



INSECTS AND MITES OCCURRING ON MUSHROOM IN SOUTH 24 PARGANAS DISTRICT OF WEST BENGAL.

Medicinal Plants

Afsana Mondal

Medicinal Plants Research and Extension Centre, Ramakrishna Mission Ashrama, Narendrapur, Kolkata – 700103

Dr. S.K. Gupta*

Medicinal Plants Research and Extension Centre, Ramakrishna Mission Ashrama, Narendrapur, Kolkata – 700103 *Corresponding Author

ABSTRACT

This paper deals with insects/mites occurring on mushroom collected from different places of South 24 Parganas district and reports occurrence of 9 species of insects under 8 families and 12 species of mites under 10 families. Out of the total of 21 species, *Megaselia scalaris* and *Musca domestica* among insects and *Tyrophagus putrescentiae*, *Acarus siro* and *Histiostoma heinemanni* among mites are the most damage causing organisms on Oyster mushroom (for insects) and Milk mushroom (for mites). Likewise, *Camponotus vicinus* (Fam. Formicidae) from insects and *Hypoaspis berlese* and *Lasioseius quadrisetosus* among mites are the two predators of much value. All the insects and mites are listed giving their habitats, date of collection, economic importance, if any.

KEYWORDS

Mushroom, Insects, Mites, South 24 Parganas.

INTRODUCTION

Mushrooms are fruiting bodies of a fungus. These are most important microbes and are used as source of human food having rich source of vitamins B, C, D, folic acid, fat, fibre, potassium, phosphorus, magnesium, copper, etc. There are about 200 species of mushroom, of which, about 2 dozens are edible and the rest are wild and many of those are unsuitable for human consumption because of being poisonous. The edible mushrooms are button mushroom (*Agaricus bisporus*), Oyster mushroom (*Pleurotus ostreatus*), paddy straw mushroom (*Volvariella volvacea*) and Milky mushroom (*Calocybe indica*). All the cultivated mushrooms differ among themselves in colour, shape, size and biochemical composition. In view of the growing importance of mushroom, many people have started cultivation of mushrooms. With the increased level of cultivation, the pest problem of mushroom is also increasing. The major pests of mushroom are insects and mites and they do a lot of damage. The Ramakrishna Mission Ashrama, Narendrapur (NRKM), Neempith Ashrama and many private parties have started mushroom cultivation and those are often attacked by a good number of insect and mites. Unfortunately, no survey has been made earlier to explore and document the insect and mite pests. Hence, a preliminary attempt has been made here to survey some of the mushroom cultivation in South 24 Parganas district of West Bengal and whatever insects and mites have been collected are being documented here in this paper.

MATERIALS AND METHODS

The collection of mites and insects occurring on mushroom in different parts of South 24 Parganas district was made during August to December, 2018. Mushroom samples including mushroom and mushroom bed from Oyster mushroom, Milky mushroom were collected at fortnightly intervals. Those samples were put into modified Tullgren Funnel using heat desiccation method with a 60 watt bulb as heat and light source. The insects and mites were collected in a receiver containing 70% alcohol fitted with the stem of the funnel. It took about 2-3 days for complete extraction of insects and mites. After

extraction, the extracted materials were sorted out under a stereo binocular microscope into different groups. The insects and mites were identified by the junior author. While making the collection of samples, observations were recorded towards damage done, if any, on mushroom or mushroom bed. All the identified species both of insects and mites have been listed taxonomic category wise giving the other relevant information.

RESULTS AND DISCUSSIONS

The insects and mites collected from mushroom from different areas of South 24 Parganas were identified and all those have been listed in Table-1 giving their names, localities, date of collection, relative abundance, habitats and importance, if any, and that Table is self explanatory.

The present paper reports a total of 21 species, of which 9 species are insects and 12 species are mites. Among the mite species 4 species, viz. *Lasioseius quadrisetosus*, *Pachylaelaps dorsalis*, *Parasitus consanguineus* and *Amblyseius heribicolus* have not been reported earlier on mushroom/bed from India. Further no species of *Antennoseius* was also reported from mushroom. So, these form new records of mushroom mites. Das et al. (1987, 1987a) reported mushroom mites from Kalyani and indicated occurrence of *Histiostoma heinemanni*, *Rhizoglyphus echinopus* abundantly, and in the present study also those two species could be collected. Among insects, the occurrence of *Isotoma* was also made for the first time in India and that was abundantly found. However, whether it caused any damage or not is uncertain.

ACKNOWLEDGEMENTS

The authors are thankful to the Secretary, Ramakrishna Mission Ashrama, Narendrapur (NRKM) for providing laboratory facilities and to Mr. Adar Mukherjee of Mushroom Unit of this Ashrama for providing mushroom samples and offering suggestions.

Table 1: List of Insects/Mites collected during August-December, 2018 from South 24 Parganas district on mushroom with their localities, habitats, relative abundance and remarks giving importance, in any.

Sl. No	Name of Species	Locality	Date of collection	Habitat		Relative Abundance	Remarks
				Mushroom	Bed		
1	INSECTS Damage causing: Order- Diptera Family 1- Phoridae (Phorid fly) <i>Megaselia scalaris</i>	NRKM	04.08.2018	From infected oyster mushroom	-	2	It attacked oyster mushroom, doing serious damage. It also was known to inject bacteria to do bacterial disease doing further damage. Similar observations were made by Scheepmaker et al. (2010).
2	Family 2- Muscidae <i>Musca domestica</i> (house fly) and <i>Stomoxys calcitrans</i>	Lakshmikantapur	04.08.2018	From infected oyster mushroom	-	1	It was also a serious pest, damaged the mushroom body, making those unsuitable for human consumption. The remarks tallied with Skovgardh. & Steenberg (2002).

3	Family 3- Sciaridae (Sciarid fly) <i>Bradysia sp. nr. analis</i> <i>Sciarid militaris</i> .	NRKM	13.08.2018	From infected oyster mushroom	-	1	It was found to feed upon developing mycelia forming sponge-like mass. Often, they made tunnels in mushroom stalks which reduced crop quality. Wuest & Bengtson (1982) also made similar observations.
4	Family 4- Cecidomyiidae <i>Mycophila sp.</i>	Kakdwi-p	04.09.2018	Mushroom fruit-body	-	2	The Larvae fed upon developing mycelia causing serious damage.
5	Family 5- Muscidae Mushroom maggots	Kakdwi-p	04.09.2018	-	Mushroom Bed	1	Maggots bored into stem and cap causing breakdown of mushroom. They multiply very rapidly and at any given time, there may be several hundreds in mushroom
6	Predators/Parasites Order- Hymenoptera Family 1- Formicidae <i>Camponotus vicinus</i>	Canning	29.09.2018	From infected oyster mushroom	-	1	This ant was found as predator of sciarid flies. (Mayr, 1862) also reported similar habitat.
7	Family 2- Diapriidae <i>Synacra sp.</i> (Parasitic wasp)	Canning	29.09.2018	-	Bed	2	This parasitic wasp was collected from mushroom bed. They are known to lay eggs on larva of Sciaris fly and kill that.
8	Order- Collembola Family 1- Entomobryidae <i>Achorutes sp. nr. armatus</i>	Jharkha- li	06.10.2018	From infected mushroom	-	1	This was found occasionally associated with mushroom bed causing browning of beds.
9	Family 2- Isotomidae <i>Isotoma sp</i>	Jharkha- li	06.10.2018	-	Mushroom Bed	3	This was abundantly encountered in mushroom bed making those brown.
1	MITES Damage causing: Order- Sarcoptiformes Family 1- Acaridae <i>Tyrophagus putrescentiae</i>	Dhamak-hali	02.11.2018	-	Bed of milk mushroom	1	Abundantly available in bed. The infestation caused browning of beds and in case of higher level of infestation, the mushroom was killed. The present observations tallied with those of Kumud & Mathur, (1989).
2	<i>Acarus siro</i> (Fungal associated)	Dhamak-hali	02.11.2018	-	Bed	1	Heavy infestation was often occurred in mushroom beds. All stages were found in the bed. Navarro et al. (1985), also remarked the same as made here.
3	<i>Rhizoglyphus echinopus</i>	NRKM	17.11.2018	-	Bed	2	They attacked Pleurotus sajor-caju, made pin-headed holes on mycelial mats. Then attacked mushroom stalk during fruit-body stage. Infested mushroom became pointed, white coloured, gills also were affected. Gupta, (2012) also mentioned similar damage symptoms.
4	Family 2- Pygmephoridae <i>Pygmephorus sp.</i>	NRKM	17.11.2018	-	Bed	1	This attacked mushroom stalk and caps. It fed on mushroom caps turning those yellowish brown. Hundreds of this mite on a cap were found. The present observation tallied with Gupta, (2012).
5	Family 3- Anoetidae <i>Histiostoma heinemanni</i>	Lakshik- antapur	29.11.2018	Milk-mushroom fruit-body	-	1	This mite was collected from milk mushroom fruit body. Due to attack on mycelia, the growth of the fruit body was checked. Gupta (2012) also mentioned similar damage symptoms.
6	Family 4- Tarsonemidae <i>Tarsonemus tarsalis</i>	Lakshik- antapur	29.11.2018	-	Bed	2	This tiny mite was associated with mushroom bed. The infestation turned the mycelia off-white and later turned reddish. The present observation tallied with Gupta (2012).

7	PREDATORS Order- Mesostigmata Family 1- Pachylaelaptidae <i>Pachylaelaps dorsalis</i>	Canning	08.12.2018	-	Bed	3	This predatory mite was collected from mushroom beds and fed upon acarid mite.
8	Family 2- Blattisociidae <i>Lasioseius quadrisetosus</i>	Canning	08.12.2018	-	Bed	2	This was also a predatory mite encountered in mushroom bed, its preyed upon Tarsonemid mites.
9	Family 3- Ascidae <i>Antennoseius sp.</i>	Canning	08.12.2018	-	Bed	2	This was encountered in bed, normally it was a predatory species, but in this study its prey could not be ascertained.
10	Family 4- Parasitidae <i>Parasitus consanguineus</i>	Jharkha- li	22.12.2018	-	Bed	2	This was collected from mushroom beds, may be predatory.
11	Family 5- Laelapidae <i>Hypoaspis berlese</i>	Jharkha- li	22.12.2018	-	Bed	2	This predatory mite was collected from mushroom bed, this may be predatory. Hoda et al. (1986) also reported similar observation.
12	Family 6- Phytoseiidae <i>Amblyseius heribicolus</i>	Jharkha- li	22.12.2018	-	Bed	3	This predatory mite was found feeding on Tyrophagus mite.

Note: 1 = Highly abundant, 2 = Moderately abundant, 3 = Least abundant.

REFERENCES

1. Das, P., Somchowdhury, A.K. and Mukhejee, A.B. 1987. Nature and Habitat of mushroom mite. *Env. & Ecol.* 5 (4): 600-680
2. Das, P., Somchowdhury, A.K. and Mukhejee, A.B. 1987 a. Source of mite infestation in mushroom cultivation. *Env. & Ecol.* 6(3):669-671
3. Gupta, S.K. 2012. Handbook. Injurious and Beneficial Mites infesting Agri-horticultural crops in India and their management. NBI, New Delhi, 362 PP
4. Hoda, F.M., Taha, H.A., Ibrahim, G.A. and el-beheri, M.M. 1986. Biological observations on the predatory mite *Hypoaspis miles* Berlese (Acarina: Laelapidae). *Bull. Soc. Entomol. d' Egypte* 66:103-106
5. Kumud and Mathur, R.B. 1989. Influence of ultraviolet radiation on the survival of the Acarid mite *Tyrophagus putrescentiae* (Astigmata: Acaridae) in: *Progress in Acarology* (Eds: GP Channabasavanna and C.A. Viraktamath) (Volume 2) 249-253
6. Mayr, G. 1862. *Myrmecologische Studien*. Verh. K-K. Zool.-Bot. Ges. Wien 12:649-776.
7. Navarro, S., Lider, O. and Gerson, U. 1985. Response of adults of the grain mite, *Acarus siro* L. to modified atmosphere. *Journal of Agricultural Entomology* 2:61-68.
8. Scheepmaker, JWA; Geels, FP; Smits, PH; Van Griensven, LILD. 2010. Control of the mushroom pests *Lycoriella auripila* (Diptera: Sciaridae) and *Megaselia halterata* (Diptera: Phoridae) by *Steinernema feltiae* (Nematoda: Steinernematidae) in field experiments. *Annals applied Biology*, 131:359-368.
9. SkovgardH, SteenbergT 2002. Activity of pupal parasitoids of the stable fly *Stomoxys calcitrans* and prevalence of entomopathogenic fungi in the stable fly and house fly *Musca domestica* in Denmark. *Bio-control* 2002; 47(1):45-60. <http://dx.doi.org/10.1023/A:1014434004946>
10. Wuest, P. and Bengtson, G.D. 1982. PennState Handbook for commercial mushroom growers. The Pennsylvania State University, University Park