

CROP: Canola
LOCATION: Alberta

NAMES AND AGENCIES:

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TITLE: THE OCCURRENCE OF CLUBROOT ON CANOLA IN ALBERTA IN 2014

ABSTRACT: A survey of 648 commercial canola crops in 36 counties and municipalities in Alberta revealed 104 new cases of clubroot. Additional surveys by county and municipal personnel identified another 279 new records of the disease, for a total of 383 clubroot-infested fields in 2014. A grand total of 1868 clubroot-infested fields have been confirmed in Alberta since surveys began in 2003.

METHODS: A total of 648 commercial canola (*Brassica napus* L.) crops in 36 counties and municipalities in central and southern Alberta were surveyed for the incidence of clubroot disease caused by *Plasmodiophora brassicae* Woronin (Table 1). All of these crops were located in fields that had either not been previously surveyed for clubroot, or had been inspected in earlier surveys and found to be negative for the disease. Of the crops surveyed in 2014, 35 were confirmed to be clubroot-resistant canola hybrids, while the others were susceptible hybrids or hybrids of unknown resistance. All of the clubroot-resistant canola crops were located in central Alberta. Surveys were conducted mainly in September shortly after swathing. When inspecting fields, a 20 to 30 m² area was selected near the field entrance and a minimum of 50 roots were sampled randomly within that area. If no symptoms of clubroot were found, then no more sampling was performed. If clubroot was found, then the field was surveyed more extensively by examining 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 taken because most clubroot infestations are known to be initiated at the field entrance (1). The severity of root infection on each sampled plant was assessed on a scale of 0 to 3, adapted from Kuginuki et al. (2), 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, based on the method of Horiuchi and Hori (3) as modified by Strelkov et al. (4). Survey activities were coordinated with the agricultural fieldman in each municipality. Data from independent clubroot inspections conducted by county and municipal staff also were collected and combined with the data from the Alberta clubroot survey, to provide the most complete assessment possible of clubroot occurrence in the province. In the cases of Barrhead, Camrose, Lac Ste. Anne, Parkland, Stettler, St. Paul, Strathcona, and Westlock counties, which were not included as part of the provincial survey in 2014, the only information on clubroot incidence this year came from the municipal inspections.

RESULTS AND COMMENTS: A total of 104 of the 648 canola crops inspected were found to have symptoms of clubroot, all of which represented new cases of the disease. Clubroot disease severity ranged from mild to severe, with an average ID <10% in 70 fields, 10% to 60% in 26 fields, and >60% in 8 fields. All cases of severe clubroot were found on susceptible hybrids or hybrids of unknown resistance. On the 35 canola crops confirmed to be resistant hybrids, symptoms of clubroot were generally absent (12 crops) or very mild (17 crops). Nonetheless, IDs ranging from 10.4% to 12.6% were observed on six resistant crops, and the corresponding *P. brassicae* populations will be isolated and tested for any shifts in virulence patterns. A strain of *P. brassicae* able to overcome the resistance in most clubroot resistant canola hybrids was identified from collections made in the 2013 survey (S.E. Strelkov, unpublished data).

In addition to the 104 new records of clubroot found in the Alberta-wide survey, another 279 new cases of the disease were identified in independent surveys conducted by municipal personnel in the counties of Athabasca, Barrhead, Camrose, Clearwater, Lacombe, Lac Ste. Anne, Lamont, Leduc, Parkland, Red Deer, Stettler, St. Paul, Strathcona, Westlock, Wetaskiwin, Woodlands, and Yellowhead (Table 1). Collectively, surveillance activities in 2014 revealed 383 new records of clubroot in Alberta, representing the second largest single-year increase in the number of new cases since surveys commenced in 2003. While still concentrated mainly in central Alberta (Fig. 1), the clubroot outbreak continues to spread, with the first confirmed infestations in the Municipal District of Lesser Slave River, and the counties of Clearwater, Smoky Lake and St. Paul. The first case of clubroot within the Town of Stettler was identified in 2013, but was reported too late for inclusion in the 2013 survey report (5). Despite its increasing prevalence in many regions, clubroot remains relatively uncommon in southern Alberta. Aside from three unconfirmed reports of the disease in the County of Newell, no other new cases of clubroot were identified south of the counties of Red Deer and Stettler in 2014.

What was believed to be the sole confirmed clubroot infestation in Cypress County, first identified in 2009, has now been found to actually be located just within the city limits of Medicine Hat, and the map of clubroot distribution in Alberta has been updated accordingly (Fig. 1). This change does not affect the total number of documented clubroot infestations in the province, which now number 1868.

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Table 1. Distribution of *Plasmodiophora brassicae*-infested canola fields identified in Alberta in 2014

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	10	0	0	0
Athabasca	20	11	1	12
Barrhead	0	--	6	6
Beaver	27	1	0	1
Brazeau	21	0	0	0
City of Edmonton	2	2	0	2
Camrose	0	--	53	53
Cardston	15	0	0	0
Clearwater	20	1	1	2
Cypress	13	0	0	0
Flagstaff	29	8	0	8
Forty Mile	15	0	0	0
Lacombe	22	8	19	27
Lac Ste. Anne	0	--	5	5
Lamont	22	7	1	8
Leduc	31	15	68	83
Lethbridge	25	0	0	0
Lesser Slave River	26	1	0	1
Minburn	24	3	0	3
Newell*	15	0	0	0
Parkland	0	--	59	59
Pincher Creek	16	0	0	0
Ponoka	23	5	0	5
Rocky View	15	0	0	0
Red Deer	21	6	2	8
Smoky Lake	28	6	0	6
Special Area 2	7	0	0	0
Special Area 3	1	0	0	0
Special Area 4	7	0	0	0
Starland	15	0	0	0
Stettler	0	--	9	9
St. Paul	0	--	1	1
Strathcona	0	--	35	35
Sturgeon	31	18	0	18
Taber	16	0	0	0
Vermilion River	21	1	0	1
Vulcan	15	0	0	0
Warner	10	0	0	0
Westlock	0	--	8	8
Wainwright	24	0	0	0
Wetaskiwin	25	7	5	12
Wheatland	15	0	0	0
Woodlands	21	4	4	8
Yellowhead	0	--	2	2
TOTAL	648	104	279	383

*Three new fields with suspicious symptoms were reported from the County of Newell but have not been confirmed.

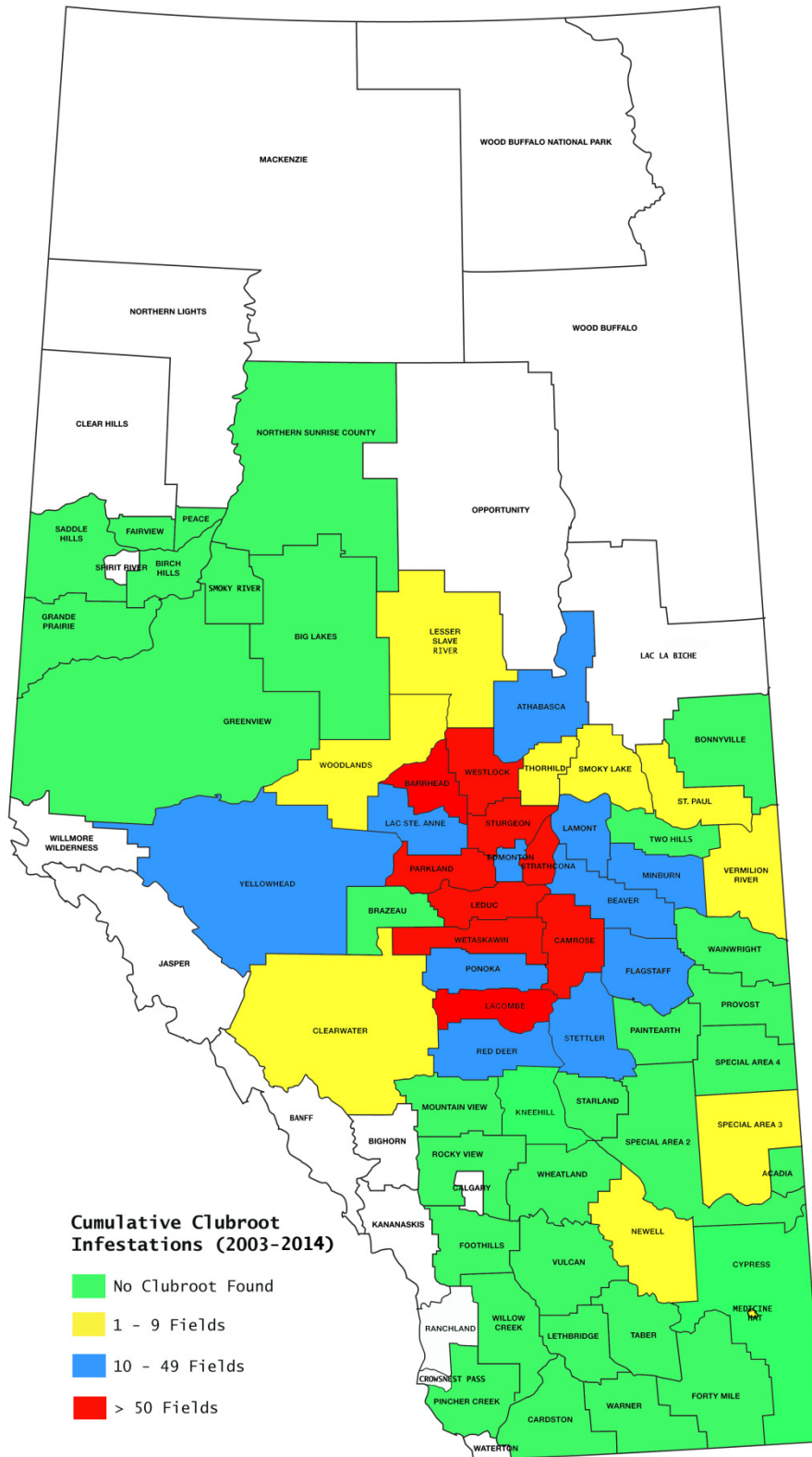


Figure 1. The occurrence of clubroot on canola in Alberta as of November 2014. Since clubroot surveys were initiated in 2003, the disease has been confirmed in a total of 1868 fields representing 28 counties and municipal districts in the province, as well as in rural areas of Edmonton, Medicine Hat, and the Town of Stettler. The presence of *Plasmodiophora brassicae* inoculum was detected in one field in Kneehill County in 2008 by means of PCR analysis and a bioassay, but no symptoms of clubroot on canola have been reported from that county since then.