Section VII
Foliage & Seed Feeding Pests

IDENTIFICATION OF CUTWORMS ON GRAPE VINES DURING THE SPRING IN SOUTH CENTRAL WASHINGTON

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Cutworms feed on grape buds at night during the spring causing a loss of yield. In a previous study, 1% to 5% bud loss resulted in economic damage to Concord grape. Until recently, we believed that the two most important cutworms were the spotted cutworm, *Xestia c-nigrum* (L.), and the redbacked cutworm, *Euxoa ochrogaster* (Guenee). In 2003 and 2004, we sampled vineyard floors to determine the cutworm species present in vineyards. In 2004, we started sampling vines at night to determine the species that were actually on the vines. Also in 2004 we tested a new rearing method that was better than the old one. The 2004 night sampling was expanded in 2005 by sampling more vineyards in south central Washington over a longer period of time. We also started working on cutworm pheromones.

Materials and Methods. We sampled for eight weeks starting on 7 March and ending on 27 April 2005. Sampling of four vineyards was repeated each week and 19 others were sampled only once during the season. The vineyards were located from Walla Walla in the east to southwest of Yakima in the west, and the Columbia River in the south to the northern part of the Yakima Valley on the north. Sampling started about an hour after sundown. Each vineyard was searched for one person-hour using flashlights. Cutworms were collected and taken to the lab for rearing. Cutworms are difficult or impossible to identify as larvae, so they must be reared to adults. They were reared in 135 ml plastic cups with about 2 cm coconut fiber (Coco Life Brik, Coconut Palm Resources, Inc. Hillsboro, Oregon) in the bottoms and a piece of artificial diet (Multiple Species Diet, Southland Products Inc., Lake Village, AR). Nylon screen covered the cups. The temperature was 27°C with 24 h light. The adult moths were pinned and identified using published descriptions and comparisons with identified specimens.

Twenty-five adult *Abagrotis orbis* (Grote) females were placed outdoors in a cage under natural light and temperature on 2 June 2005. Ten 10 males were placed under similar conditions on 7 June 2005. The females were removed from the field on 8 September and analyzed for pheromones. Compounds believed to be the moth's pheromone were applied to rubber septa at the following amounts: 0, 0.1, 0.3, 1.0, 3.0, and 10.0 mg. These lures were placed in traps and deployed in a vineyard in a randomized complete block design with 5 replicates on 6 October 2005. The traps were checked weekly, ending on 3 November.

Results and Discussion. A total of 279 cutworms were collected; 224 (80.3%) were reared to adults; 41 (14.7%) were parasitized; 12 (4.3%) died as lavae (cause unknown); and 2 (0.7%) died as pupae (cause

unknown). The rearing method resulted in successful rearing of 95% of the non-parasitized cutworms. Parasitism was similar to 2003 (11.7%) and 2004 (11.1%).

Eight cutworm species were found (Table 1). *Abagrotis orbis* [previously know as *A. barnesi* (Benjamin)] accounted for almost two-thirds of the cutworms. *Agrotis vetusta* Walker was second, making up over one-quarter of the cutworms. All the other species together composed only 8.0 % of the total. *Abagrotis orbis* ranges over most of North America but it has been reported as a pest only in southeastern Washington, southwestern Idaho, southwestern Michigan, northern Indiana, and New York. It prefers sandy soils. Recorded host plants are apple, peach, cherry, cottonwood, serviceberry, boxelder, and grape. The older larvae have dark elongate spots on each segment, one on either side of the dorsal line. The larvae pupated about two weeks after collection and spent about three weeks in the pupal stage followed by adult emergence from mid-April to early June (Table 1). The adults live through the summer but do not oviposit until mid-September. There is one generation per year. Many of the females that were placed outside were still alive on 8 September and four of the ten males were still alive on 14 October.

Little is known of the biology of *Agrotis vetusta.* It occurs across the United States and probably southern Canada and northern Mexico. It apparently has not been reported to be a pest although the moths can be common. The adult has a common name, 'the old man dart', but the caterpillar does not. *Agrotis vetusta* was collected almost two weeks later than *Abagrotis orbis* (Table 1). *Agrotis vetusta* has an extended larval period lasting for about three months (Table 1). The pupal stage averaged 24.6 days, slightly longer than the 21.0 days of *A. orbis*. The adults fly in late summer and fall. It appears to have one generation per year. The larva doesn't have any prominent markings like the spots on *Abagrotis orbis*, but it does have a series of cream-colored and brownish stripes running from the head to the posterior end.

Noctua comes Hubner was introduced into the Vancouver, BC area about 1982. Our finding apparently is the first record of it east of the Cascade Mountains and the first on grape. A related species, *Noctua pronuba* (L), apparently was first found in Washington in a light trap near Prosser in 2004. In three years of sampling cutworms in vineyards, we have yet to collect a single spotted cutworm or redbacked cutworm.

In September, compounds from female *Abagrotis orbis* pheromone glands were extracted and identified. The field test of the synthetic pheromone caught five *A. orbis* moths, all in the two highest pheromone concentrations. The last moths were caught on 20 October, suggesting that we trapped during the end of the flight. The results indicate that the pheromone was attracting moths. A pheromone for *Agrotis vetusta* has been identified.

Table 1. Species and rearing data for cutworms found in on grape vines, 2005.

Cutworm Species	Reported Food Plants	Number reared to adult	Percent of total	Mean date of collection (range)	Mean date of pupation (range)	Mean date of adult ecolsion (range)
Abagrotis orbis (=*A. barnesi*)	Fruit trees, grapes	146	64.9	7 April (14 March – 25 April)	21 April (28 March – 11 May)	12 May (18 April – 2 June)
Agrotis vetusta	Unknown	61	27.1	16 April (4 – 25 April)	14 July (15 June – 4 August)	8 August (11 July – 29 August)
Spaelotis clandestina, W-marked cutworm	Blueberry, maple, pine, beans, cabbage, corn, apple, strawberry	5	2.2	16 April (13 – 21 April)	26 April (20 April – 2 May)	12 May (5 – 20 May)
Abagrotis reedi	Willow, cotton-wood, etc	4	1.8	11 April (31 March – 18 April)	23 April (11 April – 4 May)	13 May (29 April – 23 May)
Noctua comes (introduced)	Foxglove, strawberry, weeds	4	1.8	5 April (31 March – 11 April)	17 April (11 – 27 April)	6 May (29 April – 16 May)
Euxoa messoria, Darksided cutworm	Trees, herbs, grasses	2	0.9	30 March (17 March – 13 April)	6 August (11 July – 2 September)	26 August (1 August – 21 September)
Euxoa olivia	Strawberries, corn	2	0.9	13 April (13 – 13 April)	12 September (12 –12 September)	3 October (3 – 3 October)
Euxoa atomaris	Unknown	1	0.4	13 April	22 August	8 September