2017 Alberta Weed Survey

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Figure 1. Fields surveyed in Alberta in 2017 (red dots) and the extent of agricultural area (shaded gray). Source: Leeson *et al.* (2017)

Julia Leeson, a Weed Monitoring Biologist with Agriculture and Agri-Food Canada, led a team that worked hard this year surveying weed species in Alberta field crops. Generally, the provincial weed survey takes place in July and August, following in-crop weed management, once every decade since the 1970's.

This year, the survey sampled 1,236 Alberta fields (**Figure 1**) with the collaboration of Linda Hall (University of Alberta) and Chris Neeser (Alberta Agriculture and Forestry). The crops sampled were canola, spring wheat, durum, barley, oat, lentil and field pea.

Each weed species found was summarized using a relative abundance index based on the frequency, uniformity, and density in the fields sampled. Then, the relative abundance index ranked the Alberta weed species from the most to least abundant.

Frequency - % of fields where the weed species occurred

Uniformity - % of quadrats where the weed species occurred in the field

Density - average number of plants per metre square of the weed species in the

The top five most abundant Alberta weed species in 2017 were chickweed (*Stellaria media*), wild buckwheat (*Fallopia convolvulus*), lamb's quarters (*Chenopodium album*), wild oats (*Avena fatua*), and volunteer canola (*Brassica napus*) (**Table 1**).

Chickweed was the most abundant weed species in Alberta and occurred at the greatest density (average density of 33 plants m^{-2}) compared with all other weed species.

Table 1. The ten most abundant weeds in Alberta in 2017[a]

	Relative Abundance Rank					
	1970's	1980's	1997	2001	2010	2017
Chickweed	6	5	2	3	7	1
Wild buckwheat	3	1	3	1	1	2
Lamb's quarters	5	7	7	6	8	3
Wild oats	2	3	1	2	2	4
Volunteer canola	13	19	20	16	6	5
False cleavers	41	28	8	7	5	6
Green foxtail	4	4	17	8	19	7
Volunteer wheat	---[b]	30	22	22	18	8
Canada thistle	9	12	5	4	3	9
Dandelion	15	20	10	10	4	10

[a] Adapted from: Leeson *et al.* (2017)
[b] Volunteer wheat was not surveyed in the 1970's

Wild buckwheat was the second most abundant weed and occurred in fields most frequently (42% of fields), albeit at a much lower density than chickweed (average density 4 plants m^{-2}). Since the 1970's, false cleavers (*Galium spurium*) increased in relative abundance the most (increased by 35 ranks) out of the top ten most abundant weed species, followed by volunteer wheat (increased by 22 ranks since the 1980's) and volunteer canola (increased by 8 ranks).

There could be many reasons for shifts in abundance of weed species in Alberta in the past four to five decades. Some of these reasons include shifts in predominant tillage systems from conventional to minimum or zero-tillage, selection for herbicide resistance in weed species, the release of herbicide-resistant crops, an increase in production of pulse crops with few POST-emergence herbicide options, and potentially also changes in climate and/or weather patterns.

Seven of the top ten most abundant weeds in Alberta (including volunteer wheat and canola) are resistant to at least one herbicide mode of action. Of these, wild oats holds the record for biotypes resistant to the greatest number of herbicide modes of action.

Alberta has triple herbicide-resistant wild oat biotypes (to herbicide groups 1, 2 and 8, while quintuple herbicide-resistant wild oat biotypes (to herbicide groups 1, 2, 8, 14 and 15) are in Manitoba. Species-specific biology also can play a large role in the relative abundance of weed species.

Future Weed Wisdom columns will focus on the biology of these weed species.

Source: Leeson JY, Hall L, Neeser C (2017) Residual weed population shifts in Alberta – 1973 to 2017. Page 43, in: Proceedings of the 71st Canadian Weed Science Society Annual Meeting, Saskatoon, SK, CA. November 20-23.