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SOME SOIL MITES AND INSECTS ASSOCIATED WITH SOIL SAMPLES OF MEDICINAL PLANTS IN MEDICINAL PLANTS GARDEN OF RK MISSION, NARENDRAPUR

Medicinal Plants

Reshma Parveen Medicinal Plants Research and Extension Centre, R.K.Mission, Narendrapur, Kolkata-700103

Dr. S. K. Gupta* Medicinal Plants Research and Extension Centre, R.K.Mission, Narendrapur, Kolkata-700103 *Corresponding Author

ABSTRACT

The present paper reports the occurrence of a total of 20 species of which 9 belong to insects under as many genera, 7 families and 6 orders. Mites belong to 11 species under as many genera, 10 families and 3 orders. Among the insects and mites reported here, 6 and 7 species, respectively belong to predatory group, 2 and 4 species of insects and mites, respectively belong to fungal feeding group and 2 and 1 species respectively of insects and mites are being reported here for the first time as occurrence of those in soil were earlier unknown.

KEYWORDS

INTRODUCTION:

The soil mites and insects are important components in any type of soil/ litter. A good number of mites and insects have been explored but there are many which still remain undiscovered. The soil mites and insects are of great economic importance because they help in the formation of soil humus which enriches the soil fertility. This apart, they also help in recycling of soil nutrients, help in soil aeration, act as indicator species of soil health and soil pollution and also recently it has been found that they can be good tools in determining the postmortem intervals in forensic science. In view of this, soil mites/ insects have received attention globally including India and good amount of work has been done on diversity of soil arthropods, their bio-ecology, economic importance including their role in humus formation as well as effect on agricultural practices and pesticides on soil fauna. Unfortunately, most of these works pertain to soil of agricultural land, forest, grass land, fallow land etc. But practically, very little or nothing has been done from the soil of medicinal plants. Since, no chemical pesticides are applied on medicinal plants, the soil characteristics are ecologically little different from the soil of other crop fields. Due to this paucity of knowledge, it was thought desirable to take up a preliminary study on soil mites and insects from medicinal plant garden of RKMA, Narendrapur and whatever little information have been gathered on diversity of soil mites and insects, the same has been included in this paper .

MATERIALS AND METHODS:

The soil samples were collected from medicinal plant garden of RKMA, Narendrapur during July to October, 2018. At each time 250 grams of soil samples were collected from shovel and the mites and insects were extracted from soil samples by using heat desiccation method under Tullgren's funnel. The extracted specimens were preserved in 70% alcohol. All these specimens of insects and mites were identified by the junior author and have been arranged in a classificatory manner.

RESULTS AND DISCUSSION:

The identification of collected soil mites and insects revealed the occurrence of a total of 11 species of mites belonging to 11 genera under 10 families and 3 orders while the insects belonged to 7 species under 7 genera, 7 families and 5 orders. All those have been listed in Table-2 and Table-3, giving their date of collection, name of the species, respective habitat (name of the plant species wherefrom soil sample were collected), relative abundance and importance including their nature of association. These two Tables are self explanatory. Out of the 11 species of mites, there were 7 species which belonged to predatory group and appeared to devour upon different groups of mites (acarids) and insects (collembolans). The remaining four species were fungal feeders known to be associated with the fungi grown in the root system of the respective plants. Among the insects 6 were predatory species feeding upon collembolans and acarids, while there were two species which were fungal associates. The nature of association of the remaining 1 species was unknown.

Table 1: Total species, genera, families, orders and nature of association of insects and mites collected from medicinal plant garden of RKMA, Narendrapur.

	Total species	Total Genera	Total Families	Total Orders	Total Predators	Fungal Associates	Unknown Associates
Insects	7+2 undetermined	7+2 undetermined	7	5 +1 undetermined	6	2	1
Mites	11	11	10	3	7	4	-

Table-2: List of Insects collected through extraction of soil from Medicinal Plant Garden of RKMA, Narendrapur

Date of collection	Name of species	Habitat	Relative abundance	Remarks
27.07.2018	Order Collembola Family- Entomobryidae *a. Entomobrya* sp.	Soil associated with *Randia dumetorum*	1	Collected abundantly, may be serving as food of predatory mites
02.08.2018	Family- Isotomidae b. *Isotoma* sp.	Soil associated with *Ocimum sanctum.*	1	As above.
25.07.2018	Order Coleoptera Family- Scarabidae a. Scarabid beetle larva	Soil associated with *Calotropis gigantea*	2	Predator
27.07.2018	Family- Staphylinidae *b. Oligota* sp. Near Oviformis	Soil associated with *Abelmoschus moschatus*	3	Fungal damage root system. Not earlier reported from soil.
27.07.2018	Order Hymenoptera Family- Formicidae *a. Camponotus* sp.	Soil associated with *Coccinia grandis*	3	Predator, feed on Collembola
02.08.2018	Order Hemiptera Family- Anthocoridae *a. Orius* sp.	Soil associated with *Phyllanthus emblica*	3	Unknown importance, however, it is known to be a predator. Not earlier reported from soil.

31.08.2018	Order Diptera Family- Muscidae *a. Musca domestica*	Soil associated with *Coccinia grandis*	3	Associated with litter
31.08.2018	Order Diplura (unidentified)	Soil associated with *Datura metel*	3	Rare occurrence, importance unknown
02.08.2018	Class Symphylla (unidentified)	Soil associated with Andrographis paniculata	3	Rare occurrence, known to be a predator.

Table-3 List of Mites collected through extraction of soil from Medicinal Plant Garden of RKMA, Narendrapur

Date of collection	Name of the species	Habitat	Relative abundance	Remarks
27.07.2018	Order Mesostigmata Family- Laelapidae *a. Hypoaspis vacua*	Soil associated with *Rauvolfia serpentina*	2	Predator of collembola
27.07.2018	Family- Blattisociidae *Lasioseius parberlesei*	Soil associated with *Azadirachta indica*	1	Predatory group, prey probably *Tyrophagus* sp.
31.08.2018	Family- Laelapidae *Ololaelaps* sp.	Soil associated with *Andrographis paniculata*	2	Predator
02.08.2018	Family- Macrochelidae *Macrocheles glaber*	Soil associated with *Indigofera tinctoria*	2	Predator on Acarid mites
02.08.2018	Family- Parasitidae *Parasitus consanguineus*	Soil associated with *Rauvolfia serpentina*	2	Soil dweller predator
31.08.2018	Order Trombidiformes Suborder Prostigmata Family- Cunaxidae *Neocunaxoides andrei*	Soil associated with *Ocimum sanctum*	3	Predatory group, prey unknown, may be nematodes
10.10.2018	Family- Tydeidae *Paratydeus* sp.	Soil associated with *Withania somnifera*	3	Predator on acarid mites
27.07.2018	Order Sarcoptiformes Suborder- Astigmata Family- Acaridae a. *Glycyphagus geniculatus*	Soil associated with *Withania somnifera*	3	Associated with roots having fungal infection. Not earlier reported from soil.
31.08.2018	Family- Acaridae b. *Tyrophagus putrescentiae*	Soil associated with *Ficus hispida*	1	Fungal associated mite
02.08.2018	Family- Anoetidae b. *Histiostoma* sp.	Soil associated with *Ocimum sanctum*	3	Fungal associated mite
02.08.2018	Suborder Oribatida Family- Scheloribatidae *Scheloribates* sp.	Soil associated with *Calotropis gigantea*	2	Fungal associated mite

Note: Relative abundance 1= highly abundant, 2= moderately abundant, 3= rare or casual occurrence

CONCLUSION:

From the preliminary data obtained by identification of the collected material during July to October, 2018, it is not possible to draw any meaningful conclusion about the diversity of mites and insects from soil collected from medicinal plant garden of Narendrapur. However, it is clear that the soil of medicinal plant garden is faunastically quite rich. Hence more intensive and extensive study will reveal many more interesting species.

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