

CROP: Canola
LOCATION: Alberta

NAMES AND AGENCIES:

S.E. Strelkov¹, V.P. Manolii¹, J. Liu¹, C. Jurke², D.C. Rennie¹, D. Orchard³, S.F. Hwang⁴ and P. Laflamme⁴

Telephone: (780) 492-1969; **Facsimile:** (780) 492-4265; **E-mail:** stephen.strelkov@ualberta.ca

¹Department of Agricultural, Food and Nutritional Science, University of Alberta, 410 Agriculture/Forestry Centre, Edmonton, AB T6G 2P5

²Canola Council of Canada, Box 3035, Lloydminster, SK S9V 1P9

³Canola Council of Canada, 5410 – 45 Avenue, Wetaskiwin, AB T9A 0E9

⁴Alberta Agriculture and Rural Development, Crop Diversification Centre North, 17507 Fort Road NW, Edmonton, AB T5Y 6H3

TITLE: THE OCCURRENCE OF CLUBROOT ON CANOLA IN ALBERTA IN 2011

METHODS: A total of 447 commercial canola (*Brassica napus* L.) crops in 21 counties in central Alberta were surveyed for the incidence of clubroot (Table 1), caused by the obligate parasite *Plasmodiophora brassicae* Woronin. Of these crops, 23 were confirmed to be clubroot-resistant canola hybrids. The survey was conducted from late August to late October, 2011, with the crops usually visited after swathing. The roots of all plants within a 1 m² area at each of 10 locations along the arms of a 'W' sampling pattern were dug from the soil and examined for the presence of galls, which were taken as an indication of *P. brassicae* infection. The severity of root infection on each sampled plant was assessed on a scale of 0 to 3, adapted from Kuginuki et al. (1), where 0 = no galling, 1 = a few small galls, 2 = moderate galling and 3 = severe galling. The individual ratings were then used to calculate an index of disease (ID) for each field, according to the method of Horiuchi and Hori (2) as modified by Strelkov et al. (3). Visits to fields were coordinated with the Agricultural Fieldman in each municipality.

RESULTS AND COMMENTS:

One hundred and three of the 447 canola crops surveyed were found to be clubroot-infested, all of which represented new cases of the disease. This number included a case in the County of Vermillion River and another in Red Deer County, representing the first confirmed cases of clubroot in those municipalities (Table 1). Clubroot was detected in nine of 23 fields cropped to a resistant canola hybrid, and in 94 of 424 fields cropped to susceptible hybrids or hybrids of unknown resistance. Clubroot severity in the infested resistant crops was generally very low to low, with average ID values ranging from 0.2 to 10.2%. In the infested susceptible crops or crops of unknown resistance, the average ID was below 10% in 50 fields, between 10 and 60% in 32 fields and above 60% in 12 fields. In addition to the 103 infested canola crops found in this survey, another 162 new cases of clubroot were identified in surveys conducted independently by Barrhead, Leduc, Parkland, and Strathcona counties. A total of 831 fields are now confirmed to be infested with clubroot in Alberta, distributed over 20 counties and a rural area of northeast Edmonton. The outbreak remains most severe in the central part of the province, although the number of cases in counties formerly considered to be peripheral to the main outbreak continues to rise.

The number of new cases of clubroot identified in 2011 is the greatest found in a single year since surveying commenced in 2003. Conditions early in the growing season were favorable for clubroot development, with abundant rainfall throughout much of central Alberta. However, the increasing prevalence of this disease also likely reflects continued spread of *P. brassicae*. This year (2011) also marked the first confirmed cases of clubroot in Saskatchewan, although the pathogen (but no disease symptoms) was first identified in that province in 2008 (4). The cropping of clubroot-resistant canola hybrids should be considered as an important disease management tool in affected counties and neighboring regions, although resistance will have to be carefully managed to ensure its longevity.

ACKNOWLEDGEMENTS:

We would like to thank J. Babcock (Ponoka), K. Basu (Strathcona), M. Bates (Beaver), J. Benson (Yellowhead), Q. Bochar (Sturgeon), D. Burlock (Lacombe), T. Davies (Camrose), C. Dowhan (Thorhild), T. Eleniak (Lamont), A. Eyolfson (Flagstaff), M. Flock (Barrhead), T. Gresiuk (Lamont), P. King

(Camrose), K. Kotylak (Beaver), J. Leskiw (Parkland), W. MacLean (Thorhild), S. Majek (Wetaskiwin), C. McIntosh (Red Deer), A. Preachuk (Red Deer), J. Schwindt (Wainwright), B. Sommerville (Kneehill), S. Steffen (Ponoka), G. Thompson (Lac Ste. Anne), J. Tigert (Westlock), D. Ullery (Minburn), A. Van Beers (Leduc) and T. Warren (Parkland) for their assistance with the survey. The financial support provided by the Canola Council of Canada through the Agriculture and Agri-Food Canada Clubroot Risk Mitigation Initiative is gratefully acknowledged, as is the support from the Alberta Crop Industry Development Fund, the Alberta Canola Producers Commission, the Agri-Flex Program of the Government of Canada, and various industry partners.

REFERENCES:

1. Kuginuki, Y., Hiroaki, Y., and Hirai, M. 1999. Variation in virulence of *Plasmodiophora brassicae* in Japan tested with clubroot-resistant cultivars of Chinese cabbage (*Brassica rapa* L. spp. *pekinensis*). *Eur. J. Plant Pathol.* 105:327-332.
2. Horiuchi, S., and Hori, M. 1980. A simple greenhouse technique for obtaining high levels of clubroot incidence. *Bull. Chugoku Natl. Agric. Exp. Stn. E (Environ. Div.)*. 17:33-55.
3. Strelkov, S.E., Tewari, J.P., and Smith-Degenhardt, E. 2006. Characterization of *Plasmodiophora brassicae* populations from Alberta, Canada. *Can. J. Plant Pathol.* 28:467-474.
4. Dokken-Bouchard, F.L., Bouchard, A.J., Ippolito, J., Peng, G., Strelkov, S., Kirkham, C.L., and Kutcher, H.R. 2010. Detection of *Plasmodiophora brassicae* in Saskatchewan, 2008. *Can. Plant Dis. Surv.* 90:126.

Table 1. Distribution of clubroot-infested canola fields identified in Alberta in 2011

County	Number of fields surveyed	Number of new cases of clubroot-infested fields
Barrhead	20	6 ^a
Beaver	21	0
Camrose	25	10
Flagstaff	20	7
Kneehill	16	0
Lacombe	16	2
Lac Ste. Anne	18	4
Lamont	21	5
Leduc	25	12 ^b
Minburn	22	0
Parkland	20	9 ^c
Ponoka	21	3
Red Deer	16	1
Strathcona	26	9 ^d
Sturgeon	23	15
Thorhild	24	2
Vermillion River	30	1
Wainwright	23	0
Westlock	21	9
Wetaskiwin	18	6
Yellowhead	21	2
TOTAL	447	103

^aAn additional 3 clubroot-infested fields were identified in a survey conducted by the County of Barrhead, bringing the total number of new cases in that municipality to 9

^bAn additional 139 clubroot-infested fields were identified in a survey conducted by the County of Leduc, bringing the total number of new cases in that municipality to 151

^cAn additional 11 clubroot-infested fields were identified in a survey conducted by Parkland County, bringing the total number of new cases in that municipality to 20

^dAn additional 9 clubroot-infested fields were identified in a survey conducted by Strathcona County, bringing the total number of new cases in that municipality to 18

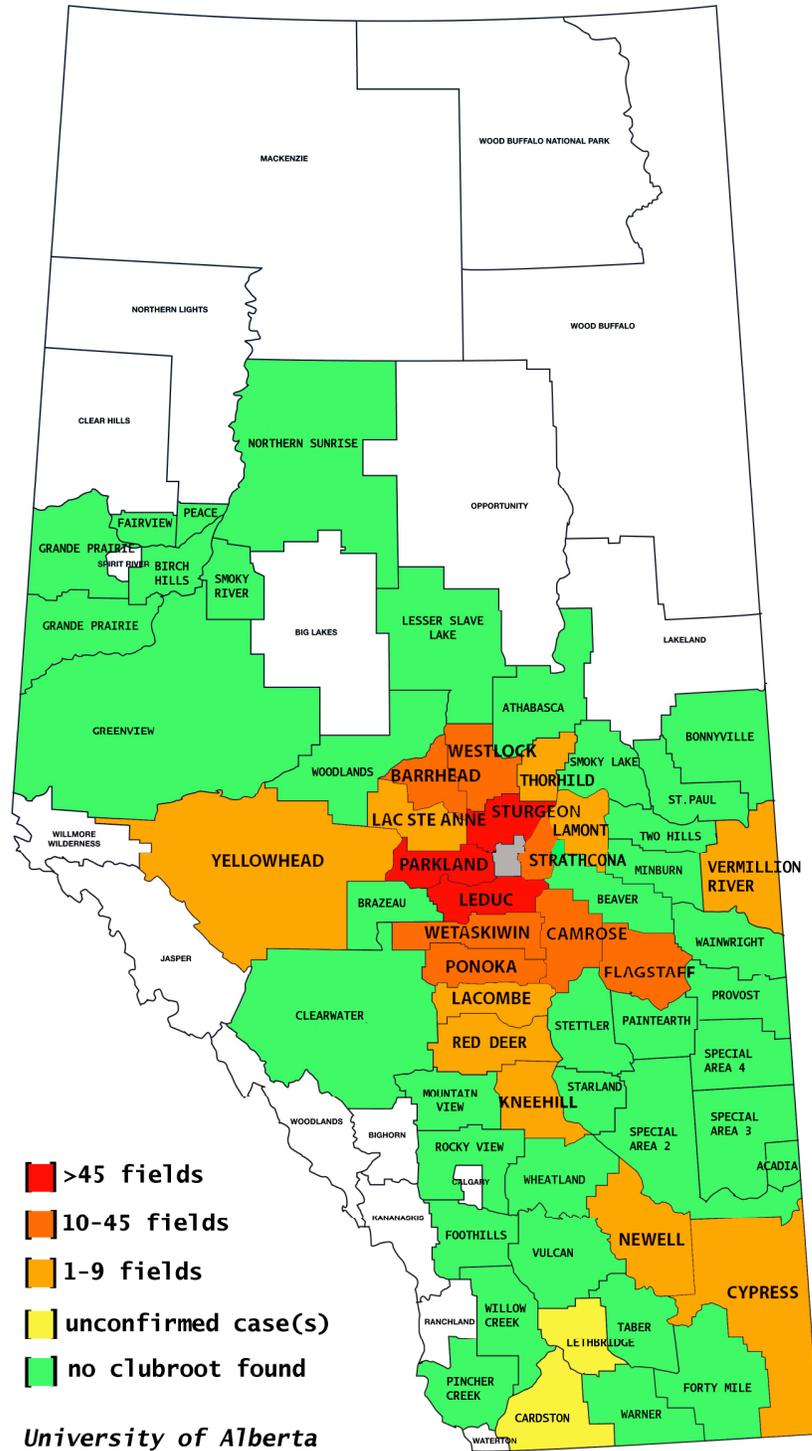


Figure 1. The occurrence of clubroot on canola in Alberta as of November 2011. Since clubroot surveys were initiated in 2003, the disease has been confirmed in a total of 831 fields representing 20 counties and a rural area of the City of Edmonton.