

Taxonomic Review of Indian Pipunculids in Comparison to Pipunculids of Other Countries

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Abstract: The taxonomy of Pipunculids is largely neglected in India. Brunetti, 1912, 1915 & 1923 and Subramaniam, 1922 worked on Indian Pipunculids. Since 1923 no work was done on the Indian Pipunculids till 1971. Then Hardy, 1971, 1972 & with Delfinado, 1975 worked on Indian Pipunculids. Kapoor et al. 1977, 1985 & 1987 worked on Indian Pipunculids. Again Michael, 1997 worked on Indian Pipunculids. After that no work was done on taxonomy of Indian Pipunculids. The Present review will enable researchers to work in this field and to explore new species of Pipunculids.

Keywords: Pipunculids, Taxonomy, Auchenorrhyncha, Vena spuria, Syrphids

1. Introduction

The Pipunculid is a small but very distinct fly belongs to the family Pipunculidae and order Diptera with a world wide distribution. They are distinguished by their large spherical or hemispherical head which is extremely mobile and composed almost entirely of compound eyes. These flies are therefore called big headed flies. The family name is based on the genus *Pipunculus* Latreille (Latreille, 1802). According to Cammerson (1974), the name *Pipunculus* means “little pumpkin” due to the characteristic and peculiar head resembling pumpkin. The Pipunculids are relatives of Syrphids (hover flies or flower flies). They can be differentiated from Syrphids by large compound eyes that occupy most of their hemispherical head, the distinctive wing venation (no vena spuria, cell r4+5), the chitinized post spiracular plate found in the larvae. During their larval stage they are known as endoparasitoids of several families of Auchenorrhyncha (Homoptera) such as rice leaf hoppers. Over 1428 species of Pipunculids have been described worldwide (Papeet al., 2011).

2. Early work on Pipunculidae

The first Pipunculid species were described by Bose, 1792. Meigen (1800) described the genus *Dorillas*. Latreille (1802) erected the genus *Pipunculus*. Meigen (1803) erected genus *Micronensia* Meigen. Fallen (1810) discovered genus *Cephalopus* Fallen. Walker (1834) erected genus *Chalarus* Walker. Macquart (1834) also erected a genus *Atlenevra* Macquart. Zetterstedt (1838) erected genus *Nephrocerus* Zetterstedt. Rondani (1856) discovered genus *Alloneura* Rondani and *Prothecus* Rondani. Later, Loew (1865, 1872) described 8 new species from America and Europe including *P. subvirescens*. Becker (1884) worked on Egyptian Pipunculids. Johanneson (1884) described 2 new species of *Nephrocerus* from New York. Kowarz (1887) described 14 species (of which 4 new) from Bohemia. Giard (1889) worked on *Atlenevraspuria* Meigen (Now *Chalaruspuria*). William (1893) described 6 new species of *Pipunculus* from north America. Hough (1899) described 3 new species of *Pipunculus* while studied on Pipunculids of North America. Becker (1900) published comprehensive

work on Pipunculids and described 6 new species from the Palaearctic Region. Verrall (1901) worked on British Pipunculidae of which 5 are new ones belonging to 4 genera *Chalarus*, *Verrallia*, *Nephrocerus* and *Pipunculus*. Kertes (1903) described 6 new species of the genus *Pipunculus* from Sri Lanka.

Perkins (1905) described 26 new species from Australia and 5 new species from Hawaii. He in 1906 also described 1 new species, *P. eutrichodus* from Queensland. Becker (1907) reported 1 new species of *Pipunculus* from Tunis. De Meijere (1907) described one new species from Holland and 2 new species of *Pipunculus* from Java. Kertes (1907) described 1 new species from Formosa and two from Africa. Becker (1908) described 2 new species of *Pipunculus* from Hungary. Strobl (1909) added *P. argyrostictus* as a new species from Monistrol. Becker (1910) added one new species from Corsica. Perkin (1910) reported 4 new species from Hawaii. Wahlgren (1910) studied on the Swedish Pipunculidae and described 1 new species. Cresson (1911, 1912) described 9 new species of *Pipunculus* from North America.

Brunetti (1912) was first to work on Indian Pipunculids and described 12 new species from India. Kertes (1912, 1915) described 15 new species from Formosa. Malloch (1912, 1913) described 4 new species from North America. Banks (1915) described 4 new species of *Pipunculus* and *Verrallia* from United States. Brunetti (1915) reported on new species *Pipunculus uniformis* from Shimla (H.P.), India. Johnson (1915) described one new species of *Nephrocerus* from United States. Knab (1915) also described 2 new species from United States. Johnson (1919) published a revised list of Diptera of Jamaica which included 2 new species of *Pipunculus*. Collin (1920) worked on British Pipunculidae and reported 1 new species. Becker (1921) described 6 new species from Palaearctic Region. Brunetti (1922) reported *P. annulifemur* parasitizing leaf hopper as a new species from Bangalore, India. Lamb (1922) described 4 new species from Seychelles. Brunetti (1923) published his comprehensive work on these flies “Fauna of British India” in which 19 were truly Indian (out of 24). Becker (1924) described 5 new species from Formosa. Tonnoir (1925)

reported 3 new species from New Zealand. Brunetti (1927) reported 4 new species from Pahang. Shanon (1927) added 4 new species from Argentina.

Curran (1927) studied on North American Diptera and described 2 new species of *Pipunculus* from Canada. He in 1928 worked on African Pipunculidae. Frey (1932) studied on England Pipunculids. Curran (1934) added few new species from Africa. Sack (1935) revised the Palaearctic *Dorylaidae* and described new species. Enderlein (1936) erected 2 new genera i.e. *Cephalosphaera* for *Pipunculus compestris* Laterrille and *Jassidophaga* for *Verrallia pilosa* Zetterstedt. Collin (1938) erected new genera and species from Nearctic and Palaearctic Region. Aczel (1939) erected 3 new tribes *Chalarine*, *Dorylainiand* and *Nephroceriniand* a new genus *Tomosvaryella* or *Dorilassylvatica* Meigen from Hungary.

Hardy (1939) while working on Nearctic Pipunculidae described 4 new species and 2 new sub species of the genus *Pipunculus* and one new species of the genus *Verrallia* from U.S.A. Hardy *et al.* (1939) added 8 more new species from U.S.A. Duda (1940) described 4 new species of *Pipunculus* from Germany and also erected a new genus *Strandimyza*. Aczel (1940) erected 4 new genera i.e. *Anacephalops*, *Claraeola*, *Collinas* and *Eudorylas* and also described a new species of *Cephalosphaera* from Europe. Hardy (1940) described 7 new species of *Tomosvaryella* and 1 new species of *Dorylas* from U.S.A. Brooks and Jagnes (1941) worked on the Pipunculidae of Iowa, USA. Collin (1941) worked on Pipunculidae of Ussuri region of USSR describing 4 new species of *Pipunculus* and 1 of *Verallia*. Hardy (1943) worked on Nearctic *Dorilaidae* and described 27 new species and a new genus *Allomethus*.

Rapp (1943) described 2 new species from Quebec and 1 from New Jersey. He again worked on Pipunculidae of New Jersey in 1944. In 1945, he studied the types of genera & sub genera of Pipunculids. Rapp & Cooper (1943) published a catalogue of African Pipunculids.

Aczel (1944) revised the Palaearctic species of *Tomosvaryella* giving new species. Aczel (1948) published a monograph of *Dorilaidae* of Europe. Aczel (1952) brought a catalogue of Pipunculids of Neotropical region.

Collin (1956) worked on Pipunculids describing many new species of *Alloneura*, *Cephalops* and *Pipunculus* from Palaearctic region. He again in 1958, described 2 new species from Yugoslavia (1 of *Alloneura* & 1 of *Cephalops*).

Koizumi (1959) described 2 new species of *Eudorylas* and 1 of *Tomosvaryella* from Japan. He again in 1960 described 2 new species of *Dorilaidae* from Japan.

Coe (1966) published a handbook for the identification of British insects included 13 new species of Pipunculidae. He again in 1966 worked on British species of *Chalarus* & *Verallia* with 6 new species. In 1969, he described some Pipunculids from Southern Spain. Whittkar (1969) described life cycle of *Verallia aucta* and *Verallia setosa*.

Hardy (1971) published a review of the Oriental Pipunculids in which 4 species from India i. e. *T. oryzaetora*, *T. subvirescens*, *P. Eudorylas Javaensis* and *P. (E.) orientalis*. He in 1972 published a monograph on the Oriental Pipunculids in which he described 6 species from India i. e. *P. (Cephalops) subaeneus* Brunetti, *P. (E.) fillicornis* Brunetti, *P. (E.) macropygus* de Meijere, *P. (E.) uniformis* Brunetti, *T. limpidipennis* (Brunetti) and *T. nitens* (Brunetti). Bankowska (1972) reviewed the Polish species of Pipunculidae of which 13 were new species. Hardy and Delfinado (1975) brought out a catalogue of the Oriental Pipunculidae of which 23 were from India. Lyenborg (1975) worked on the Danish Pipunculidae and described 2 new species.

Kapoor *et al.* (1977) added 2 new species namely *P. (E.) ranikhetiensis* and *P. (E.) kumaonensis* from Kumaon hills of U.P., India. Rald (1977) worked on the Pipunculidae of Denmark and described some rare species along with a checklist.

Albrecht (1979) described 8 new species of *Dorylomorpha* from Finland. Chandra (1979) worked on the taxonomy of Phillipines. Mc. Lean (1979) described a new Pipunculid, *Nephrocerus flavicornis* from Norfolk, Britain.

Kozanek (1981) while working on the Pipunculidae of Czechoslovakia, described 5 new species of *Pipunculus* and *Nephrocerus*. Shatalkin (1981) described 1 new species of *P. (claraeola)* from USSR.

Kapoor *et al.* (1985) again described 1 new species of the genus *Dorylomorpha* Aczel and 1 new sub genus *Claraeospaera* from India. Jervis (1986) added 2 new species of the genus *Chalarus* Walker (*C. trilineatus* and *C. orientalis*) from Burma. Speight (1986) found *Dorylomorphamaculata* as new to Ireland. Rafael (1986) described a new genus *parapipunculus* of Pipunculidae from Nearctic region & Mexico. He again in 1986 described a new genus *Amanzunculus* from Amazon Basin.

Kapoor *et al.* (1987) described 2 new sub genera from India.

Kuznetsov (1990) described new species of Pipunculidae of Palaearctic region. He again in 1991 described a new species of the genus *Pipunculus* from Palaearctic region. In 1994, he described new Palaearctic species of *Tomosvaryella* Aczel.

Morakote *et al.* (1990) studied on the Japanese Pipunculidae. Jervis (1992) worked on taxonomic revision of genus *Chalarus* Walker from European fauna. De Meyer (1993) revised Afrotropical species of *Tomosvaryella* Aczel, 1939. Ale Rocha *et al.* (1995) worked on genus *Tomosvaryella* Aczel from Mexico, Central America.

Skevington & Marshall (1998) studied on systematic of New World *Pipunculus*. Skevington (1999) described *Cephalosphaera* Enderlein, a genus of Pipunculidae new for Australia. Skevington (2001) worked on revision of Australian Pipunculidae. Skevington (2002) studied on phylogenetic revision of Australian members of the *Allomethus* genus. Skevington (2003) worked on revision of Australian *Eudorylas* Aczel. Moya - Raygoza *et al.* (2004) reported *Eudorylas spinosus* (Hardy) parasitoids of corn leaf

hoppers from Mexico. Koenig & Young (2007) reported genus *Nephrocerus* attack adult crane flies (Tipulidae). Virlaet *al.* (2009) reported *Eudorylasschreiteri* (Shannon) as a parasitoid of corn leaf hopper.

3. Conclusion

From above review on Pipunculids it is clear that there is little work done in India in comparison to rest of the world. Brunetti (1912) was the first to work on the Indian Pipunculids and described 12 new species from India. Again in 1915, he described 1 new species *Pipunculusuniformis* from Shimla, India. He published his comprehensive work (1923) on these flies in "Fauna of British India" including 24 species. Out of these 24 species 19 are from India. Since 1923 no work was done on the Indian Pipunculids till 1971.

Hardy 1971 published a review of the Oriental Pipunculids included 4 species from India. In 1972, he published a Monograph on the Oriental Pipunculids included 6 species from India. Hardy *et al.* (1975) published a catalogue of the Oriental Pipunculidae including 131 species of which 23 were from India.

Kapoor *et al.* (1977, 1985) described 3 new species from kumaon hills of U. P., India. Later, Kapoor *et al.* (1987) published A Comprehensive Monograph on Indian Pipunculids including 91 species from India. Taxonomy of these flies are largely neglected in India. So, there is a need for detailed systematic work on these flies in India.

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