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Hymenopteran Insect Pollinators on Apple Bloom in District Rajouri, Jammu (Jammu and Kashmir), India

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Abstract

Survey was carried out on the insect pollinators visiting apple bloom in Bhudhal area of Rajouri district during April 2012-13. A total of 06 species of insect belonging to order Hymenopteran comprising of 03 families i.e Apidae (*Apis cerana indica*, *Bombus haemohoidalis*, *Xylocopa collaris*) Vespidae (*Eumeneous coarctatus* and *Odynerus* species) and Scolidae (*Compsomeris presmatica*) were recorded. The paper also incorporates the taxonomy and diagnostic features of these pollinating species.

Key words: Apple, pollinators, hymenoptera.

Introduction

Pollination is one of the most important mechanisms in the maintenance and promotion of biodiversity and, in general, life on Earth. Pollination also benefits society by increasing food security and improving livelihoods (Khan and Khan, 2004). Pollination is pre-requisite for sexual mode of reproduction in flowering plants and involves the transfer of pollen grain from the anther to the stigma of the flowers with the help of abiotic and biotic agents. Abiotic agents include wind, water, gravity, climatic condition etc, whereas biotic agent agents include insects, birds, bats, and small mammals etc (Free, 1993). Abiotic agent like weather plays an important role in determining the success or failure of pollination as it effect both pollen germination and bee activity. Of the biotic agent insects are prime importance in pollination of agricultural and horticultural crops. These insects belong to different orders viz., Hymenoptera, Diptera, Lepidoptera, Coleoptera and Thysanoptera (Michener, 1974). Of these Hymenopterans are the most important agent because of their high energy requirements and tendency for collecting provisions for their brood in the form of pollen and nectar. The various insects belonging to this order include honeybees, bumble bees and solitary bees (Mc Greoge, 1976).

Rajouri is a district of Jammu region in Indian state of Jammu and Kashmir. Rajouri district is located between 70° and 74°- 4' East longitude and 32° 58' and 33° 35' in north latitude. The average annual rainfall is 1150mm, and average temperature varies from 7.42°C to 37.4 °C.

Material and Methods

The insects were collected from the the field by the traditional methods like hand picking, by using entomological nets from the area under study. The collected insects were killed, stretched , pinned and preserved for identification (Southwood , 1978). Identification of different insect specimens was done by the taxonomic section of Entomology Division of Indian Agricultural and Research Institute, New Delhi.

Observation and Discussion

Apis cerana indica (fig 1.)

Order: Hymenoptera

Family: Apidae

Genus: *Apis*

Species: *cerana indica*

Host plant: Apple (Verma and Chauhan, 1985).

Diagnostic characteristics :

Small sized, 11-12mm in length, abdomen anteriorly yellow and posteriorly black, hind leg bears pollen basket. Head bears compound eyes, three ocelli on frons, antennae black geniculate, pubescence tawny, face flat; thorax yellow with tawny pubescence; anteriorly two yellow bands on abdomen, posteriorly black, pubescence tawny, underside of abdomen yellow with lateral extremities black; legs black, pubescence tawny, hind leg bears pollen basket, basitarsus bears antenna cleaner.

Bombus haemohydialis (fig 2.)

Order: Hymenoptera

Family: Apidae

Genus: *Bombus*

Species: *haemohydialis*

Host plant: Apple (Verma and Chauhan, 1985); (Mishra *et al.* 1976)

Diagnostic characteristics:

Large sized, Length 22-24mm, body bears soft dense orange and black pubescence, Legs hairy. Head bears compound eye, three ocelli present on frons, antennae black, geniculate. Face flat, Mouth parts chewing and biting type, Thorax black pubescent, pubescence dark grey and thick; abdomen bears yellow orange thick pubescence, 1st band yellow and 2nd orange; legs pubescent, modified for transporting pollens, body pubescence branched and making them more efficient in trapping pollen; tibia also bears spine.

Xylocopa collaris (carpenter bee) (fig 3)

Order : Hymenoptera

Family: Apidae

Genus: *Xylocopa*

Species: *collaris*

Host plant: Apple, peach (Abrol, 2005).

Diagnostic characteristics:

Length 22mm, creamish white dense pubescence, legs hairy. Head bears compound eyes, frons bears three ocelli; antennae geniculate, black; face flat; thorax shiny and creamish white pubescence; forewings bears humuli at the lower margin which fits into hind wing; abdomen shiny and bears creamish white pubescence all over; legs pubescent, bears spur/spine on tibia; tarsus bears claws; body pubescent.

***Camsomeris prismatica* (fig 4.)**

Order : Hymenoptera

Family: Scolidae

Genus: *Camsomeris*Species : *prismatica***Host plant:** Apple (Kumar, 1989)**Diagnostics characters:**

Medium sized, 18-19mm in length, abdomen bears four yellow stripes of pubescence, whole body pubescent. Head bears antennae, black, geniculate, 12 segmented and pubescent. Thorax shiny and pubescent; abdomen black and shiny, bears 4 yellow stripes of pubescence; legs black pubescent, mid and hind tibiae with stout spines, tarsus bears claws; fore wing with pseudo venation.

***Eumenes coarctatus* (potter wasp) (fig 5 .)**

Order : Hymenoptera

Family: Vespidae

Genus: *Eumenes*Species: *coarctatus***Host plant:** Apple (Verma and Chauhan, 1985).**Diagnostics characters:**

Medium sized, 11-12mm in length, thorax and abdomen is jointed together by a thin and long petiole. Head bears compound eyes, frons with 3 ocelli, antenna geniculate; wings bear hamuli; prothorax bears yellow band, mesothorax black, metathorax also bears yellow band; Upper surface of abdomen bears five yellow strips, rest black in colour anteriorly abdomen segment thin elongated with yellow band, second segment with two yellow dots, posteriorly abdominal segment yellow banded and pointed tip.

ODYNERUS SPECIES (BURROWING WASP) (FIG 6 .)

Order : Hymenoptera

Family: Vespidae

Genus: *odynerus***Host plant:** Apple (Verma and Chauhan, 1985).**Diagnostics characters:**

Small wasp, Length 9mm, thorax and abdomen is jointed together by a thin petiole, black rounded abdomen with yellow stripes, tip pointed. Head bears compound eyes, frons with 3 ocelli, antenna geniculate; wings bear hamuli; prothorax bears yellow band, mesothorax black, metathorax also bears yellow band; Upper surface of abdomen bears five yellow strips, rest black in colour.



Fig 1 *Apis cerana indica* 2. *Bombus haemohydialis* 3. *Xylocopa collaris* (carpenter bee) 4. *Camsomeris prismatica* 5. *Eumenes coarctatus* (potter wasp) 6. *Odynerus* species (burrowing wasp)

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