GRASS-FEEDING MOTHS COLLECTED IN KENTUCKY BLUEGRASS SEED FIELDS TREATED WITH POST-HARVEST BURNING OR BALE-ONLY IN THE GRANDE RONDE VALLEY, 2001

Marvin Butler and Paul Hammond

Abstract

A survey of moths was conducted in a Kentucky bluegrass field in the Grande Ronde Valley to assess the effects of post-harvest burning on their composition and abundance. Just prior to harvest, blacklight traps were operated in the burned portion of a field and the bale-only portion of the same field. Although the survey was conducted only on the night of July 6, it suggests that post-harvest burning the previous season can have a beneficial effect on reducing cutworms compared to bale only.

Introduction

A fifth year of study was conducted in 2001 to assess the composition and population dynamics of grass-feeding moths in commercial Kentucky bluegrass seed fields in the Pacific Northwest. The first studies in 1996-1998 were more qualitative and examined the species composition in three different regions: central Oregon, the Grande Ronde Valley of northeastern Oregon, and the Rathdrum Prairie of northern Idaho (Butler et al. 2001). A more quantitative study was conducted in 2000 to follow the seasonal phenology and actual abundance of different moth species in central and northeast Oregon (Butler and Hammond 2001).

Methods and Materials

The results of 2000 suggested that a follow-up study might be helpful to assess the effects of post-harvest burning on the composition and abundance of the moth fauna. This was conducted on July 6, 2001 in a field near LaGrande in Union County. Part of the field had received the usual post-harvest burn treatment during 2000, while the remainder of the field was not burned and the straw was baled. One blacklight trap was operated in the burned portion of the field, and a second trap was operated in the baled portion. The results of 2001 are shown in Table 1 and are compared with the 2000 results from other fields in the same region.

Results and Discussion

These 5 years of studies have identified a complex community of grass-feeding moths that occupy Kentucky bluegrass fields in the Pacific Northwest, and this community is comprised of three distinct feeding guilds as follows.

1. The sod-webworms belong to the family Pyralidae, subfamily Crambinae. They included two species, *Chrysoteuchia topiaria* and *Pediasia dorsipunctella*. Of these, *C. topiaria* was sporadically common in different fields but was never abundant.

During 2001, it was twice as common in the burned treatment compared to the baled treatment, but this may not be significant in view of the low numbers in general. *Pediasia dorsipunctella* was always present in every field but was always quite rare.

2. The climbing cutworms belong to the family Noctuidae, subfamily Hadeninae. Their larvae feed on leaves, inflorescences, and developing seed-heads. They included two species, *Aletia oxygala* and *Leucania farcta*. During 2000, *A. oxygala* was relatively common in several fields, but it was scarce in 2001. *Leucania farcta* was uncommon during 2000 and rare in 2001. These moths were never abundant enough to be of much economic consequence, and were of virtually no significance in the 2001 field study.

3. The largest group is the soil cutworms that feed at the soil surface or burrow into the soil, feeding on roots, rhizomes, and stems. They belong to the family Noctuidae, subfamily Amphipyrinae. Four species were present, including *Protagrotis obscura, Apamea amputatrix, Agroperina dubitans*, and *Crymodes devastator*. Of these, *A. dubitans* was common on the Rathdrum Prairie in Idaho, but it was always quite rare in Oregon fields. *Apamea amputatrix* was also a rare species, while *C. devastator* was frequent to common. The only species present at epidemic outbreak levels that could have inflicted serious economic damage in the fields during this study was *P. obscura*.

Huge numbers of *Protagrotis obscura* were present in the Kentucky bluegrass fields of Union County during 2000; indeed one trap in the Coventry field yielded close to 10,000 moths on a single night. By contrast, all other species were present only at very low numbers, certainly well below any economic thresholds. It was thought that post-harvest burning practices might be a major factor in keeping most species at low levels. However, *P. obscura* is a burrowing cutworm, so its larvae might be well protected in the soil during burning treatments.

The objective of the 2001 study was to compare the effects of post-harvest burning with bale-only on the moth community. These results are shown in Tables 1 and 2. Aside from *P. obscura*, all of the moth species were present in equally low numbers in both the burn and bale-only treatments. No treatment effects were evident on these species. For example, we counted 30 individuals of *Crymodes devastator* in the burn trap and 32 in the bale-only trap.

The major effect was evident on the epidemic species, *P. obscura*, with 2,007 individuals in the bale-only trap and only 717 in the burn trap. This represents a reduction of 64 percent in the number of moths within the burned treatment compared to the baled treatment.

While this is only a single experiment in a single field, it is suggestive that post-harvest burning can have a beneficial effect in reducing numbers of cutworms in these fields. With these results in mind, it is perhaps difficult to explain the massive numbers of *P. obscura* present in the 2000 study fields, particularly the Coventry field. It is possible

that the timing of post-harvest burning may be critical to the success of cutworm control. If burning is done shortly after harvest, the eggs and newly hatched larvae may suffer heavy mortality, but if burning is delayed for a month or more, most larvae may have burrowed into the soil where they would be protected from the fire.

One interesting question concerns the effects of high *P. obscura* numbers on the other species of grass-feeding moths. For example, *Crymodes devastator* might potentially exist at much higher numbers if not for the presence of so many *P. obscura*. Of particular interest is the competitive interaction of high densities of cutworms with sod-webworms. If *P. obscura* was much less common, sod-webworms such as *Chrysoteuchia topiaria* might become more common in these fields. Both the 2000 and 2001 field data tend to suggest this possibility as shown in Table 1.

Table 1. Total numbers for all grass-feeding moths collected near La Grande, Union County, Oregon near July 1, 2000 and 2001, in Kentucky bluegrass seed fields.

	2000			2001	
Species	Abbey (north)	Abbey (south)	Coventry	Burn	Bale- only
	----------number----------				
Protagrotis obscura	4,339	2,205	9,431	717	2,007
Apamea amputatrix	1	1	6	0	0
Agroperina dubitans	1	0	0	1	0
Crymodes devastator	5	6	10	30	32
Aletia oxygala	6	12	31	4	2
Leucania farcta	4	4	4	0	1
Chrysoteuchia topiaria	7	22	1	16	6
Pediasia dorsipunctella	2	4	1	3	3
Totals	4,365	2,254	9,484	771	2,051

Table 2. Identification, feeding type, and number of grass, hardwood, and herb-feeding moths collected in Kentucky bluegrass treated with post-harvest burning or bale-only near La Grande, Union County, Oregon, 2001.

Species	Feeding type	Black light location	
		Open burn	Bale-only
		----------number----------	
Protagrotis obscura	grass	717	2,007
Crymodes devastator	grass	30	32
Chrysoteucia topiaria	grass	16	6
Aletia oxygla	grass	4	2
Pediasia dorsipunctella	grass	3	3
Agroperina dubitans	grass	1	0
Leucania farcta	grass	0	1
Paonias excaecatus	hardwood	1	0
Sericosema juturnaria	hardwood	1	0
Hessperumia sulphuraria	hardwood	1	0
Caenurgina erechtea	herbs	12	6
Anagrapha falcifera	herbs	5	1
Euxoa idahoensis	herbs	1	0
Loxostege cereralis	herbs	1	0
Grammia ornata	herbs	0	2
Platyyerigea montana	herbs	0	1
Spodoptera praefica	herbs	0	1
Totals		793	2,062

References

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