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An Updated Checklist of Ichneumonid Parasites (Hymenoptera: Ichneumonidae) Associated with Insects/ Insect Pests of Agricultural, Horticultural and Other Economically Important Plants in the Union Territory of Jammu & Kashmir

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ABSTRACT

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Based on the literature survey, the present work provides an updated checklist of Ichneumonidae parasites (Hymenoptera: Ichneumonidae) associated with insects/ insect pests of Agricultural, horticultural and other economically important plants in Union territory of Jammu & Kashmir. The paper deals with as many as 46 species of such recorded parasites spread over 11 subfamilies and 29 genera of family Ichneumonidae. Moreover, the systematic information, pertaining to the host insect-host plant range and local distribution of these listed Ichneumonidae parasites, has also been provided in this work.

Introduction

The Ichneumonidae (Hymenoptera) are one of the most species-rich families of all organisms with an estimated 60,000 species in the world⁴¹. According to Gauld¹⁸ many authorities regard this figure as an underestimate. The family Ichneumonidae is currently split into 37 subfamilies, of which 24 have been recorded from the Afro tropical region⁴⁴. With such huge number of

subfamilies, the classification of family Ichneumonidae has not reached a stable consensus. Ichneumonids are parasitoids of Lepidoptera, Hymenoptera, Diptera, Coleoptera and rarely spiders and other arthropod groups¹⁵.

The ichneumonids are widely studied because they are important agents of biological control of many groups of insects, including some agricultural, horticultural, and forest pests and

play an essential role in the normal functioning of most ecosystems. Ichneumonids have been used successfully as bio-control agents and given the largely undocumented fauna there is a huge potential for their utilization in managed bio-control programmes²⁶.

From Jammu and Kashmir region, no significant consolidated account *vis-a-vis* ichneumonid parasitoids and their known insect hosts has been published earlier, and whatever little information is available in this regard, is confined to some papers scattered in different papers, some of the prominent ones are: Ahmad and Dar³, Bhagat¹², Bhat⁵, Bhat and Bhagat⁶, Bhat and Bhagat^{6 and 7}, Bhat *et al.*,^{8, 9, 10 and 11}, Cameron¹³, Gupta^{20, 21 and 25}, Gupta and Tikkar²⁸, Gupta and Narendran³⁰, Jamal and Zaki³², Masoodi *et al.*,³⁴; Mittal *et al.*,³⁵; Rishi and Shah³⁸ and Zutshi⁴².

Hence, there was a dire need to prepare an updated checklist and inventory of Ichneumonid parasites of this region covering their host-insect range and local distribution. The present document will provide some base line data that will enable ready reference and information, whenever required for standardization and future utilization of these parasitoids for bio-control programmes of this region. Apart from this, the present work will also enable conservation management decisions *viz-a-viz* Ichneumonidae parasitoids as bio control agents.

Materials and Methods

The present study brings together scattered information about Ichneumonidae parasites of insects/ insect pests, reported on various kinds of agricultural, horticultural and other economically important plant species, from Jammu and Kashmir. The checklist presented here is mainly based on available literature

rather than on extensive taxonomic studies. Based on the literature Survey, all the previously published available research papers, pertaining to ichneumonidae parasites of insects, from Jammu and Kashmir, were examined and the information obtained was documented.

The data base was generated with special reference to Ichneumonidae parasites, their host insect/ insect pest and host plant ranges, followed by authors reporting them from J&K region. In order to generate such comprehensive database (pertaining to Ichneumonidae), apart from available research papers and catalogues, the other vital e-resources and abstracting services (particularly, CABI, NISCAIR, AGRI, Biological abstracts, Inflib net, etc.) were also consulted.

The arrangement of the subfamilies and genera of enlisted ichneumonid parasites has been provided alphabetically for convenience, and does not reflect phylogenetic relationships. The tribes and genera therein also are arranged in alphabetical order, largely according to the classification of Yu and Horstmann⁴⁵ and Yu *et al.*,^{46 and 47}

Results and Discussion

Based on the literature survey, the present checklist was prepared which provides base line data of as many as 46 species of ichneumonid parasites of family Ichneumonidae of J&K, falling under 11 subfamilies and 29 genera (Table 1).

The data of said 46 species of Ichneumonidae parasite is listed alphabetically below according to their subfamily names, tribe name (wherever available), Genera and species, followed by insect-host of the parasite along with host-plant on which such parasite was recovered

from the insect host. The check list is appended as under:-

Subfamily Banchinae wesmael, 1845

Tribe banchini wesmael, 1845

Genus *Exetastes* Gravenhorst, 1829

Exetastes fornicator (Fabricius, 1781)
(=*Icheuomon fornicator*)

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir

References: Ahmad and Dar, 1978

Subfamily: Campopleginae forster, 1869

Genus *Campoletis* Forster, 1869

Campoletis sp. (=Anilastus sp.)

Host Insect Pest: (i). *Lymantria obfuscata* on plants, *Salix* spp. and *Populus* spp.; (ii). *Trichoplusia ni* on plants, *Brassica o.* var. *acephala*, *B. o.* var. *capitata* and *B. o.* var. *gongylodea*; (iii). *Plusia signata* on *B. o.* var. *capitata* and *B. o.* var. *gongyloda*

Localities in J&K: Baramulla, Badgam, Pulwama, Srinagar, Kashmir.

References: Anonymous, 1970; Bhat, 2008; Bhat, 2018

Campoletis chloridae Uchidda

Host Insect Pest: (i). *Thysanaplusi orichalcea* on plants, *Alium cepa*, *Brassica rapa* and *Pisum sativum* ; (iii) *Helicoverpa argmiega* on plants, *Alium cepa*, *Lycopersicon esculentum*, *Solanum tuberosum*, *soybeen*, *Brassica campestris* var. *toria*, *Brassica*

juncea and *Cicer arietinum*

Localities in J&K: Bandipora, Baramulla, Badgam, Ganderbal, Pulwama, Srinagar, Kashmir, Jammu

References: Thakue *et al.*, 1995; Gupta and Raj, 2003; Bhat, 2008; Bhat *et al.*, 2009 ; Bhat *et al.*, 2010; Bhat *et al.*, 2017; Bhat, 2018

Genus *Campoplex* Gravenhorst, 1829

Campoplex longipes Moley

Host Insect Pest: Unknown insect and host plant species

Localities in J&K: Kashmir

References: Ahmad and Dar, 1978

Genus *Casnaria* Holmgren, 1859

Casinaria sp. (=Horogenes sp.)

Host Insect Pest: *Plutella xylostella* (= *Plutella maculipennis*) on plant, *B. o.* var. *capitata*

Localities in J&K: Srinagar

References: Simmonds and Roy, 1960

Genus *Charops* Holmgren, 1859

Charops bicolor (Szépligeti, 1906)

Host Insect Pest: *Heliothis armigera* on plant, *Lycopersicon esculentum*

Localities in J&K: Badgam, Bandipora, Srinagar

References: Bhat *et al.*, 2009.

Genus *Diadegma* Forester, 1869

***Diadegma fenestrata* (Holmgren)**
(=*Diadegma fenestralis*)

Host Insect Pest: (i). *Helicoverpa armigera* on plants, *Lycopersicon esculentum*; (ii). *Plutella xylostella* on plants, *Brassica campestris*, *B. o. var. acephala*, *B. o. var. botrytis*, *B. o. var. capitata*, *B. o. var. gongylodes*, *B. rapa* and *Raphanus sativus*

Localities in J&K: Anantnag, Bandipora, Baramulla, Badgam, Ganderbal, Pulwama, Srinagar.

References: Bhat, 2008; Bhat and Bhagat, 2008; Bhat *et al.*, 2009

***Diadegma semiclausum* (Hellen)**

Host Insect Pest: (i). *H. armigera* on plants, *B. o. var. acephala*, *B. o. var. gongylodes*; (ii). *P. xylostella* on plants, *B. o. var. acephala*, *B. o. var. gongylodes*

Localities in J&K: Srinagar

References: Bhat, 2018

Genus *Erioborus* Forester, 1869

***Erioborus* sp.**

Host Insect Pest: *Helicoverpa armigera* on plant, *L. esculentum*

Localities in J&K: Bad. Srinagar

References: Bhat *et al.*, 2009.

Genus *Hyposoter* Forester, 1869

***Hyposoter ebeninus* (Gravenhorst, 1829)**

Host Insect Pest: (i). *Pieris brassicae* on plants, *Brassica campestris*, *B. o. var. acephala*, *B. o. var. botrytis*, *B. o. var.*

capitata, *B. o. var. gongylodes* and *B. rapa* ; (ii). *Pieris rapae* on plants, *B. o. var. acephala*, *B. o. var. gongylodes*, *B. o. var. capitata*; (iii). *Pontia daplidice* on plants, *B. o. var. acephala*, *B. o. var. gongylodes*

Localities in J&K: Anantnag, Badgam, Baramulla, Srinagar, Pulwama, Ganderbal

References: Bhat and Bhagat, 2009; Bhat, 2010a; Bhat, 2017; Bhat, 2018

Subfamily cremastinae förster, 1869

Genus *Eucremastus*

***Eucremastus Szépligeti*, 1905**
(=*Cephalobolus parvipes* Morley.)

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir

References: Ahmad and Dar, 1978

Genus *Pristomerus* Curtis, 1836

***Pristomerus* sp.**

Host Insect Pest: *Ostrinia kashmirica* on *Crisium* sp.)

Local Distribution: Kashmir (Achabal, Lar)

References: Anonymous, 1970

***Pristomerus sulci* Mahd. and Kolu**

Host Insect Pest: *Glyphodes pyloalis* on *Morus* spp

Local Distribution: Pampore (Pulwama)

References: Mittal *et al.*, (2011)

Subfamily cryptinae kirby, 1837
tribe hemigasterini

Genus *Ecthrus* Gravenhorst, 1829

***Ecthrus coracinas* Gupta 1978**

Host Insect Pest: Coleopteran larvae (wood boring)

Local Distribution: Kashmir (Gulmarg)

References: Gupta, 1978

Subfamily diplazontinae viereck, 1918

Genus *Diplazon* Nees, 1819

***Diplazon laetatorius* (Fabricius, 1781)**
(= *Basus lactatorius* (Moley) (= *Ichneumon lactatorius*))

Host Insect Pest: Unknown insect host and plant species

Local Distribution: Kashmir

References: Ahmad and Dar, 1978

Genus *Promethes* Förster, 1869

***Promethes albiventralis* Diller**

Host Insect Pest: unknown insect and host plant species

Local Distribution: Ladakh

References: Diller 1984

Subfamily ichneuomoninae

Genus *Protichneumon*

***Protichneumon pisorius* (Linnaeus, 1758)**

Host Insect Pest: unknown insect and host plant species

Local Distribution: Kashmir

References: Wachkoo and Akbar (2019)

Subfamily pimplinae wesmael, 184

Tribe EPHIALTINI Hellén, 1915

Genus *Exeristes* Forester, 1869

***Exeristes roborator* (Fabricius, 1793)**

Host Insect Pest: *Ostrinia kashmirica* (Pyralidae) on *Cirsium* sp. (= *Cricus* sp.)

Localities in J&K: Achaba (Anantnag), Lar (Ganderbal)

References: Anonymous, 1970

Genus *Scambus* Hartig, 1838

***Scambus (Ateleophadnus) aithomelus* Gupta and Tikkar**

Host Insect Pest: *O. kashmirica* on *Crisium wallichii*

Localities in J&K: Srinagar

References: Gupta and Tikkar, 1967

***Scambus flavicrus* Gupta and Tikar.1968**

Host Insect Pest: *O. kashmirica* on *Crisium* sp. (= *Crinus* sp)

Localities in J&K: Achabal (Anantnag), Lar (Ganderbal)

References: Anonymous, 1970

***Scambus (S.) indicus* Gupta and Tikar, 1968**

Host Insect Pest: larva of lepidopteran on unknown plant sp.

Localities in J&K: Kashmir (Gulmarg)

References: Gupta and Tikkar, 1967

***Scambus (S.) kahmiricus* Gupta and Tikar, 1968**

Host Insect Pest: Lepidopteran larvae on unknown plant species

Localities in J&K: Kashmir (Shopian)

References: Gupta and Tikkar, 1967

***Scambus nursei* (Cameron)**

Host Insect Pest: Lepidopteran and coleopteran larvae on unknown plant species

Localities in J&K: Kashmir.

References: Narayan and Lal, 1955

***Scampus* sp.**

Host Insect Pest: *Thusanaplesia orichalea* on *Phaseolus vulgaris* and *Rumex nepelensis*

Localities in J&K: Badgam, Gandrbal

References: Bhat *et al.*, 2010; Bhat, 2017.
Tribe PIMPLINI Wesmael, 1845

Genus *Itoplectis* Forester, 1869

***Itoplectis himalayensis* Gupta 1967**

Host Insect Pest: *L. obfusate* on plant, *Salix* spp. and *populus* spp.

Localities in J&K: Kashmir (Srinagar, Pahalgam), Jammu (Batote)

References: Gupta, 1967; Rishi and Shah, 1985.

Itoplectis nr. himalayensis

Host Insect Pest: *Plutella xylostella* on *B. capitata*, *B. gongylodes*, *B. Campestris*

Localities in J&K: Kashmir -Badgam, Barmulla, Ganderbal and Srinagar.

References: Bhat and Bhagat, 2008

***Itoplectis* sp.**

Host Insect Pest: *Plutella xylostella* (= *Plutella maculipennis*) on plant, *B. o.var. capitata*

Localities in J&K: Kashmir (Srinagar)

References: Simmonds and Roy, 1960.

***Itoplectis tibetensis* perking**

Host Insect Pest: Lepidopterous pupae on herbaceous bushes along forest edge.

Local Distribution: Kashmir (Gulmarg)

References: Gupta, 1967

Genus *Coccygomimus*

***Coccygomimus* sp.**

Host Insect Pest: *Lamantria obfusate* on unknown host plant species

Localities in J&K: Kashmir

References: Anonymous, 1970

Genus *Pimpla* Fabricius, 1804

***Pimpla archica* Zeltenh**

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir.

References: Ahmad and Dar, 1978

***Pimpla alternans* (= *Itoplectis alternans*)**

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir.

References: Anonymous, 1970

Pimpla* sp. host insect pest: (i). *L. obfusca* on *salix* spp. and *poulus* spp. (ii). *peris brassica* on *B.o.var. gongylodes

Localities in J&K: Kashmir (Srinagar)

References: Anonymous, 1969, Masoodi *et al.*, 1986, Zutshi, 1967, Bhat *et al.*, 2010, Bhat, 2017.

Genus *Theronia* Holmgren, 1859

Theronia atalantae atalantae

Host Insect Pest: *L. obfusca* on *Salix* spp. and *Populus* spp.

Localities in J&K: Kashmir.

References: Anonymus, 1970, Rishi and shah, 1985; Masoodi *et al.*, 1986 a

***Theronia* sp.**

Host Insect Pest: *L. obfusca* on *Salix* spp. and *Populus* spp.

Localities in J&K: Kashmir.

References: Zutshi, 1967; Anonymous 1969; Masoodi *et al.*, 1986

Genus *Townesia*

***Townesia exilis* Gupta and Tikar, 1976**

Host Insect Pest: *Unknown*

Localities in J&K: Kashmir.

References: Gupta and Tikar, 1976

Genus *Xanthopimpla*

***Xanthopimpla* sp.**

Host Insect Pest: *Glyphodes pyloalis* on *Morus* sp.

Localities in J&K: Kashmir. pampore

References: Mittal *et al.*, 2011.

Subfamily ophoninae shuckard, 1840

Genus *Paniscus*

Paniscus montanes cameron

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir

References: Cameron 1906.

Paniscus collaris moley

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir (Srinagar)

References: Ahmad and Dar, 1978.

Paniscus kashmirensis cameron

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir

References: Cameron, 1906

Subfamily poemeniinae narayanan and lal, 1953

Tribe POEMENIINI Narayanan and Lal, 1953

Genus *Deuteroxorides* Viereck, 1914

Deuteroxorides indicus gupta

Host Insect Pest: Coleopteran larvae on hardwood coniferous tree)

Localities in J&K: Kashmir (Pahalgam)

References: Gupta, 1980

Genus *Podoschistus* Townes, 1957

Podoschisthus scutellaris desingnes

Host Insect Pest: larvae of wood boring coleopterans on coniferous trees

Localities in J&K: Kashmir.

References: Gupta, 1980

Genus *Poemenia* Holmgren, 1859

Poemenia kashmirica gupta

Host Insect Pest: Larva of coleopteran wood boring (Coniferous trees)

Localities in J&K: Kashmir (Pahalgam)

References: Gupta, 1980, Gupta, 1985.

Subfamily tryphoninae shuckard, 1840

Tribe EXENTERINI Förster, 1869

Genus *Eridolius* Förster, 1869

Eridolius aithogaster Gupta

Host Insect Pest: larvae of saw flies (Tehtridinidae) on unknown plant

Localities in J&K: Kashmir (Pahalgam)

References: Gupta, 1991

Tribe Tryphonini Shuckard, 1840

Genus *Polyblastus* Hartig, 1837

Polyblastus kashmerensis gupta

Host Insect Pest: larvae of saw fly on unknown plant species

Localities in J&K: Kashmir (Pahalgam)

References: Gupta 1985 a

Subfamily xoridinae shuckard, 1840

Tribe Xoridini Shuckard, 1840

Genus *Xorides* Latreille, 1809

Xorides (xorides) anthracinus gupta and chandra

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir (Pahalgam)

References: Gupta and Chandra, 1974.

Table.1 A list of reported number of subfamilies, genera and species of Ichneumonidae from J&K

S. No.	Name of Subfamily	No. of Genera	No. of species
1	Banchinae	1	1
2	Campopleginae	7	9
3	Cremastinae	2	3
4	Cryptinae	1	1
5	Diplazontinae	2	2
6	Ichneuomoninae	1	1
7	Pimplinae	8	19
8	Ophioninae	1	3
9	Poemeniinae	3	3
10	Tryphoninae	2	2
11	Xoridinae	1	2
Total		29	46

Xorides (X.) minimus gupta and chandra

References: Bhat *et al.*, 2010.

Host Insect Pest: unknown insect and host plant species

Localities in J&K: Kashmir (Gulmarg)

References: Gupta and Chandra, 1974

Others

Unidentified ichneuomonid

Host Insect Pest: *Parnara guttata* (Bremer and Grey) on *Oryza sativa*

Localities in J&K: Kashmir.

References: Jamal and Zaki, 2008

Unidentified ichneumonid

Host Insect Pest: pupa of *Thysanoplusia orichalcea* on *B. o. var. gongylodes*, *P. vulgaris* and *R. nepalensis*

Localities in J&K: Ganderbal, Badgam, Baramulla, Pulwama, Ganderbal, Srinagar

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