



Manitoba Crop Variety Evaluation Trials

Protocol Manual 2016

Table of Contents

1.0	Administration	3
1.1	Contact	3
1.2	Seed Distribution	3
1.3	Plot Randomization	4
1.4	Field Reporting	4
1.5	Payments	4
1.6	Signage	5
1.7	Adjunct Trials	5
2.0	Conduct of Trials	5
2.1	Location and Establishment of Trials	5
2.1.1	Site Selection	5
2.1.2	Fertility	6
2.1.3	Seeding	6
2.1.4	Site Maintenance	6
2.1.5	Site Acceptance	8
2.1.6	Harvest	8
3.0	Data collection, analysis and submission	8
3.1	Data Collection	8
3.2	Data Analysis.....	8
	Appendix A – Provincial Clubroot Protocol	9

1.0 ADMINISTRATION

1.1 Contact

MCVET Coordinator: **Patti Rothenburger, PhD, PAg**
 Manitoba Agriculture, Food and Rural Development
 Agri-Food Innovation and Adaptation Knowledge Centre
 536 Stephen Street
 Morden, Manitoba
 R6M 1T7
 Phone: 204-823-1293
 Fax: 204-822-2939
patti.rothenburger@gov.mb.ca

Technician: Roger Burak
 Box 2000
 Arborg, MB, R0C 0A0
 Office: (204)376-3303
 Cell: (204) 641-4640
 Fax: 204-376-3311
roger.burak@gov.mb.ca

Data Management: Craig Linde, Diversification Specialist
 Manitoba Agriculture, Food and Rural Development
 Agri-Food Innovation and Adaptation
 Box 160
 Carberry, Manitoba
 R0K 0H0

Canada-Manitoba Crop Diversification Centre
 NE Corner of Hwy 1 & Hwy 5
 Carberry
 Phone: 841-4712
 Fax: 834-8817
Craig.linde@gov.mb.ca

1.2 Seed Distribution

MCVET will arrange for seed to be treated and packaged. For 2016, all seed will be treated and packaged by (to be determined by tender). Each seed package will provide sufficient seed for the plot size and configuration used by each contractor. The seed will be shipped to the contractor the week of **April 22nd**.

Remnant seed will be kept in inventory in the event of a seeding mishap. Call Roger Burak regarding any need for extra seed.

1.3 Plot Randomization

By **April 22nd** all cooperators will be emailed a list of the varieties which will be tested and at what locations. In addition an experimental design for each crop type will be forwarded. Please do not change the experimental design without permission from Craig Linde.

1.4 Field Reporting

It is necessary for MCVET to stay informed regarding the status of each site. Cooperators/contractors are asked to submit crop history/land use, fertility, and seeding report from the Protocol forms for each crop type after all seeding operations have been completed. Directions to the site (an electronically drawn map is best) and legal land descriptions must be sent to the MCVET Coordinator no later than **June 1st, 2016**.

In addition a MCVET member will be assigned to monitor each site and will contact the cooperator/contractor directly of any issues they may have with the site. The MCVET member will also contact the MCVET Coordinator, so they will be aware that a site report will be forthcoming. Photographs of the sites would be appreciated throughout the growing season and should be mailed or emailed to the MCVET coordinator.

Remember, the MCVET Coordinator must be notified as soon as possible regarding any deviations from these protocols.

1.5 Payments

For those sites which are fully funded by MCVET the contractors will be paid in two installments. Contractors can invoice up to 60% of the total cost of the trials they are responsible for as soon as the final number of entries for each crop kind has been confirmed. Payment will be made by MCVET upon inspection of the site to ensure the trial has been initiated, the crops are emerging uniformly and weed control is evident. Upon first inspection if there is a problem with the trial there will be written notice that there needs to be **immediate action** on the trial or that it needs to be **terminated**.

If the trials are successful, the second installment, being the balance of the total cost (40%), can be invoiced once the data has been transferred to the MCVET coordinator, and all adjustments for payment have been made. Invoices are to be mailed/faxed to:

MCVET
536 Stephen Street
Morden, Manitoba R6M 1T7
Fax: (204) 822-2939

Or email directly to: patti.rothenburger@gov.mb.ca

If there have been reported problems communicated in writing throughout the growing season, cooperators price adjustments will be made as follows:

- If plots are harvested but data is not useable (cv too high or there have been notes taken to document removal of a plot during tours) – Less 20% of total cost of trial for not publishing the data

- If the trial is terminated throughout the growing season and plots are not harvested
 - Less 60% of total cost of trial
- If the trial is terminated immediately following seeding at first trial inspection –
 - Less 75% of total cost of trial.

1.6 Signage

For those sites either fully or partially funded by MCVET the cooperators will be responsible for the placement of 1 generic MCVET sign at the site. Signs will be provided by MCVET. Signs must be up prior to **July 1st**.

Signs will be delivered to each cooperator, or can be picked up with the seed. Cooperators should have an inventory of the generic MCVET signs to use. If the cooperator doesn't have a sign they should email the MCVET Coordinator by the end of May to allow enough time for a new sign to be made and delivered.

1.7 Adjunct Trials

When a local group is funding a specific site, seed will still be supplied by MCVET, and the cooperators should complete the Site Reports on these sites. Payment is the responsibility of the local group. MCVET will endeavor to inform the local group, in advance of planting, the level of financial assistance that can be provided.

Cooperators will use the Standard Protocol when conducting these trials.

2.0 CONDUCT OF TRIALS

2.1 Location and Establishment of Trials

2.1.1 Site Selection

Contractor agrees to provide land, or contract land supplied by a third party, for the conduct of the trials. The land shall be representative of the area, and as level and uniform as possible for the area. Trials should be established and blocked to minimize the effect of topography and previous localized activities on that field. Contractor is responsible for payment of land rent.

Sites should be accessible by an all weather road.

The trials should be established not less than 30 meters from the border of the field (fence line, etc.). Where this is not possible a minimum distance of 15 meters should be adhered to.

Every effort should be taken in site selection to ensure best possible establishment with small plot equipment. Preferably broadleaf crops should be grown on cereal residue and cereal crops should be grown on broadleaf residue. However, sites can be established on a field that has been planted the previous year and been taken off as green feed.

Permit sufficient spacing between plots, blocks or replicates that will allow spraying of specific crops for weeds, diseases or insects, and travel of harvesting equipment.

2.1.2 Fertility

All grain legumes (pea, lentil, and fababean) will be inoculated with the suitable rhizobia inoculant. Inoculant is to be supplied by the contractor. Only inoculants of the current year's supply should be used. Pulses should be grown on soil low in nitrogen (<60 lbs of Nitrogen in the top 2 feet of soil).

All sites should have an initial soil nutrient analysis, including micronutrients. All crops should be fertilized, as per the soil test requirements. Nitrogen fertilizer can be banded (liquid, granular or anhydrous) or granular broadcasted in spring. No more than 15 lbs of phosphate or potassium will be applied with the seed of field peas while the maximum for the other crops is 20 lbs with the seed.

Fertilizer recommendations for MCVET trials can be found at one of two websites depending if a soil test has been performed or not.

1. Those with soil tests can use the appendix tables from the MAFRD Soil Fertility Guide or on the MAFRD website:
2. For those sites without soil tests – you will need to resort to the “General recommendations with no soil test” in the MAFRD Soil Fertility Guide – or on the MAFRD website: These recommendations tend to be conservative on N but liberal on PKS.

There is no recommendation for hemp; however, the recommendation from MAFRD is to treat hemp like “high yielding canola” and fertilize similarly.

2.1.3 Seeding

Seeding date should coincide with local seeding dates and should not extend past the Manitoba Crop Insurance guidelines for the location of the trial.

Seeding depth should be 0.5 - 1.0 inches for small seeded crops (mustard and flax), 1.0 - 1.5 inches for cereals and buckwheat and fababeans, and peas can be sown up to 2.0 inches, if surface moisture is limiting. Maintain the same depth for all varieties within a crop kind.

In the event that a trial needs to be re-seeded contact the MCVET Coordinator immediately for additional seed. The contractor will be responsible for the re-seeding operation.

2.1.4 Site Maintenance

Trials will be maintained in as weed-free condition as possible. Only registered herbicides for a specific crop kind will be used on MCVET sites, due to concerns with crop tolerance or individual variety tolerance.

Alleyways, trial borders and road frontage will be mowed out for clear visibility, and to have an aesthetically pleasing site. Alleyways and borders could also be tilled.

Cooperators will be supplied with labeled name stakes for the first replicate for each crop kind. If there are any seeding errors please notify the MCVET coordinator after seeding to ensure the correct stakes are prepared for placement on the post seeding inspection tour.

Disease Pressure – seed treatments

Seed from all crop types will be treated with a registered seed treatment – with the exception of sites located on AAFC Research Farms which will receive bare seed.

Disease Pressure – foliar fungicides

Cooperators need to scout for diseases in all crops, document and report any diseases present. **Due to varietal differences in crop development, no fungicide should be applied to any of the cereals.**

Any diseased plants, which the cooperator can not identify, can be sent for identification to:

Manitoba Agriculture, Food and Rural Development
Attention: Manika Pradham
Crop Diagnostics Lab
545 University Crescent
Winnipeg, MB R3T 5S6

Disease Pressure – Provincial Clubroot Protocol

As the incidence of Clubroot infection has been appearing in Manitoba soils, a Provincial Protocol for the prevention of the spread of this disease has been developed. Please review the attached Protocol carefully. (see appendix A). The MCVET team asks that you follow these guidelines to the best of your ability.

Insect Pressure – foliar insecticides

Outbreak of insect pests will be controlled by a chemical insecticide application for specific crop pests (refer to Guide to Crop Protection):

Grasshopper
 Orange Blossom Wheat Midge
 Flea Beetle
 Diamond Back Moth
 Bertha Army Worm
 Aphid

Contact the coordinator for assistance with any pest control concerns not clearly identified above.

2.1.5 Site Acceptance

A group of MCVET members will visit each site twice during the growing season to assess the trials for plant stand, weed control and to determine if they should be harvested. Contractors will be informed, in advance, of the tour typically planned for the end of June and start of August. For tour details contact the MCVET Coordinator.

2.1.6 Harvest

Samples of grain may be requested by MCVET for certain crop kinds and/or varieties. MCVET will arrange for collection of these samples from the cooperator's location.

Harvesting of crops to begin when conditions are favourable and the crop is physiologically mature. Any head or pod loss, seed shattering or any kind of loss deemed significant will be noted and submitted in the final crop report.

All harvested weights should be done on **cleaned samples** and corrected for moisture content to the accepted standard for the crop kind.

Wheat is arranged in two trials divided by classes of wheat. Cooperators can harvest these on separate dates.

Seed from each plot is to be retained by the Contractor until collected or released by the coordinator, or after October 15, whichever is sooner.

3.0 DATA COLLECTION, ANALYSIS AND SUBMISSION

3.1 Data Collection

Information to be collected for all crop kinds is outlined in the attached workbook.

3.2 Data Analysis

Please conduct preliminary analysis to ensure there are no glaring errors with your data. **Email an electronic copy of the raw data to Patti Rothenburger and Craig Linde.**

Final data analysis will be conducted by the MCVET team. A worksheet will be emailed to cooperators to enter their data throughout the growing season. **Contractors MUST NOT CHANGE THE SET-UP OR FORMATTING OF THE WORKSHEET IN ANY WAY as it is set up for input to Agrobase.**

APPENDIX A

Recommendations for Reducing Clubroot Risks Associated with Field Research

Because clubroot is not widespread in Manitoba, plot research looking at clubroot (*Plasmodiophora brassicae*) as the target pest, may only be conducted in locations *outside of Manitoba* (e.g. established field nurseries in Alberta or Ontario/Quebec).

Operational Guidelines for Conducting Field Research

Because of the risk that clubroot is already present in Manitoba soils, caution must be taken in canola field research, even when clubroot is not the disease of interest.

The following guidelines are recommended for all field research, co-op variety testing and post-registration variety testing conducted in Manitoba.

1. Industry personnel should speak with the grower if clubroot is known or suspected to be present in the field or surrounding area.
2. Discuss with the grower the type of field practices (rotations, custom field operators, oilfield activities, etc.), which potentially increase the chance of spreading clubroot, as a part of risk assessment. In addition, ask about past crops and weeds history, noting those in the Brassica family are susceptible to clubroot.
3. Inform the grower of the precautionary measures being taken to prevent clubroot spread. Ask the grower if he requires any additional measures and what those should be. Growers should feel encouraged to inspect industry equipment and protocols to be satisfied that there is no risk of contaminating their land. If tours are to be conducted, then establish clearly what precautions will be implemented.
4. Industry personnel should discuss with growers the implications of their privacy policy and corporate responsibility in regards to clubroot findings.
5. Fields selected for trials should be sampled prior to planting to determine if clubroot is present, as well as every year. If a susceptible crop is grown, watch for clubroot symptoms. Note that consecutive or tight rotations of susceptible crops, creates a high risk environment for increasing clubroot if it is introduced to the soil. Land in proximity to the entrance way to the field and/or the plot area should be sampled in a 'W' pattern providing 5 samples, which can be submitted as a composite. Sampling canola volunteers/Brassica weeds should ideally be done in the year prior to the trials, if the potential plot location is known.
 - If detected positive by PCR test or by other identifiable means (infected crops or weeds), these fields will not be utilised for research. The grower must be informed of the findings.

- If clubroot is discovered at the site while the site is in use (e.g. on plants in plots), use of field equipment needs to be minimized, and any such equipment must follow vehicle sanitation procedures. The grower must be informed of the findings.
6. Trucks, trailers, etc. should be parked or unloaded off-site. Any fields known to have clubroot infestation will be off-limits to any vehicle access and will be strongly avoided for foot-traffic as well.
 7. Records should be kept of all fields visited and sanitation procedures followed.

Vehicle Sanitation Procedures:

1. The most clearly established factor contributing to clubroot spread in Alberta was found to be from contaminated soil on agricultural equipment. Do not drive into field or access, but park on the road whenever possible.
 - Exceptions can be made for field-trials with permission of the grower. In these cases vehicle sanitation procedures will apply. Industry personnel can walk into fields but must follow human sanitation procedures.
2. Vehicles should especially stay out any of these fields following a rain – wet soil is much more difficult to remove than dry.
3. If a vehicle enters a field in the infested municipalities then it will follow these procedures:
 - Before entering any field, vehicles and equipment must be clean. Growers should be encouraged to inspect any vehicles/equipment as well. This will reduce concern that soil (infested or not) is being transported.
 - When leaving the field, knock off all clumps of soil in field before leaving field – preferably not in the field’s approach, but off to one side.
 - If a pressure washer is available, pressure wash any visible soil, focus on tires, undercarriage, and any other parts that may have contact with soil. If this is not available, use a car-wash and clean vehicle and equipment as best as possible.
 - Mist down tires and other points of contact with a disinfectant, such as 1-2% bleach solution (bleach can be corrosive), Rocal, or 1% Virkon. This disinfectant process should be the last step, since most disinfectants do not effectively penetrate soil. The disinfectant will need to be in contact for 15 to 20 minutes with the pathogen to be effective. Vehicles and equipment need to be clean and free of soil for the disinfectant process to be effective.

Human Sanitation Procedures:

1. If industry personnel enter a field in any potentially infested regions, whether it is known to have clubroot or not, they are to follow these human sanitation procedures:

- Wear disposable footwear that can be removed immediately after leaving the field. Another option is to use rubber boots or other footwear that can be sterilized (misted) with a disinfectant solution (10% bleach) upon leaving the field.
- Dispose of the disposable footwear in a sterile fashion. Sealing in a garbage bag and burning is preferred. Do not reuse disposable footwear.
- Clean and disinfect any tools that may have been in contact with soil in the field

Risk assessment of clubroot based on CFIA pest risk assessment factors

Risk factor	Risk level	Risk mitigation options
Known presence/absence of the pathogen in Canada	Low - presence in several provinces including Saskatchewan	N/A
Host range/local presence of potential hosts	Medium – infect canola and weeds in mustard family	Crop rotation out of canola crops
Potential for significant exotic biotypes or strains	Medium - 4 races exist on the prairies, potentially more races	Judicious use of R cv. to delay race-structure change
History of the organism in other new environments	Low - one of the old plant diseases described, ubiquitous, endemic	Clubroot is manageable by R cultivars, agronomic/cultural practices, and fungicides
Virulence/aggressiveness of the organism	High - aggressive under favorable soil conditions	Cultivar resistance, agronomic or cultural practices, and use of fungicides
The availability of pest risk information	Low - information abundant about clubroot, but most is on vegetable crops	Research on clubroot infection and yield impact is being studied
Nature of the proposed work (scale <i>in vivo</i>)	Low – indoor, small-scaled trials with < 100 plants, pathogen amount is much less than that in infested fields	Procedures designed to prevent pathogen escape from indoor trials will be implemented
The location, proximity of suitable hosts	Low – no canola fields within 5 km radius of the trial area	Procedures preventing/mitigating pathogen escape implemented
Mode of transmission or spread (airborne/soilborne)	Low – soilborne, no airborne spores	Measures to prevent/mitigate pathogen escape implemented
Potential rate of local and long-distance spread	Low – spread by wind/water erosion and field equipment	Equipment cleaning, use no-till /cover crops- reduce wind erosion
Presence of vectors in Canada	Low – no vector organism known	N/A
Presence of vectors in or near the trial facility	N/A	N/A
Persistence and potential for overwintering	High – resting spores persist in soil for up to 20 years	Grow non-crucifer crops, or R cv. of canola

Environ. requirements for establishment and spread	High – resting spores are tolerant to a wide range of environ. conditions	Long-term rotation or use of R canola cultivars
Capacity to control/eradicate if escapes;	Medium - eradication is impractical and unnecessary	Disease can be managed with R cultivars and crop rotation
Potential for economic or environmental losses	High – up to 50% yield reduction on canola under severe infection	Impact of the disease can be alleviated using R cultivar, crop rotation, and soil fungicides
Economic and environmental significance of pathogen and their host plants	High – the host canola is of significant economic value in western Canada, and can be affected substantially by the pathogen	Use of an integrated strategy for sustainable management of clubroot
Biosecurity-related risks (e.g. the potential for theft/misuse)	Low – trials are on secured AAFC property, with only employee access to the building	Trial area is locked at all times with restricted access by approved personnel