REPORT OF GRASS-FEEDING MOTHS COLLECTED IN COMMERCIAL KENTUCKY BLUEGRASS FIELDS OF CENTRAL AND EASTERN OREGON, 2000

Marvin Butler and Paul Hammond

Abstract

Moths were collected in black-light traps from three Kentucky bluegrass seed fields each in the Grande Ronde Valley, Union County, Oregon and the Madras and Culver areas of central Oregon, Jefferson County, during mid to late June, 2000. Moths were 99 percent *Protagrotis obscura*. Ten times as many moths were collected in fields from the Grande Ronde Valley than fields from central Oregon across the three collection dates.

Introduction

A detailed study of moths collected in black-light traps was conducted in the Grande Ronde Valley near La Grande and near Madras and Culver in central Oregon during 2000. This study expands on an earlier three-year study of field sites on the Rathdrum Prairie in Idaho, sites in Jefferson County in central Oregon, and sites in the Grande Ronde Valley of Union County in northeast Oregon from 1996 to 1998. The previous work was more qualitative, while the present study specifically examines the quantitative abundance of various species of moths over a longer time period.

Methods and Materials

Moths were collected from three fields were collected in the Grande Ronde Valley (Coventry, Abbey North, Abbey South) on June 13, June 22 and June 27. Likewise, collections were made from three fields were collected in central Oregon of Jefferson County (Kelly, Geranimo North, Geranimo South,) on June 12, June 21, and June 26. Moths were sampled using a single universal black-light trap placed 100 ft. from the edge of each field at dusk and insects were collected the following morning. A Bio-Strip 2.5 x 6-inches fumigant strip was placed in the bottom of the traps to kill the moths. Moths were placed in one gallon zip-lock bags and refrigerated until placed in a freezer. They were later thawed and identified by Paul Hammond.

Results and Discussion

Nearly 30,000 moths (29,997) were collected at all sites during this study. This included 58 moths representing 16 species that feed on herbs and hardwoods, and were merely strays flying through the area. By contrast, 29,939 moths of 11 species that feed on grasses were collected in these fields; of that number, 29,772 (99 percent) were ***Protagrotis obscura*** and only 167 (1 percent) comprised the remaining 10 species.

Table 1 shows the total numbers for all grass-feeding moths collected at each site in 2000. ***Protagrotis obscura*** was abundant in the central Oregon fields, but numbers were modest compared to the extraordinary numbers of this species found in the Union County fields. The

Coventry field in particular produced 14,733 individuals of *P. obscura* including 9,431 in a single trap from a single night. This must represent a substantial amount of bluegrass biomass that was converted into moth biomass within this field. In dramatic contrast, the remaining 10 species were collectively insignificant in number, and only 6 species were frequent to moderately common.

Post-harvest field burning may be an important limiting factor for these latter species. Most moths lay their eggs in dead or live vegetation on the ground; they then overwinter either as young larvae or dormant eggs. Field burning would normally kill most of these early stages, and few larvae would probably survive to become adult moths the following year. However, *P. obscura* tends to be a subsurface burrower in the soil, and eggs and larvae may be well protected from fire. In the absence of competitors and alternate hosts for predators and parasites, *P. obscura* may be free to expand into the huge population levels observed in this study.

Still, it is interesting that smaller numbers of *P. obscura* occurred in the central Oregon fields, suggesting that some limiting factor may be impacting the central Oregon populations that is absent from Union County. Clearly, the biology and ecological interactions that may affect the reproductive success of the species must be complex. One potential factor could be flocks of exotic European starlings *(Sturnus vulgaris)* that are ground foragers on soil invertebrates. Although this bird is usually considered to be a noxious pest itself, it could be an important biocontrol agent against soil cutworms in agricultural field systems.

Of the other species, two climbing cutworms and two soil cutworms were also present in both central and eastern Oregon fields. Of the climbing species, *Aletia oxygala* was fairly common in Union County fields while *Leucania farcta* was less common. Likewise with the soil cutworms, *Crymodes devastator* was common while *Apamea amputatrix* was less frequent. *Agroperina dubitans*, a soil cutworm previously found to be quite common on the Rathdrum Prairie in Idaho, was present but rare in Union County and did not occur in the Jefferson County fields.

Two species of sod webworm pyralid moths were also collected in this study. *Chrysoteuchia topiaria* (cranberry girdler) was frequent in northeastern Oregon, particularly in the Abbey North field, but did not appear in central Oregon fields. A second species of sod webworm, *Pediasia dorsipunctella*, occurred in both areas but was not common.

Two species of grass-feeding cutworm moths appeared in 2000 that were not seen during the 1996-1998 study. *Apamea cuculliformis* is normally a rare species, and was probably just incidental in the bluegrass fields. However, *Dargida procincta* was collected in both central and eastern Oregon during the 2000 field season. This species has an early flight season, and was probably missed during the previous study where collections were only made in late June. Kamm (1985) found *D. procincta* to be an important pest of ryegrass seed fields in the Willamette Valley of western Oregon. This species is not strongly attracted to black-light traps, and it was probably more common than the numbers in Table 1 would indicate.

Seasonal population dynamics for the most common cutworms are illustrated in Figures 1-5. Figure 1 shows that numbers of *Protagrotis obscura* were consistantly higher in the Union County fields compared to the Jefferson County fields during 2000. Numbers gradually

increased through June in the Union County fields, and dramatically increased in the Coventry field by June 27.

The remaining cutworm species only occurred in sufficient numbers within the Union County sites to be considered in Figures 2-5. *Apamea amputatrix* (Fig. 2) was absent or at very low numbers except for a slight increase in the Coventry field in late June. *Crymodes devastator* (Fig. 3) showed a similar pattern but increased in all three fields in late June, again with the Coventry field having the highest numbers. *Leucania farcta* (Fig. 4) was absent until late June when low numbers occurred in all three fields. *Aletia oxygala* (Fig. 5) was absent or rare in early June, gradually increased in mid-June, and greatly increased in all three fields by late June. Again the Coventry field showed a particularly dramatic increase of *A. oxygala* in late June.

In summary, all grass feeding moths were at moderate numbers *(Protagrotis obscura)* or extremely low numbers (all other species) in the Jefferson County fields. By contrast, most species occurred at proportionately much higher numbers in the Union County fields, with 99 percent of these moths consisting of *P. obscura.* All species in Union County fields increased in abundance through June with the highest numbers occurring in late June. The Coventry field produced proportionately parallel increases in four species that became particularly dramatic by the end of June, including *P. obscura, Apamea amputatrix, Crymodes devastator, and Aletia oxygala*.

Literature Cited

Butler, M.D., S.C. Alderman, P.C. Hammond, and R.E. Berry. 2000. Association of insects and ergot *(Claviceps purpurea)* in Kentucky bluegrass seed production fields. In preparation.

Kamm, J.A. 1985. Cutworm defoliators of ryegrass. Pan-Pacific Entomologist 61:68-71.

Table 1. Total number for all grass-feeding moths collected at each site in 2000.

	Union County			Jefferson County		
Genus species	Abbey North	Abbey South	Coventry	Geranimo South	Kelly	Geranimo North
Protagrotis obscura	8,051	4,568	14,733	845	586	989
Apamea amputatrix	2	2	6	0	0	1
Apamea cuculliformis	0	0	0	0	1	0
Agroperina dubitans	1	0	0	0	0	0
Crymodes devastator	6	6	11	1	0	4
Chortodes rufostrigata	0	0	0	1	0	0
Aletia oxygala	8	14	35	1	1	1
Leucania farcta	4	4	4	3	1	0
Dargida procincta	1	1	0	0	1	0
Chrys. Topiaria	7	27	3	0	0	0
Ped. dorsipunctella	2	4	2	0	0	1
Total	8,082	4,626	14,794	851	590	996

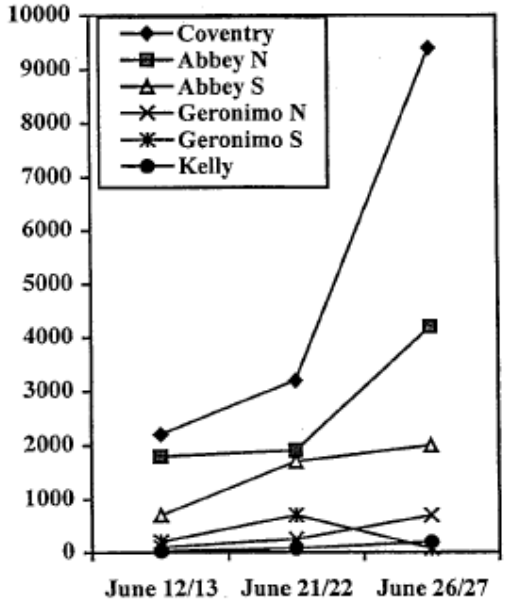

Figure 1. Seasonal emergence number of *Protagrotis obscura* in Kentucky bluegrass fields at each site in 2000.

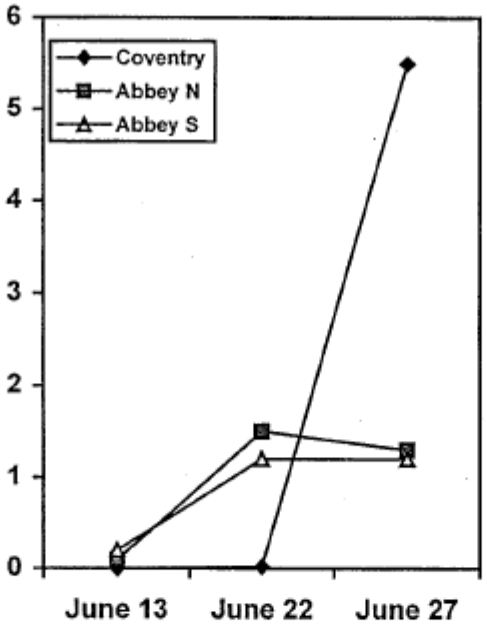

Figure 2. Seasonal emergence numbers of *Apamea amputatrix* in Kentucky bluegrass fields at Union County sites in 2000.

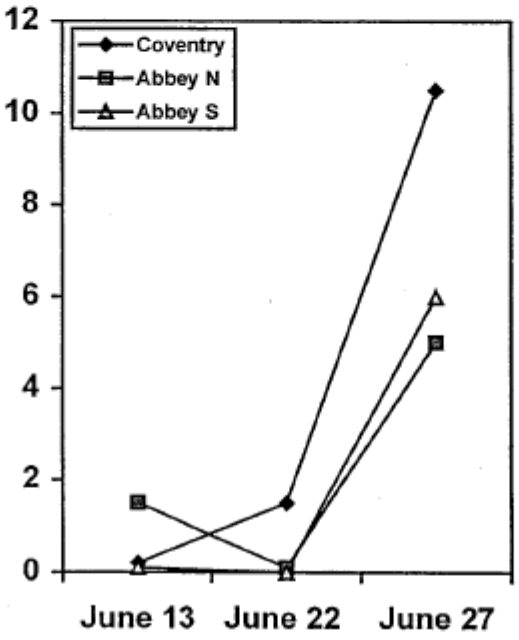

Figure 3. Season emergence numbers of *Crymodes devastator* in Kentucky bluegrass fields at Union County sites in 2000.

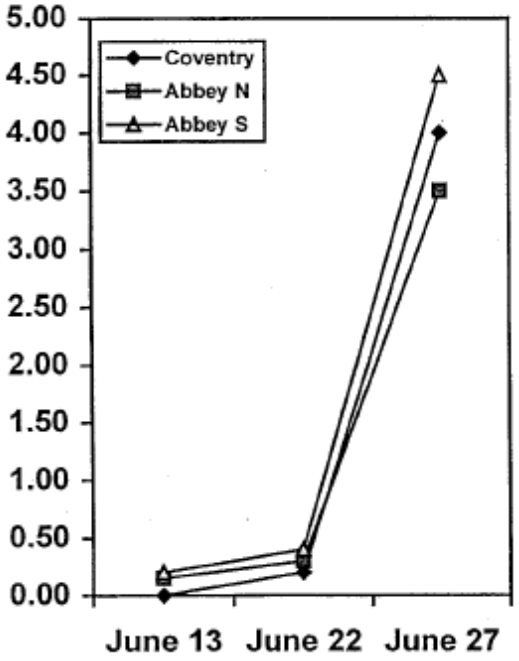

Figure 4. Seasonal emergence numbers of *Leucania farcta* in Kentucky bluegrass fields at Union County sites in 2000.

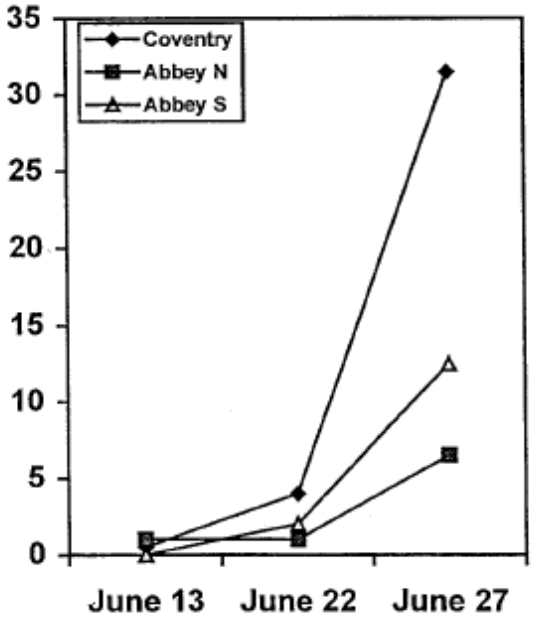

Figure 5. Seasonal emergence numbers of *Aletia oxygala* in Kentucky bluegrass fields at Union County sites in 2000.