



## ORIGINAL ARTICLE

## Studies on Some Indian Veliidae in Different Zoogeographical Regions with Special Reference to *Baptista Distant* and *Microvelia Westwood* Genus

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Received: 23<sup>rd</sup> Dec. 2018, Revised: 5<sup>th</sup> Jan. 2019, Accepted: 21<sup>st</sup> Jan. 2019

### ABSTRACT

The Indian region represents an extremely varied topography with high and precipitous mountain peaks, sharp and steep hill slopes having thick and coniferous tropical deciduous forests and annual rainfall of more than 2000 mm.; in contrast to the first levelled low plain with lower amount of rainfall and forest of stunted growth. The veliides are represented as at present known by known by 35 species belonging to 9 genera. A reference to the table 1 would clearly show that about 44.4% genera and 57.14% species are endemic. As should be expected a relatively high percentage, about 40% species constitutes the Oriental fauna of Veliidae. In Northern mountain region of the country which falls under the Palaearctic region, about 8.57% species have so far been recorded. The Ethiopian, Australian, Neotropical and Nearctic realms constitutes about fairly similar percentage i.e. 5.7% of the total fauna. Besides this, about 17.1% species are wide spread in different realms. Veliidae are represented as at present known by 35 species belonging to 9 general. *Baptista Distant* genus is mainly Oriental, widely distributed in Northern India including Northern Thailand and Malaysia. In India, this genus is represented by 4 species of which i.e. *Baptista gestroi* Distant is for the first time recorded during the present study. It is commonly found in lakes. *Microvelia Westwood* is very widely, probably universally distributed genera in which six species *Microvelia repentina* Distant and *Microvelia singalensis* Krikaldy *Microvelia albomeculata* Distant, *Microvelia distant*, *Microvelia diluta* Distant, *Microvelia annadalei* are to the knowledge. The genus is represented in India by 8 species.

**Key words:** Indian Veliidae, Zoogeographical Regions, *Baptista Distant*, *Microvelia Westwood* Genus.

### INTRODUCTION

The knowledge regarding the Veliidae fauna of India through at the moment is far from complete; but we can profitably venture on an analysis of the zoogeographical composition of the fauna on the basis of present study which should be fairly an accurate index of the general faunal conditions of the area. This is important from a scientific point of view because it opens the door to further studies and new species identification and their relation to zoogeographical climate conditions. The present work summarizes common and important Indian Veliidae, their zoogeographical distribution and concentration towards Indian states. The Indian region represents an extremely varied topography with high and precipitous mountain peaks, sharp and steep hill slopes having thick and coniferous tropical deciduous forests and annual rainfall of more than 2000mm.; in contrast to the first levelled low plain with lower amount of rainfall and forest of stunted growth. Veliidae is represented as at present known by 35 species belonging to 9 general. A reference to the table 1 would clearly show that about 44.4% genera and 57.14% species are endemic. As should be expected a relatively high percentage, about 40% species constitutes the Oriental fauna of Veliidae. In the Northern mountain region of the country which falls under the Palaearctic region, about 8.57% species have so far been recorded. The Ethiopian, Australian, Neotropical and Nearctic realms constitutes about fairly similar percentage, i.e. 5.7% of the total fauna. Besides this, about 17.1% species are widespread in different realms.

### MATERIALS AND METHODS

The material for the present study was collected from the various localities of Uttar Pradesh. The veliids were easily recognized by their hind femora not exceeding beyond tip of abdomen and

collected by using ordinary pond net. They were killed immediately in 90% alcohol which was found to be very good preservative. The genitalia was taken out with the help of forceps. From the dry specimens the genitalia was similarly taken out after the insects were softened in dessicator. The genitalia was then mounted on DPX after processing. All the drawings were made with camera lucida.

## RESULTS AND DISCUSSION

The Indian region represents an extremely varied topography with high and precipitous mountain peaks, sharp and steep hill slopes having thick and coniferous tropical deciduous forests and annual rainfall of more than 2000 mm.; in contrast to the first levelled low plain with lower amount of rainfall and forest of stunted growth. The veliids are represented as at present known by known by 35 species belonging to 9 genera. A reference to the table I would clearly show that about 44.4% genera and 57.14% species are endemic. As should be expected a relatively high percentage, about 40% species constitutes the Oriental fauna of Veliidae. In Northern mountain region of the country which falls under the Palaearctic region, about 8.57% species have so far been recorded. The Ethiopian, Australian, Neotropical and Nearctic realms constitutes about fairly similar percentage i.e. 5.7% of the total fauna. Besides this, about 17.1% species are wide spread in different realms. Veliidae are represented as at present known by 35 species belonging to 9 general.

The zoogeography of the various genera dealt within the present study, as discussed below which clearly indicates distinct pattern of distributions.

**1. Rhagovelia Mayr:** It is a world widely distributed genus and probably found in all the principal zoogeographical regions and is represented in India by 9 species. The Rhagovelia are found on the surface of fresh water i.e. ponds and lakes.

**2. Velia Latrille:** This genus is probably distributed almost entirely in Oriental realm, Nearctic, Neotropical and Palaearctic regions widely distributed throughout in Palaearctic region. The genus is represented in India by one species i.e. *Velia (Handwania) sinensis* Anderson. These are commonly occur in streams, lakes and stagnant water of ponds.

**3. Baptista Distant:** This genus is mainly Oriental, widely distributed in Northern India including Northern Thailand and Malaysia. In India, this genus is represented by 4 species of which i.e. *Baptista gestroi* Distant is for the first time recorded during the present study. It is commonly found in lakes.

**4. Microvelia Westwood:** Very widely, probably universally distributed genera in which six species *Microvelia repentina* Distant and *Microvelia singalensis* Krikaldy *Microvelia albomeculata* Distant, *Microvelia distant*, *Microvelia diluta* Distant, *Microvelia annadalei* are to the knowledge. The genus is represented in India by 8 species.

**5. Perittopus Fieber:** This genus is recorded mainly from Oriental region especially from Java by only two known species i.e. *Perittopus breddini* Krikaldy *Perittopus rufus* Fieber, during the present study, *Pemttopus breddini* Kirkaldy is for the first time recorded from India in the present study. They are commonly found in slow and fast flowing streams.

**6. Lathriovelia Anderson:** It is the first recorded genus from India by a new species *Lathriovelia pronota* sp. Nov. It was dug out of a watery dark hole in rock. This one is the habitat sharing species to that of Baptista genus. The species of this genus mainly occur in a very cryptic and secluded like wet litter, rocky banks.

**7. Angilovelia Anderson:** This genus was first recorded from Oriental region by Anderson. This genus is named to suggest its habitual similarity with species of genus Angilia. In this genus is represented in India by only one species.

**8. Angilia Stal:** This genus is well confined in Oriental region widely distributed in Burma, Celebes, ceylone, China, Formosa, India, Java, Sumatra. In India, this genus is represented by 2 species. It is commonly found in secondary forest.

**9. Pseudovelia Hoberlandt:** This genus is throughoutly represented in Oriental realm; well distributed in Burma, Ceylon, India, Java, Malaya, Philippines. It is represented by 7 species in India of which four are new species described during the present study. Most species of Pseudovelia inhabit mountain streams and the nearshore zones of river. A few species live in the ripple zone

along the shores of lakes and water reservoir. From the foregoing account and the given table II and III showing the range of distribution of various species of Veliidae occurring in India. It becomes clear that the fauna of this region is a complex admixture of Palearctic, Ethiopian, Australian, Neotropical, Nearctic and Oriental realms. Many of the species are endemic to this area while others show certain definitive distributional pattern which can be classified as follows:-

1. Species which have been able to extend in the rest of the Oriental region.
2. Species which could penetrate into Australian, Palaerctic, Ethiopian, Neotropical and Nearctic regions.

**Table 1:** Range of distribution of Indian veliidae

| S.N. | Name of the species  | Range  |
|------|--|--|
| 1.   | <i>Rhagovelia (s.str.) himachali sp.nov.</i>                           | India  |
| 2.   | <i>Rhagovelia (s.str.) miniata sp.nov.</i>                             | India  |
| 3.   | <i>Rhagovelia (s.str.) lundbladi Hungerford &amp; Mastsuda</i>         | India  |
| 4.   | <i>Rhagovelia (s.str.) polhemi sp.nov.</i>                             | India  |
| 5.   | <i>Rhagovelia (s.str.) cotanatoensis Hungerford &amp; Mastuda</i>      | India  |
| 6.   | <i>Rhagovelia (s.str.) hoberlandti Hungerford &amp; Matsuda</i>        | India, Europe and Amercia                                      |
| 7.   | <i>Rhagovelia (s.str.) usingeri Hungerford &amp; Matsuda</i>           | India  |
| 8.   | <i>Rhagovelia (s.str.) mindanaoensis Hungerford &amp; Matsuda</i>      | India  |
| 9.   | <i>Rhagovelia (Neorhagovelia) hoogstraali Hungerford &amp; Matsuda</i> | India  |
| 10.  | <i>Velia (Haldwania) sinensis Anderson</i>                             | India  |
| 11.  | <i>Angilia (Adriennella) bidentata sp.nov.</i>                         | India  |
| 12.  | <i>Angilia (Adriennella) tridentate sp.nov.</i>                        | India  |
| 13.  | <i>Angilovelvia Y-alba (Paiva)</i>                                     | India, Burma, Malaysia   |
| 14.  | <i>Microvelia aashishi sp.nov.</i>                                     | India  |
| 15.  | <i>Microvelia femandi sp.nov.</i>                                      | India  |
| 16.  | <i>Microvelia miyamoti sp.nov.</i>                                     | India and Europe   |
| 17.  | <i>Microvelia andersoni sp.nov.</i>                                    | India, Sri Lanka   |
| 18.  | <i>Microvelia diluta Distant</i>                                       | India, Sri Lanka, Sumatra, Queensland, Singapore               |
| 19.  | <i>Microvelia annandalei Distant</i>                                   | India  |
| 20.  | <i>Microvelia (s.str) douglasi Scott.</i>                              | India  |
| 21.  | <i>Microvelia (s.str) lundbladi sp.nov.</i>                            | India, Ceylon, Burma, Malaya, Philippines, IsIs, Sumatra, Java |
| 22.  | <i>Perittopus beddini Kirkaldy</i>                                     | India  |
| 23.  | <i>Baptista gestroi Distant</i>  | India, Burma, Thailand   |
| 24.  | <i>Baptista fingeri sp.nov.</i>  | India  |
| 25.  | <i>Baptista sushmae sp.nov.</i>  | India  |
| 26.  | <i>Baptista tridigita sp.nov.</i>                                      | India  |
| 27.  | <i>Lathriovelvia capitata Anderson</i>                                 | India, Malaysia  |
| 28.  | <i>Lathriovelvia pronota sp.nov.</i>                                   | India  |
| 29.  | <i>Pseudovelvia (s.str.) bajjali sp.nov.</i>                           | India  |
| 30.  | <i>Pseudovelvia (s.str.) hungerfordi sp.nov.</i>                       | India  |
| 31.  | <i>Pseudovelvia (s.str.) sexualis (Piava)</i>                          | India  |
| 32.  | <i>Pseudovelvia (s.str.) lingual sp.nov.</i>                           | India  |
| 33.  | <i>Pseudovelvia (s.str.) feuerbomi Anderson</i>                        | India, Java, Thailand, Malaysia                                |
| 34.  | <i>Pseudovelvia (s.str.) matsudi sp.nov.</i>                           | India  |
| 35.  | <i>Pseudovelvia (s.str.) longitarsa sp.nov.</i>                        | India and China  |

On the basis of distributional pattern the known fauna could conveniently be divided under the following heads:

**1. Cosmopolitan species:** The species under this group have a very wide range of distribution occurring in tropical and sub tropical parts of the world. Some of the species have been able to established themselves in all the regions either due to common or by other means of dispersal. The species are *Rhagovelia nigricans* Burmiester, *Velia currens* Fabr., *Microvelia pulchella* Westwood.

**2. Endemic species:** Those species which are confirmed in India are included here. *Rshagovelia (Rhagovelia) himachali sp. Nov.*, *Rhagovelia (Rhagovelia) polhemi sp. Nov.*, *Rhagovelia (Rhagovelia) miniata sp. Nov.*, *Angilia (Adriennella) bidentata sp.nov.*, *Angilia (Adriennella ) tridentate sp.nov.*, *Microvelia repentina Distant*, *Microvelia albomaculate Distant*, *Microvelia lundbladi sp. Nov.*,

*Microvelia femandi* sp. Nov., *Microvelia miyamoti* sp. Nov., *microvelia* sp.nov., *Microvelia andersoni* sp. Nov., *perittopus campbelli* Lundblad, *Perittopus horvathi* Lundblad, *Perittopus maculatus* Paiva, *Baptista fingeri* Sp. Nov., *Baptista sushmae* sp.nov., *Baptista tridigita* sp. Nov., *Lathriovelina pronota* sp. Nov., *Pseudovelina bajjali* sp. Nov., *Pseudovelina hungerfordi* sp.nov., *Pseudovelina lingual* sp.nov., *Pseudovelina matsudi* sp.nov.

**3. Oriental species:** The Indian species occurring in other parts of Oriental region (Burma, Ceylon, Nepal, Java, Sumatra, Bali, Borneo, Thailand, South China, Celebes, Philippines and Formosa) are placed under this group. *Rhagovelina (Rhagovelina) nigricans* (Burmiester), *Rhagovelina (Rhagovelina) lundbladi* Hungerford & Matsuda, *Rhagovelina (Rhagovelina) cotabatoensis* Hungerford & Matsuda, *Rhagovelina (Rhagovelina) hoberlandti* Hungerford & Matsuda, *Rhagovelina (Rhagovelina) usingeri* Hungerford & Matsuda, *Rhagovelina (Rhagovelina) mindanaoensis* Hungerford & Matsuda, *Rhagovelina (Neorthagovelina) hoogstraali* Hungerford & Matsuda, *Velina (Haldwania) sinensis* Anderson, *Angilovelina y-alba* (Paiva), *Microvelina annandalei* Distant, *Microvelina douglasi* Scott, *Perittopus breddini* Kirkaldy, *Baptista gestroi* Distant, *Lathriovelina capitata* Anderson, *Pseudovelina tibialis* Esaki & Miyamoto, *Pseudovelina (Pseudovelina) sexualis* (Paiva), *Pseudovelina (Pseudovelina) feuerbomi* Anderson.

**4. Indo Palaearctic species:** The species occurring in Indian as well as palaearctic regions are placed under this group. The species are *Rhagovelina (Rhagovelina) nigricans* Burm., *Velina currens* Fabr., *Microvelina douglasi* Scott., *Perittopus breddini* Kirkaldy, *Angilovelina y-alba* (Paiva).

**5. Indo Ethiopian species:** The species recorded from Indian as well as Ethiopian region are placed in this group. The species are *Microvelina douglasi* Scott., *Perittopus breddini* Kirkaldy, *Pseudovelina tibialis* Esaki & Miyamoto, *Microvelina pulchella* Kirkaldy.

**6. Indo Australian species:** The species recorded from Indian as well as Australian region are placed in this group. The species are *Rhagovelina (s.str.) lundbladi* Hungerford & Matsuda, *Rhagovelina (s.str.) insignis* Distant, *Rhagovelina (s.str.) nigricans* Burm., *Perittopus breddini breddini* Kirkaldy, *Velina currens* Fabr.

**7. Indo Nearctic and Neotropical species:** The species recorded from Indian as well as Nearctic and Neotropical region are placed in this group. The species are *Rhagovelina (s.str.) nigricans* Burm., *Perittopus breddini* Kirkaldy, *Microvelina douglasi* Scott.

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