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Whitney S. Cranshaw
Colorado State University

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CLOVER ROOT CURCULIO INJURY AND ABUNDANCE IN MINNESOTA ALFALFA OF DIFFERENT STAND AGE

Whitney S. Cranshaw¹

ABSTRACT

Root injury and midsummer adult abundance of clover root curculio (CRC), *Sitona hispidulus* (Fabricius), was surveyed in 24 different aged southeastern Minnesota alfalfa fields. CRC presence was not detected in first year fields 2–3 months following stand establishment. Increased root scarring was observed as stand age increased and most fields 3–5 years old showed heavy CRC root scarring. High CRC adult populations and widespread root scarring was found in second year alfalfa fields which suggests that CRC is a mobile insect capable of rapidly colonizing new plantings.

The clover root curculio (CRC), *Sitona hispidulus* (Fabricius), is a common insect of Minnesota alfalfa (Radcliffe et al. 1976). Larval stages can damage the crop by feeding on underground parts of the plant (Wildermuth 1910) and may directly cause reductions in plant vigor and yield. Feeding wounds also can allow entrance and establishment of pathogens (Dickason et al. 1968).

Eggs are laid after adults move back into fields following a summer aestivation period along field edges. The insect has been reported to be a weak flier (Bigger 1930) although Prescott and Newton (1963) and Pausch et al. (1980) reported that flights occur during warm days in late summer and early autumn. Prescott and Newton concluded that pedestrian travel might be most important for infestation of adjacent fields whereas winged migration was important in colonizing distant fields.

If CRC movement is largely restricted to walking, colonization and injury might be expected to occur slowly after stand establishment. CRC populations and injury would be expected to build more quickly in later years as both “native” and additional immigrants oviposited within a field. This pattern would be reflected in the larval damage of different aged alfalfa stands. This study was conducted to determine the rapidity of CRC colonization of new alfalfa stands and to survey the extent of larval injury to alfalfa roots.

METHODS AND MATERIALS

During July 1983, surveys were made of CRC abundance and root injury in 24 southeastern Minnesota alfalfa fields. Fields were of various stand ages and were all established in midspring plantings. Alfalfa roots were rated for weevil scarring on a scale of 1 (no scarring) to 10 (100% surface area root scarring). Adult CRC were collected twice, 8 July and 18–20 July, by taking a 25-sweep sample from the field interior. The timing of these surveys was made to coincide with the period of peak adult *Sitona* spp. abundance found by Radcliffe et al. (1976). Because of recent harvest, seven fields could not be sampled on the latter date. None of the fields had had any insecticide applications made to them while in alfalfa.

¹Department of Entomology, Colorado State University, Fort Collins, CO 80524.

Table 1. *Sitona hispidulus* mid-summer adult populations and larval root injury found in southeastern Minnesota alfalfa fields of different stand ages, 1983.

Planting date	<i>S. hispidulus</i> /25 sweeps ^a		Root damage rating ^b	
	No. fields	\bar{x} (Range)	No. fields	\bar{x} (Range)
1983	3	0	3	1.0 (1.0)
1982	4	17.8 (4-31)	11	4.1 (2.3-5.0)
1981	4	11.0 (1-18)	5	5.9 (4.3-6.5)
1980	1	1.0	1	8.3 (8.3)
1979	3	1.3 (1-2)	4	8.0 (7.2-9.0)

^aSweep net samples taken 18-20 July; no adults were collected on 8 July.

^bSurvey root damage rating on a 1 (no scarring) to 10 (100% root surface area scarring).

RESULTS AND DISCUSSION

CRC root scarring increased in severity with stand age (Table 1). Fields planted during spring 1983 were not observed to have roots injured by CRC weevil larvae, which is consistent with the finding of Lieber et al. (1981) that dispersal to new fields occurs in late fall. CRC damage was widespread in second year alfalfa and 3-4-year-old stands planted in 1979-1980 were heavily damaged. The rapidity with which fields were invaded suggests *S. hispidulus* may be quite mobile. The pattern of increasing larval injury with stand age was expected since root scarring accumulates over years. The severe root scarring found in older alfalfa stands further supports suggestions that CRC injury may be more important in Minnesota than is generally recognized (Radcliffe et al. 1976).

No CRC adults were collected from the first year alfalfa fields or in any fields during the 8 July survey. However, during 18-20 July sampling high CRC populations were found in fields 1-2 years after planting. This pattern further confirms that CRC is sufficiently dispersive to rapidly colonize new plantings in Minnesota. Lower adult populations were indicated in older fields, 3-4 years after planting. Apparently CRC populations do not necessarily continue to increase in Minnesota alfalfa with time, possibly because of the activity of natural controls (Turner 1957). After the stand establishment year, population build-up of CRC can be rapid and may be followed by a population leveling or even a decline.

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