3	Field Pea	Main												
WA	Agzone4	Field Pea	Main												
WA	Agzone5	Field Pea	Main												
WA	Agzone6	Field Pea	Main												
WA	Agzone1	Lentil	Main												
WA	Agzone2	Lentil	Main												
WA	Agzone4	Lentil	Main												
WA	Agzone5	Lentil	Main												
WA	Agzone1	Lupin	Main												
WA	Agzone2	Lupin	Main												
WA	Agzone3	Lupin	Main												
WA	Agzone4	Lupin	Main												
WA	Agzone5	Lupin	Main												
WA	Agzone6	Lupin	Main												
WA	Agzone7	Lupin	Main												
WA	Agzone8	Lupin	Main												
WA	Agzone2	Oat	Main												
WA	Agzone3	Oat	Main												
WA	Agzone4	Oat	Main												
WA	Agzone5	Oat	Main												
WA	Agzone6	Oat	Main												
WA	Agzone1	Wheat	Early Break												
WA	Agzone2	Wheat	Early Break												
WA	Agzone3	Wheat	Early Break												
WA	Agzone4	Wheat	Early Break												
WA	Agzone5	Wheat	Early Break												
WA	Agzone6	Wheat	Early Break												
WA	Agzone1	Wheat	Main												
WA	Agzone2	Wheat	Main												

State	Region	Crop	Series	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun
WA	Agzone3	Wheat	Main												
WA	Agzone4	Wheat	Main												
WA	Agzone5	Wheat	Main												
WA	Agzone6	Wheat	Main												

20 APPENDIX K – ACCEPTABLE PUBLIC PRESENTATION OF NVT RESULTS GUIDELINES

In order to ensure consistent and accurate reporting of NVT results, the following guidelines have been developed. GRDC requires these guidelines to be followed whenever NVT Results are published, presented or reported. GRDC's prior approval to publish, present or report NVT Results is not required, although GRDC reserves the right to change this position and amend these guidelines at any time. GRDC also reserves the right to take any necessary action in the event that NVT Results are used other than in accordance with these guidelines.
For the purpose of this document:

"NVT Results" means any output or indicator of cultivar performance that is analysed, predicted or demonstrated from operations conducted as part of the NVT program. This includes but is not limited to all analysed NVT yield results, NVT grain quality results, and NVT disease ratings results.

"NVT data" means any form of information collected at or resulting from an NVT trial.

(1) Reference to NVT as the source of data and/or results must be made in all media resulting from use of NVT resources.

   (a) Use of the NVT logo is required as a condition of accessing NVT results. More information on use of the NVT logo can be found in APPENDIX P – NVT BRAND STYLE GUIDE of the NVT Protocols.

(2) Results must not be edited, manipulated, or presented in a way that could be construed as misleading, biased or otherwise detract from the value and reliability of the results.

   (a) Upon request, users must be able to demonstrate the reproduction of results presented in marketing or other material with the results presented on the NVT website.

(3) To maintain transparency and integrity of reported NVT results it is important users can cross check any published results against the official results presented on the NVT website. As such:

   (a) Any results reported must clearly identify what information is included (Trial locations, years, varieties included/removed, selection rationale, etc.) so results are reproducible on the Long Term Yield Reporter (LTYR).

   (b) Results of Unreleased cultivars must not be published. Only results on Released cultivars can be published.

   (c) Results relating to unreleased or quarantined trials must not be published. Only results on trials that have been released can be published.

   (d) Results must not be published if the cultivar was not present in the reported dataset. That is, if the number of trials for the cultivar is zero in the reported dataset.

(4) When presenting NVT results alongside alternatively sourced data (for example, results from other projects or trials outside of NVT):

   (a) NVT results and alternatively sourced data should be clearly delineated.

   (b) Recalculating and/or combining NVT results with alternative data to produce blended or mixed results should not occur.

(5) Results from the NVT Long Term MET analysis provide the most accurate and reliable prediction of cultivar performance and therefore should be the only yield results used in any additional reporting.

(a) Participating Breeding companies have access to privileged NVT data such as plot level yield data (kg/plot data) and yearly MET Spreadsheets for data integrity and transparency reasons only, but it is not to be used for further analysis or reporting.

(b) Analysed single site data is available from the NVT website in the Trial Report PDF and the Statewide Tables. This information is only made available to provide growers with information in the interim between harvest of their local trials and publishing of the official MET results. It is not to be used for further analysis.

(i) Using social media to reference a Trial Report PDF or a Statewide Table is allowed, but any post must include a direct link to the Table or PDF to ensure the latest information is presented to the reader.

(ii) Use of screenshots of interim trial report PDFs should only occur in social media if it captures the entire page, including all red text disclaimers as Tables and PDFs are constantly updated/changing in the interim before MET data is finalised and available.

(6) Any reanalysis of NVT results should not occur.

(a) The original NVT data set has already undergone statistical analysis to produce the NVT results. Any additional analysis will not take into account the previous analysis and will therefore produce sub-optimal results.

21 APPENDIX L – NVT ENGAGEMENT WITH BREEDING COMPANIES ON NVT SOCIAL MEDIA

(1) NVT will engage with breeding companies on social media platforms if the following are met;

(a) If post is referencing specific variety or technology, do not make reference to competitor cultivars, programs, or technology.

(b) All claims made can be substantiated by publicly available NVT information, any unsubstantiated claims (e.g. Breeder produced results etc.) will not be engaged with.

22 APPENDIX M – NVT DISEASE RATINGS DISEASE SCREENING VARIETY INCLUSION LIST

The following table outlines the accepted cultivar statuses for inclusion NVT Disease Ratings program. The crop by disease combinations may be subject to change.

Crop	Disease	Commercial	Commercial First	Pre-Commercial Second	Pre-Commercial First
	Definitions	Commercial lines included in the NVT testing system that are not in their first year of testing as a commercial line	Commercial lines included in the NVT testing system for the first year as a Commercial line	Pre-Commercial entries in their **second** year of disease screening testing within NVT.	Pre-Commercial entries in their **first** year of disease screening testing within NVT.
Barley	Black point		TRUE	TRUE	
Barley	BYDV	TRUE	TRUE	TRUE	TRUE
Barley	CCN		TRUE	TRUE	
Barley	Crown Rot	TRUE	TRUE	TRUE	
Barley	Net Blotch - Net Form	TRUE	TRUE	TRUE	TRUE
Barley	Net Blotch - Spot Form	TRUE	TRUE	TRUE	TRUE
Barley	P. Quasitereoides Resistance#		TRUE	TRUE	
Barley	Powdery Mildew	TRUE	TRUE	TRUE	TRUE
Barley	Prat. Neglectus Resistance		TRUE	TRUE	
Barley	Prat. Neglectus Tolerance		TRUE	TRUE	
Barley	Prat. Thornei Resistance		TRUE	TRUE	
Barley	Prat. Thornei Tolerance		TRUE	TRUE	
Barley	Rust - Barley Grass Stripe	TRUE	TRUE	TRUE	TRUE
Barley	Rust – Leaf	TRUE	TRUE	TRUE	TRUE
Barley	Rust – Stem	TRUE	TRUE	TRUE	TRUE
Barley	Scald	TRUE	TRUE	TRUE	TRUE
Chickpea					
Chickpea	Ascochyta blight	TRUE	TRUE	TRUE	TRUE
Chickpea	Phytophthora Root Rot		TRUE	TRUE	
Chickpea	Prat. Neglectus Resistance		TRUE	TRUE	TRUE
Chickpea	Prat. Neglectus Tolerance		TRUE	TRUE	TRUE
Chickpea	Prat. Thornei Resistance		TRUE	TRUE	TRUE
Chickpea	Prat. Thornei Tolerance		TRUE	TRUE	TRUE
Faba Bean					
Faba Bean	Ascochyta blight	TRUE	TRUE	TRUE	TRUE
Faba Bean	Chocolate spot	TRUE	TRUE	TRUE	TRUE
Faba Bean	Leaf Rust	TRUE	TRUE	TRUE	TRUE

Crop	Disease	Commercial	Commercial First	Pre-Commercial Second	Pre-Commercial First
Faba Bean	P. Thornei Resistance		TRUE	TRUE	TRUE
Field Pea					
Field Pea	Bacterial blight	TRUE	TRUE	TRUE	TRUE
Field Pea	Downy Mildew	TRUE	TRUE	TRUE	TRUE
Field Pea	Powdery Mildew	TRUE	TRUE	TRUE	TRUE
Field Pea	P. Neglectus Resistance		TRUE	TRUE	TRUE
Field Pea	P. Thornei Resistance		TRUE	TRUE	TRUE
Lentil					
Lentil	Ascochyta blight	TRUE	TRUE	TRUE	TRUE
Lentil	Botrytis Grey Mould	TRUE	TRUE	TRUE	TRUE
Lentil	P. Neglectus Resistance		TRUE	TRUE	TRUE
Lentil	P. Thornei Resistance		TRUE	TRUE	TRUE
Lupin					
Lupin	Anthracnose	TRUE	TRUE	TRUE	TRUE
Lupin	Bean Yellow Mosaic Virus	TRUE	TRUE	TRUE	TRUE
Lupin	Cucumber Mosaic Virus	TRUE	TRUE	TRUE	TRUE
Lupin	Phomopsis	TRUE	TRUE	TRUE	TRUE
Lupin	Sclerotinia stem rot	TRUE	TRUE	TRUE	TRUE
Oat					
Oat	Bacterial Blight	TRUE	TRUE	TRUE	TRUE
Oat	BYDV	TRUE	TRUE	TRUE	TRUE
Oat	CCN	TRUE	TRUE	TRUE	TRUE
Oat	Leaf/Crown Rust	TRUE	TRUE	TRUE	TRUE
Oat	P. Neglectus Resistance		TRUE	TRUE	TRUE
Oat	P. Thornei Resistance		TRUE	TRUE	TRUE
Oat	Red Leather Leaf	TRUE	TRUE	TRUE	TRUE
Oat	Septoria Blotch	TRUE	TRUE	TRUE	TRUE
Oat	Stem Nematode Resistance	TRUE	TRUE	TRUE	TRUE
Oat	Stem Nematode Tolerance	TRUE	TRUE	TRUE	TRUE
Oat	Stem Rust	TRUE	TRUE	TRUE	TRUE
Wheat					
Wheat	Black Point		TRUE	TRUE	
Wheat	CCN		TRUE	TRUE	
Wheat	Crown Rot		TRUE	TRUE	
Wheat	Eye Spot		TRUE	TRUE	
Wheat	P. Neglectus Resistance		TRUE	TRUE	
Wheat	P. Neglectus Tolerance		TRUE	TRUE	
Wheat	P. Quasitereoides Resistance#		TRUE		

Crop	Disease	Commercial	Commercial First	Pre-Commercial Second	Pre-Commercial First
Wheat	P. Thornei Resistance		TRUE	TRUE	
Wheat	P. Thornei Tolerance		TRUE	TRUE	
Wheat	Powdery Mildew	TRUE	TRUE	TRUE	TRUE
Wheat	Rust - Leaf Rust	TRUE	TRUE	TRUE	TRUE
Wheat	Rust - Stem Rust	TRUE	TRUE	TRUE	TRUE
Wheat	Rust - Stripe (Yellow) Rust	TRUE	TRUE	TRUE	TRUE
Wheat	Sept. Nodorum Blotch		TRUE	TRUE	
Wheat	Sept. Tritici Blotch	TRUE	TRUE	TRUE	TRUE
Wheat	Yellow Leaf Spot	TRUE	TRUE	TRUE	TRUE

* Commercial lines with multiple years of testing resulting in an S, SVS or VS rating for a particular disease may be excluded from further testing in NVT for that disease.
** Varieties are only eligible for inclusion in disease screening activities in states where they are also nominated in NVT yield trials.
*** Rating Publication Date may be extended by the NVT Manager for unforeseen circumstances and circumstances outside of Trial Service Provider, Disease Chair, or GRDC's control.
# Only select commercial lines are eligible for inclusion in Pratylenchus Quasitereoides disease screening.

23 APPENDIX N – NOTICE OF COMMERCIALISATION

Please transfer the declaration below onto your company letterhead, complete the required information, and sign.

Return the declaration via email by 1 February to the NVT team ahead of the nomination period for the coming season.

NOTICE OF COMMERCIALISATION

I _____ (**Name**),

_____ (**Position Title**),

authorised representative of _____ (**Breeder**),

declare to Grains Research & Development Corporation (**GRDC**) for the purposes of the NVT Participation Agreement entered into between the Breeder and GRDC (**Agreement**),

that the cultivar _____ (**Variety**)

on and from _____ (date of first commercial release)

is eligible for inclusion in the NVT program as a Commercial Cultivar, and eligible for a Commercialisation Credit in accordance with the terms and conditions of the Agreement and the NVT Protocols.

The cultivar must be available to Australian grain growers to purchase seed and grow commercially in:

- the year the cultivar is first tested in NVT as a commercial cultivar funded by GRDC, and/or
- the year the Commercialisation Credit is utilized.

I **attach** to this notice the following documents evidencing the above (e.g., documents demonstrating use of a commercial cultivar name, marketing materials, evidence of seed sales, evidence of EPR collection):

- _____
- _____
- _____

Signed for and on behalf of **Breeder**:

_____

Signature of representative

_____

Full name of representative (print)

_____

Date

24 APPENDIX O – FENCE SIGNS

TSPs are responsible for supply and maintenance of NVT fence signs.
For artwork file and colour references please refer to APPENDIX P – NVT BRAND STYLE GUIDE available at https://grdc.com.au/brand/#nvt.
An example of the artwork is shown below.

The sign should be printed on:
Print: Full Colour - single sided
Stock: 5mm White Corflute
Finished size: 594 x 841mm (A1)
Finishing: Trim to finished size. Supplied with 6 eyelets in each.

The blank Site Manager Field should be completed by including Site Manager Name & phone number details which can be:

(1) Printed in a black arial font of 75 pt minimum font size, or

(2) Handwritten using thick BLACK permanent marker with instant drying, waterproof ink that won't bleed or blur when damp

(3) At their discretion, TSPs are able to add a NVT check-in QR code stickers to the sign between the NVT and GRDC logos.

(4) No other design changes should be made to the fence sign without prior approval from GRDC.

25 APPENDIX P – NVT BRAND STYLE GUIDE

NVT encourages the use of the NVT logo wherever NVT Results are published.
if you require digital files of the various NVT logos they can be found at https://grdc.com.au/brand#nvt.
Some examples are shown below:

National Variety Trials
Brand Style Guide

Logo Rules

Clear Space - all NVT logos must always have a clear area surrounding it. Allow a minimum 5mm clearance, illustrated below:

The following rules also apply for all NVT logos.
Don't - change the logo font or logo colours, distort the logo, reposition the lockup elements, add a drop shadow / inner glow / outer glow or any other effect.

Fonts

Two primary font families have been selected to be used in all GRDC and NVT branded collateral. In instances where there is no scope to fund or provide the primary font, the alternate secondary font is available. These fonts are:

Primary font. Proxima Nova & Proxima Nova Condensed
Secondary font. Arial.

The NVT logos use the font - Proxima Nova Condensed, Semibold.

Colours

GRDC Green (PMS 348C) is to be used whenever possible. This is the primary colour for GRDC and NVT.
Table 2. NVT Colours, adjacent displays all colour specifications:

Table 2. NVT Colours

	GRDC Green	Light Green	Lime	Black	White
CMYK	100/0/85/24	25/5/20/0	50/5/100/0	0/0/0/100	0/0/0/0
RGB	0/121/69	191/216/204	156/188/75	0/0/0	255/255/255
PANTONE	PMS 348C	PMS -	PMS -	PMS -	PMS -

Contact
NVT Branding
GRDC Communications team

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Grains Research and Development Corporation **NVT Brand Style Guide** 3

National Variety Trials
Brand Style Guide

This style guide has been prepared in order to protect the consistency and integrity of the GRDC National Variety Trials (NVT) brand.

Please refer to this style guide before applying an NVT logo to any printed material or electronic artwork.
The logos must not be re-created. A full set of logo artwork files are available from the GRDC Communications team.

Logo Forms

There are two forms of NVT logos - the NVT Default Logo (Primary) and the NVT Logomark. The primary logo should be used in all instances, except where NVT results are being displayed. The logomark should be used in all locations where NVT results are displayed. The logomark badges the results as official data of the GRDC National Variety Trials. For example, in a graph the logomark can be placed; bottom right corner in the caption/footnote, or to the right of the graph title, or in the top left or bottom right corner of the graph background etc.

Table 1. Logo Forms, adjacent displays the variations of these logos - colour, black, white. Colour is the preferred variation, then black. White is to be used when the logos appears on a dark background.

Opacity can be applied, however the approved percentages must be followed to allow enough contrast. Refer to adjacent table for allowable opacity percentage.

To maintain good legibility, do not use the colour logos on dark background, and do not use the white logos on light backgrounds.

The minimum size of each logo must be followed.

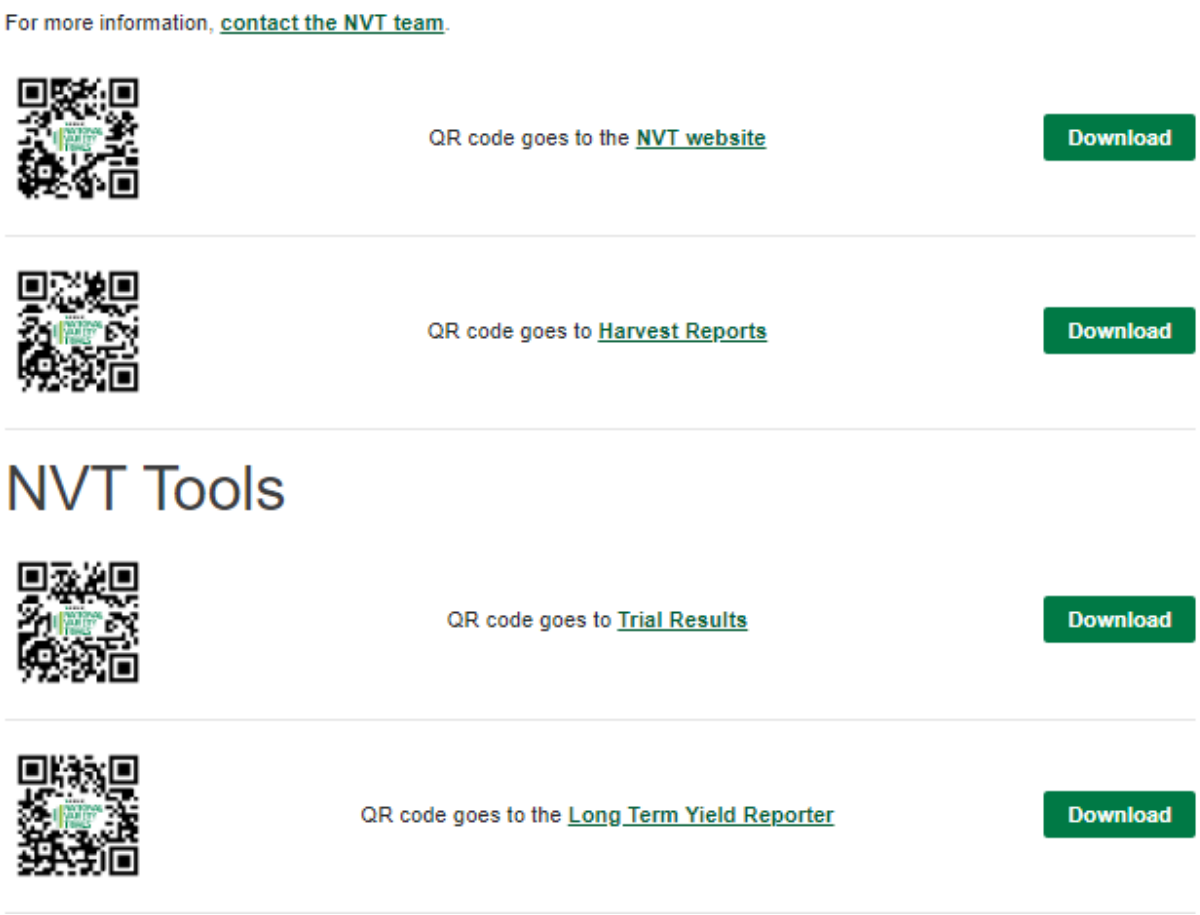
Table 1. Logo Forms

	Colour	Black	White
NVT DEFAULT LOGO (PRIMARY) Usage: in all instances (besides NVT data results), for both print and online. Minimum size: W 22mm H 12mm	GRDC NATIONAL VARIETY TRIALS™	GRDC NATIONAL VARIETY TRIALS™	GRDC NATIONAL VARIETY TRIALS™
	Do not apply opacity.	Opacity is allowed. No less than 30%.	Opacity is allowed. No less than 70%.
NVT LOGOMARK Usage: in all instances where NVT data results are being displayed, for both print and online. Minimum size: W 14mm H 4mm	NVT	NVT	NVT
	Do not apply opacity.	Opacity is allowed. No less than 30%.	Opacity is allowed. No less than 70%.

Grains Research and Development Corporation **NVT Brand Style Guide** 2

26 APPENDIX Q – NVT QR CODES

NVT encourages the use of the NVT QR codes wherever NVT data is published.
if you require digital files of the various codes, they can be found at https://grdc.com.au/brand/nvt-qr-codes.
Some examples are shown below:



27 APPENDIX R – NVT PARTICIPATION AGREEMENT - AFFILIATED PERSONNEL NOMINATION FORM

Participating Breeding Company Name ("*BREEDER*") : _____

Preferred Username* (UserID)	First Name	Last Name	State	Email	Mobile Number	Crop/s Required	Company / Business Name *	Advanced User Access Required? **	Reason for requiring access

The Participating Breeder will be required to ensure that all Affiliated Personnel are abiding by all NVT data terms of use covered by the NVT Breeder Participation Agreement and the NVT Protocols.

SIGNED *as authorised representative for the BREEDER, by a person duly authorised in that regard*

_____

Signature of authorised representative

_____

Name of authorised representative (block letters)

_____

Date

* New Users Only. This field cannot be changed once created in the NVT database, and it is used as the person's login ID. This field can be any text name that the user desires. New users will receive a temporary password in an automatically generated email once added to the system. The NVT database URL is https://www.grdc-nvt.com.au/login

** Advanced Users have the ability and authority to nominate pre-commercial cultivars for entry into NVT via the online portal, and commit the Breeding company to all costs associated with submitting cultivars into the NVT program. They can also create new cultivars, "release" varieties, and make edits to existing cultivar owned by the company that the user is assigned to.