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WEED SURVEYS IN MARITIME ORGANIC GRAIN FIELDS

Final Research Report E2008-45

INTRODUCTION

Organic farms have different weed management techniques and fertility inputs than conventional farms, which may result in different weed population dynamics. Previous research has shown that weeds in organically managed or low input fields may be both more abundant and diverse than in conventional fields and the weed species composition may vary from that observed in conventional fields. Consequently, weed surveys of conventional farms and subsequent management recommendations may not be relevant for organic producers.

In the Maritimes, organic grain and oilseed producers list weed control as one barrier to achieving high yields. Often, the most visible weeds identified as problematic can mask other weeds which may be more detrimental to yield or cause harvest difficulties. A thorough understanding of the weed populations and diversity of a region is necessary to the identification of successful organic weed management techniques.

METHODS

Between June 28 and July 26, 2006, a weed survey was conducted in organically managed grain and pulse fields at 43 sites across the Maritimes. Sixteen different farms were part of this study, with 1 – 4 fields per farm sampled depending on crops grown that year. The regional breakdown was 18 fields in Nova Scotia, 11 in New Brunswick, and 14 in PEI.

At each field, 8-10 quadrats were sampled, with the quadrat size ranging from 0.05 – 0.16 m^2. OACC staff identified and counted individual weeds at the true leaf stage and larger. In some cases, species were grouped by family when identification to the species level was not possible (i.e. *Stellaria* spp., *Cirsium* spp.).

This survey represents an assessment of what weeds were present and their abundance. It is not an indication of the relative competitiveness of the weeds, which is largely determined by their size (especially in relation to the crop) in addition to their number. For example, 10 wild oat plants and 100 shoots of couch grass both would cause an estimated 10% yield loss in wheat.

SURVEY RESULTS

The frequency of occurrence of each weed species by the number and percentage of fields where the weeds occurred, and the average density of the weed in fields where it is present is summarized in Table 1. The most common weed (appearing in 93% of fields) was lamb's quarters, an annual weed that thrives in fertile conditions. This may be regarded as somewhat unusual since organic farms are often perceived to have lower fertility unless they use manure. Chickweed and stitchwort were also widespread, but average density was lower at 25 plants m^{-2}. 'Other grassy weeds' appeared on 81% of fields and had the highest average density of any weed assessed (104 plants m^{-2}).

Grass-leaved stitchwort (L) and quackgrass (couchgrass) at flowering (R) (A. Hammermeister)

Table 1. Distribution and density of weed species sampled on Maritime organic farms, 2006

Weed Species			Distribution		Density
Common name	Latin name	Indicator of Soil Condition[Z]	Number of fields	% of all fields	Plants m^{-2}
Lamb's quarters	*Chenopodium album*	fertile	40	93	33.0
Chickweed/ Stitchwort	*Stellaria spp.*	high fertility, partly decomposed OM	39	91	25.7
Other grassy weeds			35	81	104.4
Plantain[P]	*Plantago major*	clay, poorly drained, acidic	34	79	24.9
Hemp nettle	*Galeopsis tetrahit*	acidic	29	67	11.7
Dandelion[P]	*Taraxacum officinale*	clay/heavy, acidic	28	65	6.7
Cudweed	*Gnaphalium uliginosum*	wet	25	58	45.8
Corn spurry	*Spergula arvensis*	sandy/light, acidic	24	56	77.8
Shepherd's purse	*Capsella bursa-pastoris*	saline	24	56	14.4
Wood sorrel	*Oxalis stricta*	wet, acidic	21	49	8.3
Vetch[P]	*Vicia* spp.	low N	20	47	8.1
Daisy[P]	*Chrysanthemum leucanthemum*	wet, acidic, infertile	17	40	32.7
Couch (quack) grass[P]	*Elytrigia repens*	hardpan/crusty, high fertility, low in Ca	16	37	62.2
Buttercup[P]	*Ranunculus* spp.	clay/heavy/wet	15	35	6.2
Thistle[P]	*Cirsium* spp.		14	33	4.8
Smartweed	*Polygonum lapathifolium*	wet	14	33	2.3
Wild radish	*Raphanus raphanistrum*	acidic with low fertility	13	30	14.9
Wild buckwheat	*Polygonum convolvulus*		13	30	2.4
Goldenrod[P]	*Solidago* spp.	sandy/light, wet	9	21	20.5
Yarrow[P]	*Achillea millefolium*	low K	8	19	4.9
Sheep sorrel[P]	*Rumex acetosella*	sandy, acidic	8	19	2.8
White cockle	*Silene pratensis*	sandy	8	19	3.9
Redroot pigweed	*Amaranthus retroflexus*	fertile, cultivated	7	16	31.0
Black medick	*Medicago lupulina*	low N	7	16	4.0
Stinkweed	*Thlapsi arvense*	hardpan/crusty, alkaline	7	16	1.2
Bindweed[P]	*Convolvulus arvensis*	sandy, hardpan or low OM	7	16	8.5
Other broadleaf weeds	occurring <4 sites		26	60	19.9

[Z] Indicators taken from Organic Field Crop Handbook 2nd Ed. (p. 43). Canadian Organic Growers, Ottawa ON. 2001.
[P] Perennial weed

Couchgrass appeared on 16 fields with an average density of 62 plants m^{-2}. The 'other grassy weeds' may also have included some couchgrass. Several other weeds occurred on fewer farms, but when observed were present at a higher density (cudweed, corn spurry, redroot pigweed). Averaged over all sites, the mean weed density in organic farm fields was 328 plants m^{-2}. Broadleaf weeds made up approximately 66% of weed density; the remaining 33% were grassy weeds. While most weed pressure came from annual weeds, perennial weeds were present in relatively high numbers, including couchgrass, daisy, Canada thistle, vetch, and buttercup.

CREDITS

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ACKNOWLEDGEMENTS

The authors gratefully acknowledge the assistance of co-operating organic farmers and OACC technicians, including Mark Bernard, Paula Schofield, Jody Nelson and Margaret Graves.

FUNDING

Provincial governments of Nova Scotia, Prince Edward Island and New Brunswick

Production of this bulletin was supported by:

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

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