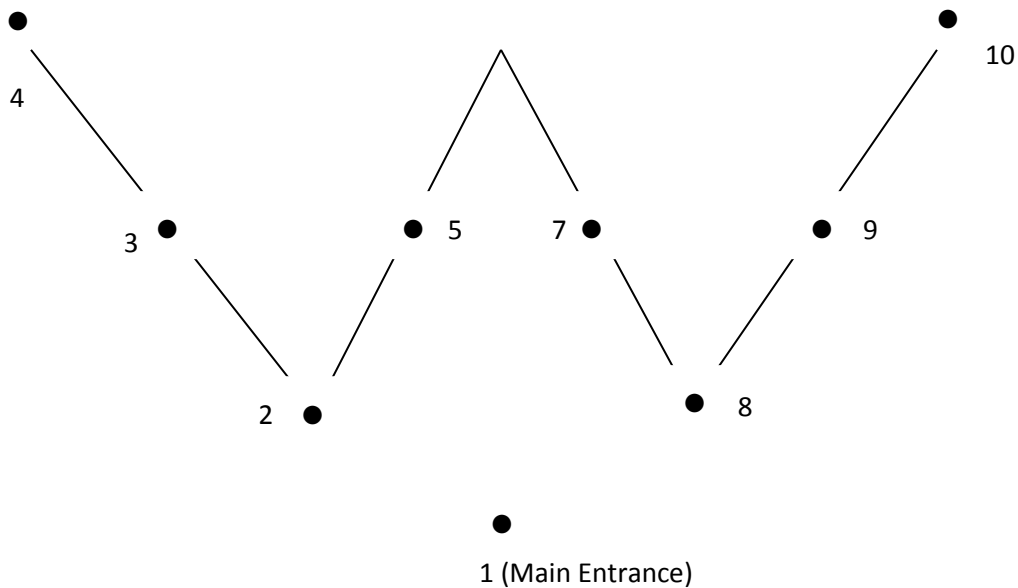


**CANOLA CLUBROOT SURVEY PROTOCOL TO IDENTIFY NOVEL STRAINS OF
THE PATHOGEN VIRULENT ON RESISTANT CULTIVARS
(SPECIAL SURVEY LED BY AARD)**

1. Since previous reports have found that clubroot infestations in canola crops will most likely be found at the field approach, begin by surveying the main approach to the field
2. Select an area about 20-30 m² in size around the approach that seems to be representative of the field as a whole; examine the roots of multiple (up to 100) plants within this area for the presence/absence of clubroot galls. If no clubroot symptoms are found, then no additional surveying is required, unless distinct patches of diseased or prematurely senescing plants are observed elsewhere in the field. If such patches are visible from the edge of the field, they should be investigated by digging out plants and observing the roots for symptoms of clubroot.
3. If clubroot is identified on any plants at the main approach to the field, then the entire field should be surveyed by inspecting the roots of all plants within a 1 m² area at each of 10 evenly spaced locations along the arms of a 'W' sampling pattern



4. In fields where clubroot is found, all of the roots within the 1 m² area at each sampling location should be dug from the soil and rated on a four-point scale, where: 0 = no galls, 1 = a few small galls, 2 = moderate galling and 3 = severe galling (**refer to Fig. 1 on p. 4**)
5. The number of plants in each category should be recorded (**see sample data sheet on p. 3**)

Sampling Protocol

- Fields of clubroot resistant varieties showing an average of 10% disease incidence or greater for an entire field or 50% or greater for an infected “spot” should be submitted to ARD for testing
- Ten representative root samples should be collected from each infested sampling point found within a field;
- Record field reference number on each sample as it is collected. Please label samples as follows:
 - 2014-R-1-1 (Year-Resistant Canola-Field 1-Sample 1)
- Sterilize sampling tools between each sample using a 1-2% v/v bleach solution
- Use a new Ziploc bag for each sample
- Keep samples cool by placing into a cooler
- Submit samples as soon as possible

Special Considerations (Biosecurity Protocol):

- To prevent spread of the soilborne resting spores of the clubroot pathogen, appropriate sanitization protocols should be followed (e.g., use of disposable boot covers, sterilization of tools and rubber boots with bleach or other disinfectant, etc.); consult the Alberta Clubroot Management Plan or AARD Agri-Facts Sheet ‘Clubroot Disease of Canola and Mustard’ (Agdex 140/638-1) for detailed information
- To improve the likelihood of identifying small patches of diseased canola plants within otherwise resistant crops, standing crops should be surveyed whenever possible Contact the Agricultural Fieldman in each municipality prior to initiating a survey in a region.
- For additional information please contact:

Maureen Vadnais
Alberta Agriculture and Rural Development
Room 200, 7000-113 Street
Edmonton, AB T6H 5T6
email: maureen.vadnais@gov.ab.ca
PH: 780-644-4432

- Suspect samples should be submitted to the following address:
Attention: Sheau-Fang Hwang
Alberta Agriculture and Rural Development
17507 Fort Road NW
Edmonton, AB T5Y 6H3

Surveyor Information

Name _____

E-mail _____

Telephone _____

Field Information

Field # _____

Legal Land Location _____

Cultivar (if known) _____

Field history (if known) and other comments _____

Sampling site #	GPS coordinates	Number of plants rated 0, 1, 2 or 3			
		0	1	2	3
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Total					

Example: if you pulled up 87 plants at the entrance and all were rated '0' (no disease)

Sampling site #	GPS coordinates	Number of plants rated 0, 1, 2 or 3			
		0	1	2	3
1	50.55156 -111.85222	87	0	0	0

Clubroot Rating Scale



Fig. 1. Clubroot rating scale: 0 = no galling; 1 = a few small galls (small galls on less than 1/3 of roots), 2 = moderate galling (small to medium-sized galls on 1/3 to 2/3 of roots), 3 = severe galling (medium to large-sized galls on more than 2/3 of roots) (S.E. Strelkov)