



Comparative Study of Receptor Organs in family Isotomidae (Order- Collembola), Agra Region

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ABSTRACT

Comparative study of receptor organs of family isotomidae i.e. *Proisotoma himalayana* Baijal, *isotomurus balteatus* Prabhuo, *Rhodonella minos* Denis sp. has been described from Agra region.

Keywords snow fleas, Receptor organs, Agra Region.

INTRODUCTION

The springtails are among the most abundant of all soil-dwelling arthropods. They live in a variety of habitats where they feed as scavengers on decaying vegetation and soil fungi. Most species are small (less than 6 mm in length) and quite susceptible to desiccation unless they remain in a moist environment. A unique, tube-like structure, the colophore is located ventrally on the first abdominal segment of most species. The member of family Isotomidae is very common near about water and also on the surface of pond water. In the species of this family abdomen fifth and sixth usually separated, species are with fine very long ciliated sensory hairs, the lasiotrichia which are main trichoid sensilla are present on the dorsal side of the abdominal segment. Sense organ of antennae third is normal without group of sensory hairs and with or not more than two or three sense rods are the characteristics of the members of this family. Isotomidae second largest family in the order. These hexapods are elongate and lack scales on the upper surface of the body. Bagnall [1] used the ocelli and post antennal organs on the morphological modification for separation of certain genera of Collembola. In India collembolan order is represented by 210 species under 86 genera, from 8 families and two sub-order [2]. Paliwal & Baijal [3] reported three new species of genus *Lepidocyrtinus* Börner from Distt. Agra and its environs.

MATERIAL AND METHODS

The snowfleas (collembola) described in this paper were collected site of Agra region- the wheat field of patholi, under the stones, fallen leaves at Yamuna River near Taj Mahal, edge of keetham reservoir. For collecting specimens to preserve and mount, then have 70% alcohol + 5% glycerine in the collecting jar. If collecting for live viewing, then just use water, the wax coating of springtails ensures that they will float. Collect material by scraping, or digging surface soil and leaf litter, preferably moist and containing decaying vegetation. Place the material on the sieve and position the lamp 4 to 5 inches above the surface. The idea is to drive the creatures down into the collecting jar by gradually drying out the soil. Typically leave the lamp on for 12 - 36 hours. Some material will still yield specimens for up to 48 hours. The microscopically study of the structure of the receptor organs, specimens were first put into dil. KOH and then mounted on slide under a binocular microscope and mounted in salmon's polyvinyl alcohol-lactophenol medium.

RESULT AND DISCUSSION

Under this family comparative study receptor organs of three genera and three species are studied. (Table 1).

Family -Isotomidae Börner, 1913

Species- *Proisotoma himalayana* Baijal

Body-Collembola collected from wheat field of Patholi, District Agra. Body deep blue dorsally, with black pigmentation and bluish gray ventrally. Ocellar field black, Antennal with blue pigmentation, furca without any pigmentation. Body clothed with moderately short, simple setae becoming a little longer towards the posterior part of body.

Species – *Isotomurus balteatus* Prabhoo

Body- Body yellowish green dorsally with black stripes and yellowish white ventrally. Ocellar field black. Leg and furca without any pigmentation. Body clothed by long ciliated setae and small simple macro setae, lasiotrichia present.

Species- *Rhodonella minos* Denis

Body- Collembolans are heavily pigmented with black color. These species also show sexual dimorphism as male Collembola provided the horn like structure on the head but female collembolan without this structure.

Table-1: Comparative Table of Receptor Organs Of Family Isotomidae (Order -Collembola)

S.No	RECEPTOR ORGANS	<i>Proisotoma himalayana baijal</i>	<i>Isotomurus balteatus Prabhoo</i>	<i>Rhodonella minosdenis</i>
1	Trichoid sensilla(tr. S.)	They are in the form of simple micro setae but at abdomen 4 th , 5 th & 6 th has macro setae. Micro setae are irregular in arrangement. These are mechanoreceptor for finding out the air current which orient the body of Collembola against the air current.	They are in the form of ciliated setae all over the body and also on antennae. The dorsal abdominal segments are provided with long ciliated setae (Lasiotrichia). Manubrium on the dorsal surface provided with group of dorsal setae which are for jumping flow also help jumping reflex.	These are in the form of micro and macro setae on the body, antennae and leg. These are mechanoreceptor which are meant for finding out the direction and velocity of air current and help the species in orientation of opposite to air current.
2	Sensilla basiconica (sn.b.)	These are in the form of sense rod present in antennal 3 rd segment. They are olfactory receptor and are meant for detecting odour from the atmosphere.	Absent	Absent
3	Sensilla chaetica (sn.ch.)	Absent	Absent	These are present on the cephalic region in the case of male. These are the organs of defence and help the species against the enemy.
4	Sensilla squamiformia(sn.sg)	Absent	Absent	Absent
5	Temperature receptors (t.rp.)	These are in the form of fine setae over the antennae and thoracic appendages which help in detecting the fluctuations of temperature	These are in the form of small setae on the antennae and thoracic appendages which are responsible for detecting the fluctuation of temperature.	These are in the form of small setae on antennae and legs. They help in finding out the fluctuation of temperature.
6	Tenent hair (ten.h.)	Absent	Absent	Absent
7	Claw with long	Absent	Absent	Absent

	sensory filament			
8	Postantennal organs (post. Ant. Org.)	These are in the form of elliptical with double ring which help in finding out the intensity of light and are hygrometers. Postantennal organs are surrounded by 3 guard setae which protect these organs from dust and injury.	These are in the form of elliptical ring, which are present just at the base of antennae, they help for detecting the intensity of light and are also hygrometers	They are present in the form of elliptical ring at the base of antennae which are photoreceptors as well as hygrometers.
9	Pseudo-ocelli (p.o)	Absent	Absent	Absent
10	Ocelli (oc.)	Ocellar field has 8 ocelli to each side, four anterior ocelli are large and four posterior ocelli are small but equal in size. These ocelli are made up of elevated cuticle and meant for finding out the intensity of light.	Ocellar field has 8 ocelli, anterior two ocelli are large five middle posterior ocelli small and equal in size and last single ocelli is very small. Each ocelli has a well developed transparent elevated cuticle which help in finding out the intensity of light.	Ocellar field has eight ocelli to each side which are sub equal in size. The transparent elevated cuticle is also present for the finding out the intensity of light.

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