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Ecology of Trombidium (Red Velvet Mite) in Karimnagar Districts Of Telangana, India

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ABSTRACT

Trombidiidae mites are ectoparasites in the larval stage and free living predators in the adult stage on a variety of arthropods among which are pests of many economic crops. The red mites which are having a complex life cycle. This study includes ecology and comparison of abundance of *Trombidium grandissium* in wild habit verses crop field. The biological control of the red mites happening by the man made activities directly or may be indirectly. This survey successfully conducted by visiting different villages and by conducting interview with the farmers Survey conducted in Elkathurthy, Suraram, Thummanapalli, Muccherla villaeges in Karimnagar district The survey results shown in table – 1 showed that the red velvet mites more in the soils rich in humus (partially decomposed organic matter), red soils and sandy soils without the use of pesticides. They are less in number in black soil. They are very few in crop lands even with the use of pesticides and in some crop lands totally absent because of these pesticides. Generally they appeared more during onset of monsoon which is favorable condition for mites. Less number of mites are found in urban areas such as Muccherla and Gopalpur due to large scale construction, dry soil and decreased ground water. The presence of these mites which indicates the non polluted condition of the soil and the air pollution where not effect on their presence or appearance. But the absence of red mites in the land which indicates the high chemical concentration and the dry condition of the different lands.
Key words: Environment attitude, teaching practices, secondary school teachers.

Key words: Trombidium grandissium, Biological control, Ectoparasite, Black soil, Sandy soils, Pesticides

INTRODUCTION

Trombidium grandissium is commonly known as graint red velvet mite, red velvet mite, true velvet mite and rain bugs. In our research area the people commonly calling it as ArudhraPurugu because it is only appear in the month of june to july this is the period commonly in astronomical calendar called as Arudhramasamu. It is visible with naked eye. It's entire body covered by red velvet organization. They are small arachnids found in plant litter. The adults are typically 4mm in length which red in colour and bearing eight legs.

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Trombidium grandissium is belongs to the phylum Arthropoda, class Trombididae (Leach, 1815), class Arachnida, order Trombidiforms. They are frequently in northern India and also found in south India and spend more time hiding in the soil with earth worms. They share an environment with number of different organisms including the castor beam, jimson weed and streptomycesplatensis. It emerges after rainy season and seen on ground in large muscle.thus it is also called as "rains insect".

They are visible a few weeks out of the year it spends majority of the life in the soil and lives in close proximity to Bacteria, nematodes and some fungi. It has many adaptations to help it survives in harsh environment. It helps in regulate the ecosystems by keeping other insects soil ecosystems by keeping other insects and spider population in check by including them in their diets.

This extends the life of bacteria and fungi which are the most important decomposers of organic waste in the soil ecosystems. Some of these bacteria and fungi are known to cause discomfort in humans and some times even kill them. But this bug is survived in such harsy conditions. Recent research evident that *T. grandissium*anti fungal oil, and the haemolymph of these mites showed the anti fungal activity. This secretion allow the mite to live harsy environment.

As we know the larvae are ectoparasites and the adults are free-living predators. Non-feeding larvae have been reported in one species (Smith, B.P. 1998.).
The larvae of *Trombidium grandissium*parasitic on different artropodes like TrombidiidaeHomoptera: Aphididae, Lepidoptera, Coleopteran, Opiliones and AcariAraneae and Lepidoptera Orthroptera, Coleoptera, Lepidoptera, Araneae and SolifugaeHomoptera: Aphididae Hymenoptera, Hemiptera, Homoptera and DipteraHomoptera: AphididaeLepidoptera, Coleoptera, Diptera, Orthoptera, Hemiptera and Homoptera Hymenoptera, Araneae, Pseudoscorpiones and Opiliones. (Zhi-Qiang Zhang *1997)* The adults are predatory.their diet includes termites, aphids, beetle eggs and spider mites. They also cannibalism and at each other.

The life cycle of the red velvet mite is very complex and fertilization which is unique. During copulation male organism drops their spermatophores on the ground and the female organism pick that spermatophores , leading to indirect sperm transform. If another male come along the spermatophores before a female, it will destroy the spermatophores and lay their own. After fertilization fertile eggs developed in moist soil and hatch 1 to 2 months latter. In the life cycle of this red velvet mite has four stages - egg, larvae, nymph and adult. The larvae mostly live in crickets and sucks fluid from the host for nutrition support. The group of Trombidiidae has complex life cycle in the soil is usually univoltine(Henking,1882; Howard, 1918; Miller, 1925; Hirst, 1926; Michener, 1946; Robaux, 1974; Aeschlimann and Vitou, 1986; Southcott, 1986b, 1994; Zhang and Xin, 1989a,b; Zhang *et al*., 1995; Zhang, Z.-Q.et. al., 1989; Dong *et al*., 1996). The temperate in the environment plays major role in the hatching of the eggs are laid in the soil during March–July and hatch after 1–2 months. The formation of the larvae is generally in synchrony with the hosts of them.

The larvae of Trombidiidae are ectoparasitic on arthropod hosts and the attachment time is approximately 1 to 2 weeks. They detached from the host and go to reach into the soil. Calyptostaticprotonymphs develop within the protective layer called cuticle of larvae. Deutonymphs develops in the summer or autumn and further development forgo on the soil surface and plants. The nymphs under go for gradual development within the cuticle in the soil and adults will emerge in the autumn. Even the larvae of Trombidiidae appear late in summer or autumn may not to be success in the formation of the adult in the same year and will go for complete their life cycle in the future one or two years (Robaux, 1974) Robaux, P. 1974. Recherchessur le developpementet la biologie des acariens 'Thrombidiidae'.Mem. Mus. Hist. Nat., Ser. A Zool. 85: 1–186., The development and survival of each life cycle stage is affected by the temperature, relative humidity (RH) and food availability/quality (Robaux, 1974). The eggs of *Allothrombiumfuliginosum*(Hermann) need an RH of near 100% for optimal development and survival (Robaux, 1974). Exposure of *A. fuliginosum*prelarvae to 85% RH for 4 days resulted in 80% mortality and the development of survivors was slower than that at 100% RH (Robaux, 1974). *Allothrombiumpulvinum*eggs failed to develop normally at RHs lower than 80% (Saboori and Zhang, 1996). The optimal temperatures for post-embryonic development for the Trombidiidae fall between 14 and 25°C and are slightly lower for the Trombidiinae and Microtrombidiidae than for *Allothrombium*(Robaux 1974).

As we know that the red velvet mites secrete oil have been used to cure the immunity related diseases such as paralysis, this mite could be used as a potential biological control tool. They are vital to increase soil decomposition and greatly maintain balance in soil ecosysytems.

MATERIALS AND METHODS

Survey conducted in different areas at Karimnagar district of Telangana, India and information gathered by conducting interviews with the local people majorly with farmers and direct observations. During the survey pit fall traps / Barber traps (Barber, 1931) are used for suitable effective methods for isolation of mites belongs to Arthropoda. It can be further improved by using baits. Since *Trombidium grandissiumspecies*is relatively big in size and can be seen through naked eye, hand picking up of redvelvet mites also useful for sample collection. Soil sampling or extraction is proved to be more affective for collection of larval stages of *Trombidium grandissium*life cycle. Tullgren funnel is another method useful for to extract of surface soil Arthropodes as well as other stages of their life cycle.

The project period is about two years. In this regard the first six months of the project period time we have spent on literature review, selection of sampling sites and observation for betterment in the research results. In the second half of the 1st year project spent on insect sampling and soil sampling by using various methods. In the first half of the 2nd year focused on extraction of insects and their larval stages from the samples. Later in next six months of the 2nd year we have done separation , identification , preservation and data collection.

For the analysis of elements in survey lands, about 2.0gr of air dried soil sample was weighed into 150ml beaker and 20ml of concentrated HNO_3 was added to it and well covered with a glass lid, this mixture was allow to stand for one hour before the careful addition of 15ml of concentrated $HClO_4$ acid. It was placed on an electric hot plate to digest at 200 – 250°C until the mixture turned yellowish in colour in about an hour. The digest was dissolved in 0.1M HCl and filtered into a 250ml of volumetric flask and made up to mark with deionised water used 3 times in rinsing the digestion container (rodojevic et. Al., 2005). Finally , the elements were determined by atomic absorption spectrophotometer.

RESULTS AND DISCUSSION

Data collected to know ecology of trombidiumgrandissimum in Karimnagar and Adilabad districts of Telangana presented in table 1, 2 and 3 respectively by conducting survey, individual interview with farmers and villagers such as Elkathurthy, Sitaram, Michaela and Thummanapalli of Karimnagar districts and Adilabad districts., And direct observations at the selected study areas. The interview taken from M. Prabhakar, B. Sammaga farmers of Gopal our village, Devenderreddy 52 year farmer old and mallaiah aged 65 year Shepherd of Sitaram Village, Padma aged 45 year agriculture labour of Muccherla village of thummanapalli which belongs to the Karimnagar districts. In Adilabad district conducted my studies with Ramulu 65 year ,Narayana 62 year farmers from Srirampur village Mandamarrymandal and at Managerial high way. These results showed in tbles 1, 2 and 3 as mentioned before.

The red velvet mites are found in Arudramasam by rasina cotton and maize crops. During cultivation of these crops, some red velvet mites were appear on the surface of soil for few days later they disappeared. Sample and data collecties from 12 X 12 sa.mtrs. of land such as corp lands and un cultivated land rich in himus. More mitra and their larvae are fiind in red soils, sandy soils than the black soils

In Muccherla village more number of mites is noticed in crop field without the application of pesticides. Some Fields not noticed with red velvet mites where the pesticides used for betterment in crop yield like cotton and maize. It is evident that the soil get not disturbed for the last couple of years without using of pesticides. Agriculture is become favorable habit for highly sensitive mite. *Trombidium grandissium* survived in sandy soils which are with rich humus.

Survey conducted in huzurabad agricultural land and barren land, no mites have been found because of the usage of pesticides in agricultural forming. Soil has been changed lands in barren land because of no forming take in these lands since from many years. In red soils and sandy soils more number of red velvet mites were identified because it's loose soil texture.

Comparison of abundance of *Trombidium grandissium*wild habitat where as crop fields shown in table 1 and 2, they are showing that more mites are found in red soils without the application of pesticides but less number of mites present in the crop fields where was the application of pesticides. This is due to harmful effect of pesticides on the red velvet mites. The soil in wild habitats rich in humus, hence more number of mites when compared with crop lands. By the cultivation of maize and cotton crops with the application of pesticides the mites disappeared . It is found that more mites in red soils at Elkathurthy village. This survey conducted in about 12 X 12 sq. mtrs. Of area in each of the selected study area of agricultural land and wild land. In Muccherla village low density of mites are identified, because by the usage of pesticides more.

These mites spend most of their life time in the soil. So air pollution does not show any adverse effect on the mites. (Robau x., 1974). Abundance of mites was low in flooded fields, but number of red velvet mites increased when these lands become day(chen et. al.,1994). Inter cropping reduced the migration of *Trombidium grandissium*(mites). In this research result showed that the land remained unused for many years and start cultivation to raise cotton and red gram crops, dense population of mites are found in there soils around 10meters and low density of mites found in adjacent crop lands.

The results regarding chemical analysis of soils with red velvet mites and soils without mites shown in the table –

Table-1.Show the distribution of *Trombidium* species in the area of Karimnagar district. (12X12sq.m.)

location	Normal soil without crops rich in humus	Red soil without pesticides	Red soil with pesticides	Black soil without pesticides	Black soil without pesticides
Elkathurthy	55	45	22	6	10
Suraram	44	40	12	4	15
Muccherla	36	52	18	2	8
Gopalpur	42	31	08	-	11
Thummanapalli	62	41	09	04	18

3, these results showed that the organic carbon, available N_2, P and K are higher in soil with mites and low concentration found in soils without red velvet mites O,C,N_2,P and K in soils with mites are 1.79%, 326kg/h, 263kg/ h, 351kg/h and in soils without mites are about 0.12%, 76mg/h , 66kg/h. 52kg/h. this increase is due to increase of decomposition of litter by mites.

Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of this paper.

References

[1]. Leach, W. E. 1815. Entomology. Pp. 57-172 in: Brewster, D. (ed.) 1815. The Edinburgh encyclopedia. Edinburgh: William Blackwood, Volume 9.

[2]. Smith, B.P. 1998. Loss of larval parasitism in parasitengonine mites. Exp. App. Acarol. 22: in press.

[3]. Zhi-Qiang Zhang**International Institute of Entomology, CAB International, 56 Queen's Gate, London SW7 5JR, UK (Received 17 October 1996; accepted 20 June 1997.*

[4]. Zhi-Qiang Zhang**International Institute of Entomology, CAB International, 56 Queen's Gate, London SW7 5JR, UK (Received 17 October 1996; accepted 20 June 1997.*

[5]. Miller, E.A. 1925. An introductory study of the Acarina or mites of Ohio. Ohio Agricult. Exp. Stn Bull. 386: 82–172.

[6]. Howard, C.W. 1918. A preliminary report on the Trombidiidae of Minnesota. Rep. State Entomol. Minnesota 17: 111–144.

[7]. Henking, H. 1882. Beitragezuranatomie, entwicklungsgeschichte und biologie von *Trombidium fuliginosum*Hermann. Z. Wiss. Zool. 37: 533–663.

[8]. Hirst, S. 1926. Note on the development of *Allothrombiumfuliginosum*Hermann. J.R. Microscopical Southcott, R.V. 1986b. Studies on the taxonomy and biology of the subfamily Trombidiinae (Acarina: Trombidiidae), with a critical revison of the genera. Austr. J. Zool. Suppl. Ser. 123: 1–116. Soc. 1926: 274–276.

[9]. Swapna Gurrapu and Estari Mamidala. In vitro HIV-Reverse Transcriptase Inhibition of Andrographolide Isolatedfrom Andrographis Paniculata. European Journal of Biomedical and Pharmaceutical Sciences. 2017. Volume 4, Issue 12. 516-522.

[10]. Michener, C.D. 1946. The taxonomy and bionomics of some Panamanian trombidiid mites. Ann. Entomol. Soc. Am. 39: 349–380.

[11]. Aeschlimann, J.P. and Vitou, J. 1986. Observations on the association of *Allothrombium*sp. (Acari: Thrombidiidae) mites with lucerne aphid populations in the Mediterranean region. In Ecology of Aphidophaga, I. Hodek (ed.), pp. 405–410.

[12]. Academia, Prague & Dr. W. Junk, Dordrecht. Robaux, P. 1974. Recherches development Southcott, R.V. 1986b. Studies on the taxonomy and biology of the subfamily Trombidiinae (Acarina: Trombidiidae), with a critical revison of the genera. Austr. J. Zool. Suppl. Ser. 123: 1–116. nt et la biologie des acariens 'Thrombidiidae'. Mem. Mus. Hist. Nat., Ser. A Zool. 85: 1–186.

[13]. Southcott, R.V. 1994. Revision of the larvae of the Microtrombidiidae (Acarina: Microtrombidiidae), with notes on life histories. Zoologica 144: 1–153.

[14]. Southcott, R.V. 1986b. Studies on the taxonomy and biology of the subfamily Trombidiinae (Acarina: Trombidiidae), with a critical revison of the genera. Austr. J. Zool. Suppl. Ser. 123: 1–11.

[15]. Zhang, Z.-Q. 1995. A cladistic analysis of Trombidiidae (Acari: Parasitengona): congruence of larval and adult morphology. Can. J. Zool. 77: 96–103.

[16]. Zhang, Z.-Q. 1989a. Biology and Ecology Trombidii mites Acari: Trombidiodae). Experimrntal and applied acarology 22: 139 – 155

[17]. Dong, Y.-C., Ran, R.-B. and Xiang, J.-Y. 1996. Biology of *Allothrombiumovatum*(Acari: Trombidiidae) and its controlling effect on *Aphis gossypii*(Homptera: Aphididae). Syst.Appl. Acarol. 1: 35–40.

[18]. Bartlett, T. family Trombidiidae – velvet mites. 2004. Bugguide. <URL: http://bugguide.net/mode/view/2419>. Dabert, M., W. witalinski, A. Kazmierski, Z. Olsazanowski, J. Dabert. 2010.

[19]. Molecular physiology of acariform mites (Acari: Arachnide): stong conflict betweenphylogenicsignel and long brach attraction artificial. Molecular phylogenetics and evolution 56 : 222 – 241.

[20]. Hill H. G. 1905, composition of the oil from birbahoti or the " rain insect" (trombidiumgrandimissimum), Journal of the Asiatic society of Bengal new series 1(3) : 74 – 80.

[21]. Lighty , G., C. Padmalatha , A.J.A. Ranjithsingh, P.Parasaratham. 2011. Antifungal efficiency of haemolymph and aqueous extraction of red velvet mite, T. grandissimum. International journal of Biology 3(1) : 111 – 114.

[22]. Lighty , G., C. Padmalatha, P.Parasaratham, , A.J.A. Ranjithsingh 2010. Evaluation of Immunomodulation potential of red velvet mite, T. grandissimum. Using swiss Albino mice. Australian Journal of Basic and Applied sciences 4(10) : 4576 – 4579.

[23]. Mahawar , M. M., D. P. Jaroli . 2008. Traditional Zootherapeutic studies in India:Arevie. Journal of Ethnobiology and Ethnomedicine 4:17

[24]. Aeschlimann J.P. and Vitou, J. 1986. Observations on the associations of Allothrombium sp. (Acari: Trombididae) mites with Lucerne aphid populations in them.

[25]. Saboori, A. and Zhang, Z.-Q. 1996. Biology of *Allothrombiumpulvinum*in Mazandran. Iran. Exp.Appl. Acarol. 20: 137–142.

[26]. Rodojevic , M and Bashkin, V.N. (2005). “Practical environmental Analysis” Royal society of chemistry, Cambridge UK. 78.
[27]. Andre. M. 1953. Observations sur la fecundation chez Allothrombiumfuliginosm Herm. Bull. Mus. Hist. Nat. Paris 25(2):383-386.