FIRST RECORD OF *OSCINELLA FRIT* (LINN.) (CHLOROPIDAE, DIPTERA) AND *HYLEMYIA CILICRURA* (ROND.) (ANTHOMYIDAE, DIPTERA) FROM INDIA

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I—INTRODUCTION

In May and June 1955, during the course of a faunistic survey of the Kulu and Lahaul-Spiti Valleys in the Punjab, India, the writer collected over fifty species of dipterous flies from snow over the Rohtang Pass (32° 22·5′ N. 77° 15·0′ E.) and adjacent mountains, at altitudes between 13,800 ft. and 14,500 ft. Of the species collected, the following four are well known pests of a variety of crops in different parts of the world. While the first two have been recently reported from India, the last two do not appear to have been recorded from the country previously.

1. *Phytomyza atricornis* (Meigen) (Agromyzidae)
2. *Acanthiophilus helianthi* (Rossi) (Trypaneidae)
3. *Oscinella frit* (Linnaeus) (Oscinellinae ; Chloropidae)
4. *Hylemyia cilicrura* (Rondani) (Anthomyidae)

P. atricornis, the Pea Leaf Miner, which is wide spread in central Asia, Europe, North America, Australia, New Zealand, etc., was for the first time recorded, under that name, from India in 1937 by Ahmad and Gupta, who subsequently in 1943, gave a fuller account of it and concluded that the species, though not properly identified earlier, had been reported upon in India a few decades before their own record.

A. helianthi, the Safflower Fruit Fly, which is also widely distributed in central Asia, southern Europe, and North Africa, was first recorded from Delhi, India, in 1939, by Bhatia and Singh and subsequently reported upon in greater detail by Pruthi (1941, 1942) and more recently by the present writer (1956) from the Rohtang Pass.

The present account deals with the remaining two species, namely, *O. frit*, often called the European Frit Fly, and *H. cilicrura*, the Seed Corn Maggot of America or the Shallot Fly. Pruthi (1950) included these two species in his list of "some of the more important pests found in various countries but not recorded so far in India", under their older names, i.e., *Oscinis frit* Linnaeus and *Chortophila cilicrura* Rondani. Since both the species were collected alive in fairly large numbers from the Rohtang Pass, it is probable that their source of origin was not very far. Further investigations on the species are desirable in view of their notoriety as pests of cereals, such as wheat, barley and maize which constitute some of the principal crops grown in the valleys on either side of the Pass. Their record is also of interest from the point of quarantine against insect pests.

The material of the Frit Fly was kindly identified by Dr. G. W. Sabrosky of the U. S. National Museum, Washington, and of *H. cilicrura* by Dr. F. van Emden, of the Commonwealth Institute of Entomology, London, to both of whom the writer is highly indebted for their help.

II—Notes on *Oscinella frit* (Linnaeus)

1758. *Musca frit* Linnaeus, *Systema naturae*, ed. 10, **1**, p. 598. Holmiae.

1933. *Oscinella frit* (Linn.), Duda, *Lindner die Fliegen*, **16**, p. 88 (Chloropidae).

The species has frequently appeared under the following names in the literature on economic entomology ; *Oscinis frit* (Linn.), *Chlorops frit* (Linn.) and *Oscinella frit* (Linn.). Aldrich (1920) and Duda (1933) have discussed its taxonomy in detail and to a certain extent the same has been done by Collins (1946).

When Linnaeus first described this species in 1750, he stated that in Sweden its larvae caused serious damage to barley, by attacking the immature grains which shrivelled and became worthless. Such grains are called "Frits" by the Swedes, hence the name Frit Fly.

In Europe, the larvae of the late autumn brood over winter as stem miners in winter grain, chiefly rye. The spring grain, especially rye and oats, is attacked in the same way by the spring brood. The summer brood, on the other hand attacks kernels of oats more commonly than those of barley. These differences were mostly responsible for a general belief prevailing for a long time that several species were involved (Aldrich, 1920). Similarly in North America when the infestation was first noticed on young wheat and several grasses the fly was known under various names of *Oscinis variabilis* Loew, *Oscinis carbonaria* Loew, *Oscinis soror* Macq., etc., until 1912 when Becker identified *O. frit* for the first time from North America.

The preference of the fly for certain crops as well as the degree of its attack on them appears to vary according to several ecological factors. In England, for instance, it usually attacks oats but the injury to sweet corn (*Zea mays*) may be, according to Haskell (1952 : 519), "often so devastating that a large proportion of the crop may be ruined" In North America while wheat and grasses are preferred, in most countries of Europe and in Russia, wheat, barley, rye, etc., are commonly attacked.

Distributed widely in Europe, Russia and North America, the species is being recorded for the first time from India where its hosts are still unknown.

Material examined.—27 examples of the Frit-fly were collected as follows :

Locality	Date of collection	Material collected	Collector
Rohtang Pass (*ca.*13,800 ft.).	4-vi-1955	3♀♀	*A. P. Kapur*
Rohtang Pass (*ca.*14,000-14,500 ft.).	5-vi-1955	15♀♀, 3♂♂	,,
Rohtang Pass (*ca.*13,800 ft.) (return journey).	19-vi-1955	4♀♀, 2♂♂	,,
	Total	22♀♀, 5♂♂	

Most of the flies collected were alive and were females. Those which were preserved in spirit and examined subsequently had distended abdomen containing from 8 to 24 elongate eggs in each case.

III—NOTES ON *Hylemyia cilicrura* (Rondani).

1866. *Chortophila cilicrura* Rondani, *Atti. Soc. Milano*, **9**, p. 165.

1937. *Hylemyia cilicrura* (Rond.), Seguy, *Gen. Ins.*, **205**, Diptera, Muscidae, p. 82.

In the literature on applied entomology this species has been generally referred to under *Phorbia cilicrura* (Rond.), *Anthomyia cilicrura* (Rond.) and *Hylemyia cilicrura* (Rond.), besides the original name under which it was described. Detailed synonymies and taxonomic notes on the species are given by Seguy (*loc. cit.*) and van Emden (1951) respectively.

The flies lay eggs usually on freshly turned soil where there is abundance of decaying vegetable matter or on the seeds and seedlings. The eggs hatch readily and the maggots burrow into the seed, often destroying the germ. Corn, beans, peas, cabbage, turnip, beet, radish, onion, seed potatoes, etc., are attacked in Europe and North America. Occasionally wheat, oats, sun-flower and cucurbit seeds are also attacked in the U.S.A. and in Argentina, South America. In the U.S.S.R. cotton seeds and cotyledons, and in Japan soya beans, wheat and a wide range of other crops are attacked.

The species is widely distributed in parts of Africa, Europe, the U.S.S.R., N. China, Korea, Japan, and the U.S.A., where it is believed to have got introduced and was first recorded in 1856.

Material examined.—(*a*) *From the Rohtang Pass* : 106 examples of the flies were collected, as follows :

Locality	Date of collection	Material collected	Collector
Rohtang Pass (*ca.* 13,800 ft.).	4-vi-1955	25♀♀	*A.P. Kapur*
Rohtang Pass (*ca.* 14,000-14,500 ft.).	5-vi-1955	67♀♀, 2♂♂	,,
Rohtang Pass (*ca.* 13,800 ft.).	19-vi-1955 (return journey)	12♀♀	,,
	Total	104♀♀, 2♂♂	

The majority of the flies were alive at the time of capture. Nearly one-third of the number of female flies had distended abdomens which were full of mature ovaries. Nearly 20 elongate eggs could be seen in each case on dissecting the abdomen of specimens preserved in spirit.

The sexes were very unevenly represented, there being only two males in a total catch of 106 examples as mentioned above. Miles (1948) and Hawley (1922) have also referred to the occurrence of uneven sex-ratio in this species. The former observed that in *bred* specimens the number of males and females produced were approximately equal but this was not so in examples collected in nature. Hawley observed that females seemed to be more numerous than males on bare soil and males seemed to predominate about herbage. It seems obvious, therefore, that differences in the habits of males and females are responsible for the uneven proportion of sexes among the captured material.

(*b*) *From other parts of the Himalayas* : On going through the collections of the Zoological Survey of India, Calcutta, the writer came across the following interesting material of *H. cilicrura*, which, though collected many years back, was identified by Dr. F. van Emden and incorporated into the Survey's collections in November, 1950. This collection shows that the species is probably distributed all along the Himalayas, from Simla Hills in the western to Darjiling in the eastern Himalayas.

Earlier collections of *H. cilicrura* in the Zoological Survey of India, Calcutta.

Locality	Date of collection	Material collected	Collector
Simla (7,000 ft.), N. W. Himalayas.	24-iv-1907	2 ♀♀	*N. Annandale*
,,	5-v-1907	2 ♀♀	,,
,,	11-v-1908	1 ♀	,,
,,	7-v-1910	1 ♀ ..	,,
,,	9-v-1910	10 ♀♀, 1♂	,,
,,	12-13-v-1913	2 ♀♀, 3♂♂	,,
Phagu (9,000 ft.), Simla Hills	11-v-1909	1 ♀	,,
Theog (8,000 ft.), Simla Hills.	13-v-1909	1 ♀	,,
Matiana (8,000 ft.), Simla Hills.	?	1♂	,,
Unchagoan, (Nainital Dist., U. P.), central Himalayas.	7-iv-1909	1 ♀	*Museum collector*
Mussoorie (6,650 ft.), U.P., central Himalayas.	?	1 ♀	*Bond*
Darjiling (6,000 ft.), N. Bengal ; eastern Himalayas.	22-ix-1908	. 1♂	*E. Brunetti*
,,	24-ix-1908	1 ♀ ..	,,
,,	26-ix-1908	.. 1♂	,,
,,	30-ix-1908	2 ♀♀	,,
,,	2-x-1908	1 ♀	,,
Total		. 26♀♀, 8♂♂	

These collections show that *H. cilicrura* is widely distributed in the higher altitude of the western, central and eastern Himalayas. Since the species is a notorious pest of a variety of crops in Europe, central Asia, North China, Japan, North America and parts of South America, it would be useful to determine its economic status in different places in India from where it has been collected. At present it is known from the hills in North India, but perhaps a more thorough survey in the neighbouring areas may also be considered desirable from the point of internal quarantine in the country.

IV—SUMMARY

The Frit Fly, *Oscinella frit* (Linn.) and the Seed Corn Maggot, *Hylemyia cilicrura* (Rond.) which are notorious pests of cereals and other crops in different parts of the world and which were hitherto not recorded from India, were collected together with many other insects from the snow-covered Rohtang Pass (13,800-14,500 ft.) in the Kulu subdivision, Punjab, India, during June 1955. Since the files were collected in fairly large numbers and when most of these were alive, it seems probable that their source was not far away from the Pass.

Notes on the taxonomy, nature of injury and geographical distribution of the species and on the extent of the material collected are given. An examination of the insect collection in the Zoological Survey of India, showed that while *O. frit* was unrepresented, a fair number of examples of *H. cilicrura* from Simla Hills (7,000-9,000 ft.), Nainital district (exact altitude of locality unknown), Mussoorie (*ca.* 6,650 ft.) and Darjiling (*ca.* 6,000 ft.) were present. These had been collected a number of years ago but were identified and incorporated in the collections only recently. In view of the notoriety of these species as pests in several other countries, it seems desirable to determine their economic status and geographical distribution in India.

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