MATERIAL AND METHODS
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The extensive surveys of Ichnumon flies were conducted throughout the different places of Maharashtra State, India during 1981 - 1985. Large number of specimens were collected from fields, on grass like lucerne (*Medicago sativa* Linn.), on weed, in the shade of trees, in and nearby forest, at light, in and near crops like sorghum (*Sorghum vulgare* Pers.), bajara (*Pennisetum tryphodium* Rich), maize (*Zea mays* Linn.), sugarcane (*Saccharum officinarum* Linn.), rice (*Oryza sativa* Linn.), cotton (*Gossypium herbaceum* Linn.), ground nut (*Arachis hypogaea* Linn.), pigeon pea (*Cajanus cajan* Linn.) and castor (*Ricinus communis* Linn.) etc. Maximum collections were made during August to February. Some parasitized hosts and cocoons of Ichneumonids along with their hosts were also collected and reared in the laboratory. Some collections were made by light-weight malaise trap (Townes, 1972). In addition, collections of Drs. P.K. Nikam and K.S. Heble were also studied in the present work.
The collected specimens were killed in killing bottle and pinned. The pinned specimens were dried and kept in the Insect store boxes. Wings, antennae, hind claws and ovipositor sheath were mounted on slides in D.P.X.

For the study of male genitalia, the abdomen was cut apically after softening its tip with liquid ammonia. The cut segments were boiled in 4 - 6% potassium hydroxide (KOH) for 5 minutes for separating their parts from muscles, later washed thoroughly in distilled water to remove KOH. The genitalia were stretched with the help of two fine needles and pressed in between a slide and coverslip, later dehydrated in flattened state and mounted on slide in Canada balsam or in D.P.X. The subgenital plate is also flattened in a similar way and mounted. Eggs and larval stages, prepupae and pupae of parasitoids extracted after dissection in 70% alcohol from host's body were preserved in 70% alcohol and glycerene (70 : 30). The eggs and early larval instars were processed through higher grades of alcohol and mounted on cavity slides in D.P.X.
Morphological study was carried out with the help of binocular and monocular microscopes. Figures were drawn with the help of binocular camera lucida. In some cases monocular camera lucida was also used. Comparative measurements were taken with micrometer in the monocular microscope. Body lengths of the specimens and immature stages were taken with micrometer in the monocular microscope and also with binocular camera lucida. Measurements of the figures drawn by binocular camera lucida were calculated with the scale and those drawn by the monocular camera lucida with the stage micrometer. All the measurements are recorded in millimeters.

For the generic treatment monumental volumes of Townes 'The genera of Ichneumonidae' (Part-I, 1969; Part II and III, 1970 and Part IV, 1971) were consulted and for specific treatment 'A catalogue and reclassification of the Indo-Australian Ichneumonidae' by Townes, Townes and Gupta (1961) was followed. In addition, the recent works on some genera containing all the details viz., Ichneumonologia Orientalis Part-IV by Gupta and Maheshwary, 1977; Part VII by Chandra and Gupta, 1977; Records of the Zoological Survey of India, No. 17 by Jonathan, 1980 were also followed for identifications of the species.
Visit of Dr. P.K. Nikam to Hamburg, Federal Republic of Germany to attend the XVII International Congress of Entomology in the month of August, 1984 has been very useful. The identifications of some species included in this thesis were confirmed by Dr. Henry Townes, American Entomological Institute, 5950, Warren Road, Ann Arbor, Michigan, U.S.A. and Dr. Klaus Horstmann, Zoologisches Institut der Universital, Röntgenring 10, D-8700 Würzburg, Germany, at the Laboratory of the latter.

Visit was also made for the consultation of literature to the Library of Indian Agricultural Research Institute, New Delhi.

The terminology used in the thesis follows that of Townes (1969), Peck (1937) as interpreted for male genitalia of Ichneumonidae by Gauld (1976a) and Jonathan (1980) and for immature stages that of Short (1959). Some of the important taxonomic terms pertaining to the present study are expressed in figures 1 – 4. All districts of Maharashtra and visited places for collection are shown in figure 26. Figure 27 shows Oriental region and various states of India. The details on the material and method of Part II on biology and biometry are given along with that part.
**Figure 1. Head and Thorax of an Ichneumonid**

- **a:** Head, front view,
- **b:** Head, rear view,
- **c:** Thorax, side view.

**Areas of Thorax**

1. Median lobe of mesoscutum,
2. Lateral lobe of mesoscutum,
1 & 2. Mesoscutum,
3. Scutellum,
4. Postscutellum,
5. Hind margin of metanotum,
6. Tegula,
7. Subtegular ridge,
8. Collar,
8, 9 & 10. Pronotum,
10. Hind corner of pronotum,
11, 12 & 13. Mesopleurum,
12. Speculum,
13. Prepectus,
14. Mesepimeron,
15. Upper division of metapleurum,
16. Lower division of metapleurum,
17. Juxtacoxal area,
18. Propleurum,
19. Mesosternum,
20. Front coxa,
21. Middle coxa,
22. Hind coxa,
23 to 28. Propodeum,
23. First lateral area,
24. Second lateral area,
25. Third lateral area,
26. First pleural area,
27. Second pleural area,
28. Third pleural area,
29. Propodeal Spiracle.

**Carinae and Grooves of Thorax**

- **A:** Notaulus,
- **B:** Epomia,
- **C:** Prepectal carina,
- **D:** Mesopleural fovea,
- **E:** Mesopleural suture,
- **F:** Sternaulus, **G:** Postpectal carina,
- **H:** Juxtacoxal carina,
- **I:** Submetapleural carina,
- **J:** Pleural carina,
- **K:** Lateral longitudinal carina of propodeum,
- **L:** Median longitudinal carina of propodeum,
- **M:** Basal transverse carina of propodeum,
- **N:** Apical transverse carina of propodeum,
- **O:** Propodeal apophysis or crest,
- **P:** Costula.
FIGURE 2. WINGS OF AN ICHNEUMONID

VEINS

a: Fore wing

AB - Costa,
CD - Subcosta,
EFG - Metacarpus,
HIJF - Radius,
KLNO - Cubitus,
PQRW - Discoides,
RST - Subdiscoideus,
CP - Medius,
UV - Submedius,
VWX - Brachius,
BEH - Stigma,
DF - Basal vein,
IL - First intercubitus,
JN - Second intercubitus,
QL - Discocubitus,
K - Ramulus,
QK - First recurrent vein,
MS - Second recurrent vein,
Y - a bulla,
IV - Nervulus,
QRM - Post nervulus.

b: Hind wing

ab - Costella,
cde - Subcostella,
ef - Metacarpella,
dgh - Radiella,
jk - Cubitella,
mm - Discoidella,
kg - Intercubitella,
jl - Mediella,
op - Submediella,
pq - Brachiella,
r - Axillus,
jmp - nervulus,
bh - basal hamulus,
dh - distal hamuli.

CELLS

a: Fore wing

1 - Radial cell,
2 - Median cell,
3 - Discocubital cell,
4 - Aorelet,
5 - Third cubital cell,
6 - Second discoidal cell,
7 - Third discoidal cell,
8 - Submedian cell,
9 - First brachial cell,
10 - Second brachial cell,
11 - Anal cell.

b: Hind wing

12 - Costellan cell,
13 - Radiellan cell,
14 - Mediellan cell,
15 - Cubitellan cell,
16 - Discoidellan cell,
17 - Submediellan cell,
18 - Brachiellan cell,
19 - Anellan cell,
20 - Postellan cell.
FIGURE 3. ABDOMEN AND LEG OF AN ICHNEUMONID

a: Abdomen, side view.

1 - Petiole,
2 - Postpetiole
3 - first tergite,
4 - first sternite,
5 - Tergo-sternal suture,
6 - Ventrolateral carina,
7 - Dorsolateral carina,
8 - Mediandorsal carina,
9 - Glymma,
10 - Spiracle,
11 - Second tergite,
12 - Thyridium,
13 - Apical margin,
14 - Pygotyle,
15 - Ovipositor,
16 - Ovipositor sheath,
17 - Subgenital plate.

b: Leg

18 - Coxa,
19 - First trochanter,
20 - Second trochanter,
21 - Femur,
22 - Tibia,
23 - Tibial bristle,
24 - Tibial spurs,
25 - Tarsus,
26 - Claw,
27 - Hairs.
FIGURE 4. GENITALIA OF AN ICHNEUMONID

a - Cvipositor of an Ichneumonid,
b - Subgenital plate,
c - Male genital capsule,
d - Aedeagus.