

CROP: Canola
LOCATION: Alberta

NAMES AND AGENCIES:

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TITLE: OCCURRENCE AND SPREAD OF CLUBROOT ON CANOLA IN ALBERTA IN 2016

ABSTRACT: A survey of 570 commercial canola (*Brassica napus* L.) crops representing 40 counties and municipalities in Alberta revealed 68 new fields infested with clubroot (*Plasmodiophora brassicae* Woronin). Another 221 new cases of the disease were found during surveillance by municipal and county personnel, for a total of 289 new clubroot-infested fields in 2016. Clubroot infestations have been confirmed in a grand total of 2443 fields in Alberta since surveys for this disease commenced in 2003.

METHODS: A survey for clubroot (*Plasmodiophora brassicae* Woronin) was carried out in 570 commercial canola (*Brassica napus* L.) crops distributed across 40 counties and municipalities in Alberta. Fields included in the survey had either not been inspected previously for clubroot, or had been surveyed earlier and found to be free of the disease. Most fields were visited in September shortly after swathing. A 20 to 30 m² area was selected near the field entrance and at least 50 canola roots were sampled randomly within that area. If no symptoms of clubroot were found, then no more sampling was carried out. If clubroot was found, then the crop was surveyed more extensively by inspecting the roots of all plants within a 1 m² area at each of 10 locations along the arms of a 'W' sampling pattern. This approach was used because most clubroot infestations are initiated at field entrances (1). Clubroot symptom severity on each sampled canola plant was assessed on a scale of 0 to 3 according to Kuginuki et al. (2), where: 0 = no galling, 1 = a few small galls, 2 = moderate galling and 3 = severe galling. The individual ratings were used to calculate an index of disease (ID) for each crop, based on the method of Horiuchi and Hori (3) as modified by Strelkov et al. (4). Whenever possible, surveillance activities were coordinated with the agricultural fieldman in each municipality. Survey information from independent clubroot inspections conducted by county and municipal staff was collected and combined with the data from the Alberta-wide survey, in order to produce the most complete assessment possible of clubroot infestation in the province.

RESULTS AND COMMENTS: Symptoms of clubroot were found in 68 of 570 canola crops inspected. Disease severity ranged from mild to severe, with an average ID <10% in 45 crops, 10-60% in 20 crops, and >60% in three crops. The three cases of severe clubroot were found in susceptible hybrids. In addition to the new records of clubroot identified in the province-wide survey, another 221 new cases of the disease were found during surveillance by county and municipal personnel in the counties of Athabasca, Camrose, Lacombe, Lamont, Leduc, Minburn, Parkland, Smoky Lake, Stettler, Strathcona, Sturgeon, Westlock, Wetaskiwin and Woodlands (Table 1). Since Athabasca, Lacombe, Lamont, Minburn, Parkland, Stettler and Wetaskiwin were not visited as part of the province-wide survey coordinated by the University of Alberta and Alberta Agriculture and Forestry, the only data on clubroot occurrence in those counties came from the municipal personnel. Further monitoring of canola crops in the Peace River Region of Alberta by Ministry of Agriculture and Forestry staff revealed no instances of clubroot there (data not shown), and the region still appears to be free of the disease. In total, 289 new clubroot infestations were recorded in Alberta in 2016, for a grand total of 2443 fields with confirmed infestations since surveys began in 2003 (Fig. 1).

While most of the 289 new records of clubroot were found on susceptible canola hybrids or hybrids of unknown resistance, symptoms of the disease also were identified in 42 fields that had been planted to

clubroot-resistant hybrids. Galled canola root tissue was collected from each of these fields in order to recover the corresponding pathogen populations and evaluate their virulence under controlled environmental conditions. Novel virulence phenotypes of *P. brassicae*, capable of overcoming the resistance in most clubroot resistant hybrids, have been recently identified in Alberta (5). As such, it is important to monitor for further shifts in pathogen virulence that could decrease the effectiveness of genetic resistance as a clubroot management tool.

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Table 1. Distribution of *Plasmodiophora brassicae*-infested canola fields identified in Alberta in 2016

County or municipality	Number of fields assessed in provincial survey	Number of new cases of <i>P. brassicae</i> -infested fields	Additional new cases identified by county/municipal staff	Total new cases
Acadia	2	0	0	0
Athabasca	0	--	3	3
Beaver	24	2	0	2
Bonnyville	24	0	0	0
Brazeau	7	0	0	0
Camrose	20	5	34	39
Cardston	10	0	0	0
Clearwater	21	2	0	2
Edmonton (City)	3	1	0	1
Flagstaff	24	0	0	0
Foothills	10	0	0	0
Forty Mile	10	0	0	0
Lac Ste. Anne	21	2	0	2
Lacombe	0	--	5	5
Lamont	0	--	3	3
Leduc	12	6	94	100
Lesser Slave River	23	0	0	0
Minburn	0	--	1	1
Mountain View	16	1	0	1
Newell	20	0	--	0
Paintearth	22	0	0	0
Parkland	0	--	38	38
Pincher Creek	10	0	0	0
Ponoka	21	4	0	4
Smoky Lake	26	10	1	11
Special Area 2	10	0	0	0
Starland	20	0	0	0
Stettler	6	0	5	5
St. Paul	22	2	0	2
Strathcona	3	0	10	10
Sturgeon	35	13	12	25
Taber	10	0	0	0
Two Hills	18	4	0	4
Vulcan	14	0	0	0
Warner	10	0	0	0
Westlock	48	11	1	12
Wetaskiwin	0	--	12	12
Wheatland	20	0	0	0
Willow Creek	10	0	0	0
Woodlands	18	5	2	7
TOTAL	570	68	221	289

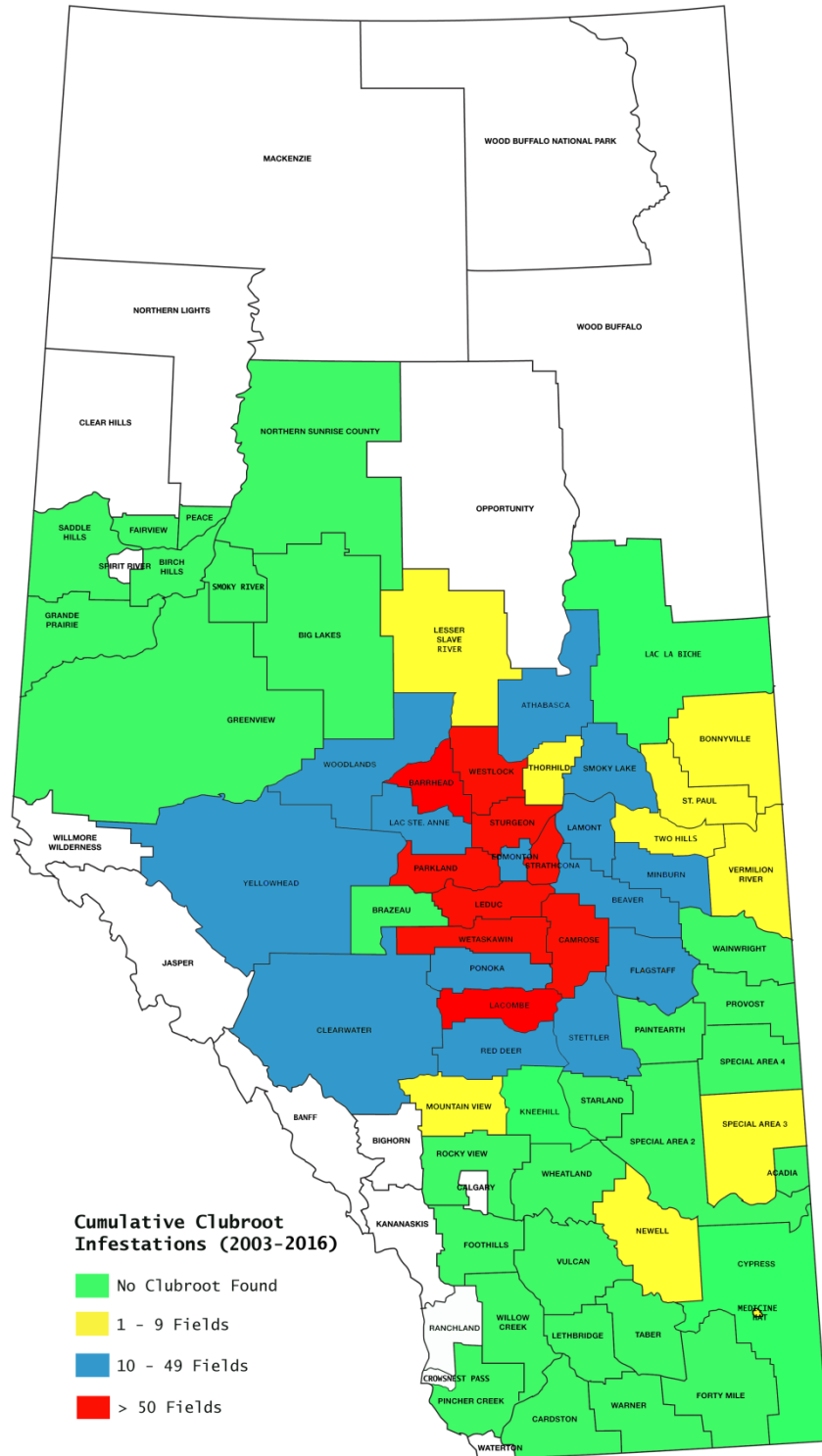


Figure 1. The occurrence of clubroot on canola in Alberta. Since surveys for clubroot were initiated in 2003, the disease has been confirmed in a total of 2443 fields representing 31 counties and municipal districts in the province, as well as in rural areas of the cities of Edmonton and Medicine Hat, and the Town of Stettler.