

Shore fly, *Scatella tenuicosta* (Diptera: Ephydriidae): A Pest of Ornamentals in Flower Farms of Ethiopia

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Abstract

Accurate identification of an insect pest is a prerequisite for a biological control program. Owing to the newness of glasshouse horticulture in Ethiopia, the identity of most pests inflicting damage to various plant species is not known at species level. Black flies in Poinsettia at Desa farm located at Koka in the central rift valley were regarded as sciarid flies (Diptera: Sciaridae). A need to implement biological control of the pest necessitated accurate identification of the insect. Adult flies were collected by tapping leaves with the fly onto vial filled with 70 % ethanol. Samples were sent for expert identification to Wageningen University of the Netherlands. The insect was identified as shore flies, *Scatella tenuicosta* Collin (Diptera: Ephydriidae). Morphological differences of the two flies including their biology are outlined.

Introduction

Protected agriculture is new to Ethiopia and research on pest management in this setting is at its infant stage (Ahmed et al. 2009). Ahmed et al. (2009) reported the diseases and arthropod pests complexes present in flower farms of Ethiopia. This list provides general information on the type of disease and arthropod pests inflicting damage to flowers in the different farms scattered in the central region of the country both in high and low elevation areas. Accordingly, a range of pesticides are being used by the farms to mitigate their damage. However, due to ineffectiveness of most of the pesticides in use and the environmental concerns including the very low pesticide residue levels permitted by horticultural products importing countries, efforts are being made to promote biological control based Integrated Pest management (IPM). The successful control of red spider mites using the predatory mite, *Phytoseillus*

persimilis replaced pesticidal control by biological control program in several flower farms currently (Ahmed et al. 2009, Belder et al. 2009). Similar efforts are being made to evaluate and use bio-control agents against many other disease and insect pests. The black flies at Desa farm located at Koka occur in large number. The farm uses various insecticides and follows sanitation measures to combat this problem (Ben, personal information). However, the magnitude of the problem could not be lowered to tolerable range. These black flies were considered Sciarid flies or Fungus gnats (Diptera: sciaridae) as documented in Ahmed et al. (2009). It was deemed necessary to import bio-control agents reportedly effective against this insect pest (sciarids). One such bio-control agent is the entomopathogenic nematode, *Steinernema feltiae*. Although the bio-control policy is not yet in place in the country, a guideline has been developed by the Ethiopian Institute of Agricultural Research to import bio-control agents for pest control research purpose. This guideline

requires determination of the identity of the target pest as well as the proposed bio-control agent at species level. Hence samples were collected and sent for expert identification to Wageningen University of the Netherlands to determine the identity of the insect in order to process import permit for the proposed bio-control agent.

Materials and Methods

The farm was visited in January 2010 together with two research scientists of Wageningen University of the Netherlands. Poinsettia plants in one of the green houses were checked for the presence of flies by walking between the beds. Adult flies were sampled by tapping leaves of the plant with the flies onto a vial half filled with 70 % ethanol. About 20 to 30 flies were collected per vial in five vials and the samples were taken to Wageningen University for expert identification. Second sampling was made on 14 July 2010. Twenty live adult flies were collected in a similar fashion. Four yellow sticky cards each measuring 9 cm X 11 cm and kept by the farm scouts for monitoring flies density were also examined to determine the occurrence of one or more fly types based on morphological features in the entomology laboratory of Melkassa Agricultural Research Center (MARC). Photographic pictures of the different parts of the insect were taken using a camera attached to a stereo microscope. Morphological differences of the two fly types available in published literatures were also referred for comparison.

Results and Discussion

Every single poinsettia examined in January 2010 was infested by the flies. On the other hand, infestation level in July was extremely low (less than 5 %). Confirmation letter on the identity of the species collected in January 2010 was received on 19 May 2010. The insect was identified as shore flies, *Scatella tenuicosta* Collin (Diptera: Ephydriidae). The fly was identified by E.G.M Dijkstra and T. Zatwarnicki (National Reference laboratory, Wageningen). However, sampling made

on 14 July 2010 revealed the presence of sciarid flies too. Photographic pictures produced from a camera attached to a stereo microscope are shown in Fig. 1. Sciarid flies have long antennae (beaded antennae consisting of 14 segments) and legs, and the head is quite small in relation to the body. The shore fly adult resembles a small house fly (It is about the size of a fruit fly), the antennae and legs are short, and the head is relatively large (Malais and Ravensberg, 1992). Morphological variation in the larvae of the flies and wing venation are also used for differentiating the two flies. Larvae of sciarid flies are elongate, translucent-whitish, with a conspicuous black head. The costa ends between R_{4+5} and M. Wings of shore flies are characterized by two distinct costal breaks with no anal cell. The larvae of shore fly have posterior respiratory cone (Fig. 2) (Alford, 1999). Larvae of sciarid flies occur in the soil, or potting mix, and feed on fungi and healthy plant tissue. Shore fly larvae live in wet areas containing algae. Both adults and larvae feed on algae (Lindquist 1996). Both flies can complete their life cycle in 25 to 30 days.

The occurrence of both flies in Desa ornamental farm suggests the need of considering both fly groups in the pest management program. As shore flies live in very wet areas and do not feed on plant roots, both biological and chemical control are regarded ineffective in shore fly management. Cultural and physical control which include avoiding potting mixes that promote the growth of algae, cleaning algae from benches, walls and floors and not having permanently wet area are regarded effective. On the other hand sciarid flies can be controlled with insecticides and biocontrol agents. The insect attacking nematode *Steinernema feltiae* and predatory mites in the genus *Hypoaspis* are reported effective (Lindquist 1996). Use of these biocontrol agents against sciarid flies at Desa farm, however, requires information on the seasonal abundance of the fly. As observed from the two surveys conducted in January and July 2010, all poinsettia examined in January were infested with shore flies only but infestation level in July was very low (less than 5%) and both flies were found. Moreover, the identity of the sciarid fly need to be determined at species level by taxonomists.

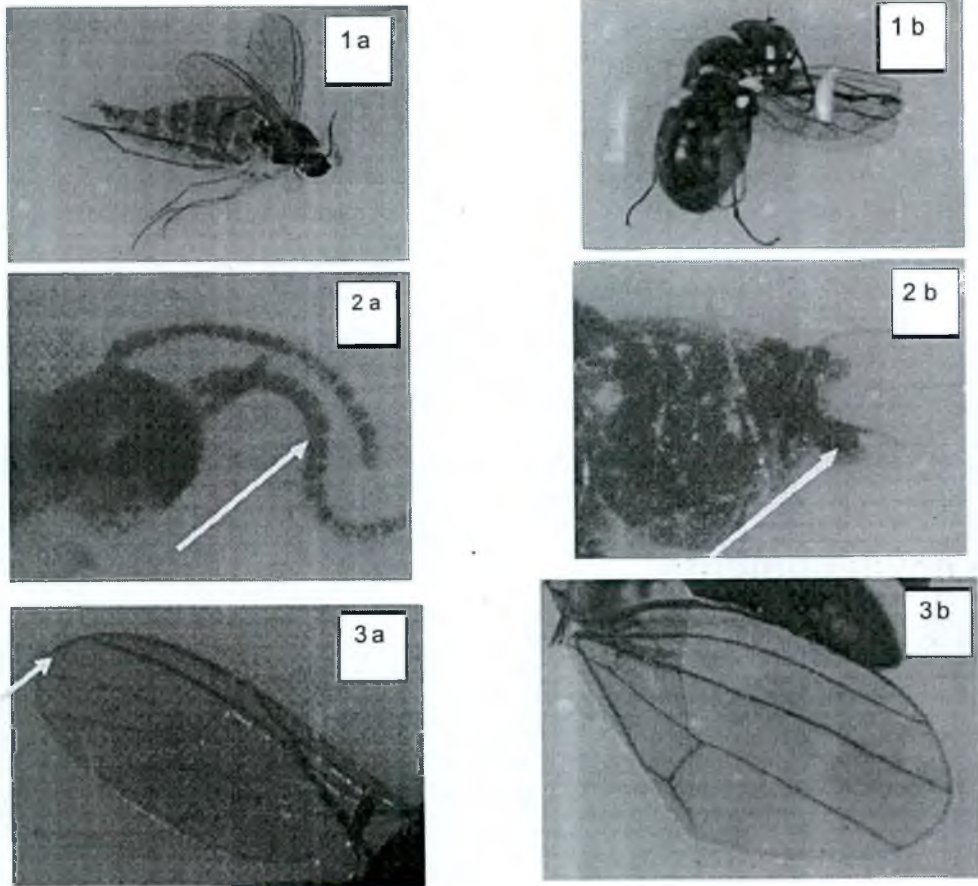


Figure 1. Pictures showing some of the morphological features of sciard and shore flies: 1 – sciard; 2 -shore fly (a - adult fly; b - antennae structure and c = wing venation)

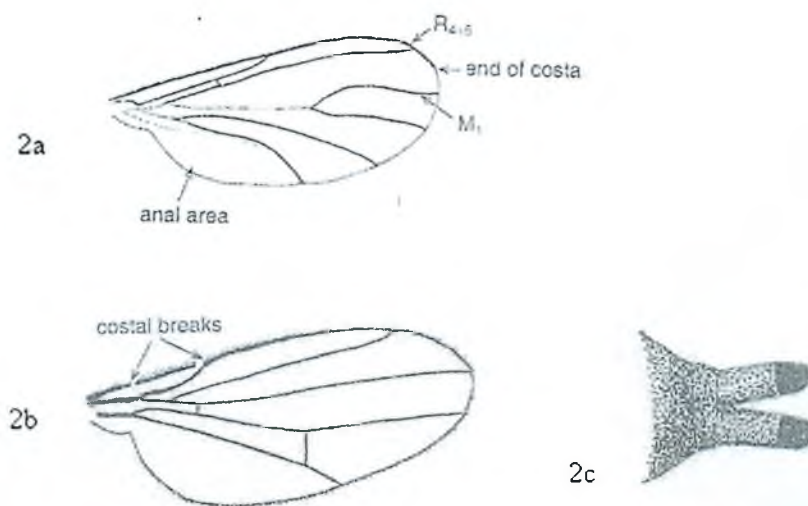


Figure 2. Wing venation of sciarid flies (2a); shore fly (2b) and posterior respiratory cone of a shore fly larva (Alford, 1999)

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