SHORT COMMUNICATION

Identification of Instars of *Hypera postica* Using Chaetotaxy

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ABSTRACT A new method using chaetotaxy for identification of instars of *Hypera postica* (Gyllenhal) is presented and compared with earlier methods. I recommend a combined method using separation of small (first and second instars) and large (third and fourth instars) followed by identification of particular instars by using chaetotaxy.

KEY WORDS morphology, chaetotaxy, larva, Hyperini, alfalfa weevil

The alfalfa weevil, *Hypera postica* (Gyllenhal), has four instars. The first (L1) and second (L2) instars usually feed on the young growing stem tips of alfalfa, *Medicago sativa* L. The third (L3) and fourth (L4) instars also feed on leaves and can cause serious defoliation (Hoff et al. 2002). Therefore, monitoring of larval abundance is essential for crop protection. Shake-bucket or sweep-net methods (Hoff et al. 2002) are frequently applied for monitoring; the first method is more useful for detection of L1 and L2 instars and the second method for larger larvae (Hoff et al. 2002). Although discriminating between small and large larva is often sufficient for control decisions, the knowledge of determining particular instars is essential for precise pest monitoring.

The importance of a larva as a pest increases with its age. The L1 larva mostly searches for food in adequate supply to complete development (J.S., unpublished data) and causes nearly no harm. The food consumption of L2 larvae is also unimportant. For practical control, however, it is useful to determine the time to expect molting from L2 to L3 larvae, which are more damaging. Therefore, differentiating between L1 and L2 is useful for timely control decisions. The discrimination of L3 from L4 larvae may be useful for further research.

Larval morphology of *H. postica* has been studied mainly on fourth instars (Anderson 1948; Bland 1983; Skuhrovec 2003, 2005). The instars differ in body length and head width (Table 1). Identification using body measures is rapid but often not accurate, because the widths of head capsules of successive larval instars overlap (Table 1). Even the improved method for instar identification, the head capsule caliper (Bartell and Roberts 1974), is still limited by the overlapping ranges of the head width measurements. A larva is moved along the angular caliper until the head capsule width fits within the range of one of the four instars.

In this article, I present a method for identification of *H. postica* instars by using chaetotaxy, which is applicable for all larvae of weevils of the subfamily Hyperinae (J.S., unpublished data).

Materials and Methods

H. postica larvae were reared from eggs laid by adults collected in Kačice, Czech Republic (50° 09′ 14″ N, 14° 00′00′ E [WGS-84]; 388 m above sea level) in 2002–2005. The larvae fed with leaves of *Medicago sativa* L. were reared in petri dishes at constant 20°C and a long-day photoperiod of 16:8 (L:D) h.

Forty individuals of each instar were fixed in Pampel liquid (4 parts glacial acetic acid, 6 parts 4% formaldehyde, 15 parts 95% ethyl alcohol and 30 parts distilled water). In making slides (May 1994), a larva was decapitated and its head and were body placed in lactic acid for 2 wk to remove the soft tissues. Remaining body parts were then mounted on temporary slides in glycerin. Head width was measured under a binocular microscope (10–100× magnification) by using calibrated oculars. Drawings were traced from photographs of digital camera (SONY DXC-950P) and processed in the computer (Adobe Photoshop, Adobe Systems, Mountain View, CA; CorelDRAW, Corel Corporation, Ottawa, Ontario, Canada).

All material (slides, adult weevils, larvae) is deposited in the collection of the author.

Results

Head width overlapped between instars (Table 1). Important morphological differences between instars are on lateral parts of abdominal segments I–VIII (dorsum; see square in Fig. 1A) where numbers of setae differ. The first instar has only one seta (Fig. 1B), the second instar has three setae (Fig. 1C), and the third and the fourth instars have five setae on each of abdom-

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