

Delia Steiniella Emden: Newly Recorded Pest of Wheat (*Triticum aestivum*) and Its Infestation Levels at Sinana, Ethiopia

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Abstract

Shoot fly species *Delia arambourgi* Seguy was expected to infest barley (*Hordeum vulgare*), wheat (*Triticum aestivum*) and tef (*Eragrostis tef*) in Ethiopia. It was considered as major pest of barley and minor pest of wheat and tef. Currently, however, differences have been recognized between the shoot fly species reared separately from barley and wheat. This study was conducted with the main objective of identifying the shoot fly attacking wheat down to the species level and to quantify its infestation levels. Accordingly, the shoot fly reared from wheat was sent to the University Museum of Natural History, U.K. and was identified as *D. steiniella* Emden. It caused infestations ranging from 56.5 to 74.5 % on different bread wheat varieties at Sinana, Ethiopia, under natural infestation in the field. There was no significant ($P > 0.05$) variation in the levels of infestations between the varieties.

Key words: Barley, *Delia arambourgi*, *Delia steiniella*, wheat

Running title: Newly recorded insect pest of wheat

Introduction

Ethiopia is the largest wheat producer in sub-Saharan Africa on a total of about 0.75 million ha durum and bread wheat fields about 76% of which is in Arsi, Bale and Shewa (Hailu et al. 1991). Biotic factors such as insect pests are among the multitude factors limiting yield potential of wheat. Forty-one species of field insect pests have been recorded on wheat (Adugna and Kemal 1986, Abdurahman and Adugna 1991). Of these, only *Schizaphis graminum*, *Diuraphis noxius*, *Decticoidea brevipennis*, *Locusta migratoria migratorioides*, *Aiolopus longicornis* and *Schizonychia* spp are classified as major pests. In addition, Sileshi (1995) reported shoot fly species *Atherigona angustiloba* van Embden, *Melanochaeta vulgaris* (Adams), *Oscinella*

acuticornis, *Oscinella nartschukiana* Beschovski, *Rhopalopterum* sp, *Scolioptthalmus micatipennis* Duda and *Delia arambourgi* (Seguy) attacking wheat at Alemaya, Ethiopia.

Infestation of wheat by shoot fly has been on record in Ethiopia but the damage has been attributed only to *D. arambourgi* Seguy, which was supposed to be minor pest of wheat and tef (Crowe et al. 1977, Tadesse 1979, Adugna and Kemal 1986, Hill 1989, Amsal et al. 1997). *D. arambourgi* was first reported as major pest of barley from Holetta, Ethiopia (Davidson 1969). Following this report, the shoot flies attacking wheat, barley and tef crops have simply been referred as *D. arambourgi* without proper identification of the species.

Currently, however, morphological differences have been observed between the shoot flies reared from barley and wheat at Sinana, Ethiopia. Hence, the importance of identification of species was recognized. This study addressed the newly recorded insect pest and its infestation levels.

Materials and Methods

Specimens preparation

Sample specimens were collected from Sinana Agricultural Research Center (SARC) campus, located in Bale Zone of Oromiya Regional State at 7° N latitude and 40° E longitude. The elevation of SARC is 2400 m.

Infested wheat seedlings showing deadhearts were collected from field and placed in emergence cages, containing moistened soil. Water was periodically added to the soil to maintain suitable conditions for adult emergence from the pupae. The emerged adult flies were provided with glucose and Potato Dextrose Agar solutions. Adult flies were killed with 80% ethanol and pinned with a No. 2 entomological pin, following the procedures given by Millar et al. (2000). Flies were sent as dry specimens to the University Museum of Natural History, Oxford, UK for identification.

Determination of infestation level

Field experiment was conducted at Sirinka Agricultural Research Center in *bona* season (August–December, 2003) to determine the level of natural infestation of wheat by the shoot fly and varietal differences in susceptibility. Five bread wheat varieties (Wabe, Soofumar, Mitike, Dure, and Maddawalabu) were sown in randomized complete block design with

four replications. Each plot had a size of 0.8 m × 1 m. Number of seedlings showing infestations were counted from among a total of 50 plants within 50 cm × 50 cm quadrat one month after sowing and the values were converted to percentages (Tafa 2003). Data were subjected to analysis of variance (ANOVA) using MstatC statistical package (MSTU 1998).

Results

The shoot fly attacking wheat at Sinana was identified to be *D. steiniella*, belonging to the family Anthomyiidae of order Diptera. This pest is found in many highland and mid-altitude areas of Bale. *D. steiniella* is markedly bigger in size than barley shoot fly at all developmental stages (larval, pupal and adult) so that the two species are easily distinguishable. The average larval and pupal weight of *D. steiniella* was 7.8 and 8.5 mg, respectively; whereas the average larval weight of barley shoot fly was 3.8 and the pupal weight is 4.2 mg. So far, *D. steiniella* has not been reported attacking wheat in Ethiopia or elsewhere in the world.

The mean infestation percent of the five wheat varieties ranged from 56.5% for Wabe to 74.5% for Mitike (Table 1). The remaining three varieties had infestation percent lying in between. However, there was no significant ($P = 0.05$) statistical difference of infestation among the varieties. The infestation levels recorded in the current study justifies the need for conducting yield loss study and research on various management aspects. In addition, the shoot fly fauna in Ethiopia should be further identified across locations and crops to exhaustively distinguish other species that might be associated with small cereals.

Table 1. Infestation levels of *Delia steiniella* on five bread wheat varieties at Sinana, Ethiopia

Variety	Infestation percent
<i>Wabe</i>	56.5
<i>Soofumar</i>	59.5
<i>Mitike</i>	74.5
<i>Dure</i>	69.5
<i>Maddawalabu</i>	57.5
CV%	14.8
LSD (P=0.05)	NS

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