Himalaya for over 50 years prior to 1997, yet its next appearance was only 20 years after the last sighting in 1999.

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References

Bailey, F.M. 1951. Butterflies from Nepal, Part 1. *Journal of the Bombay Natural History Society* 50: 64-87.

Evans, W.H. 1932. *The identification of Indian butterflies*. Bombay Natural History Society, Bombay. x + 454 pp., 32 pl.

Smetacek, P. 2001. Resolution of the controversial western limit of the range of *Delias acalis* Godart (Lepidoptera: Pieridae). *Journal of the Bombay Natural History Society* 98(2): 298-300.

Wynter-Blyth, M.A. 1957. *Butterflies of the Indian Region*. Bombay Natural History Society, Bombay. xx + 523 pp., 72 pl.

BIOEFFICACY OF SOME GREEN PESTICIDES TOWARDS THEIR OVICIDAL ACTION AGAINST EGGS OF *TETRANYCHUS AFRINDICUS* NASSAR & GHAI (ACARI: TETRANYCHIDAE) INFESTING *ADHATODA VASICA* UNDER LABORATORY CONDITION

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Abstract

The mite species *Tetranychus afrindicus* Nassar & Ghai, 1981 was founed to be a new pest of Vasak (*Adhatoda vasica L*) in the Medicinal Plant Garden of R.K Mission, Narendrapur, Kolkata, West Bengal and a laboratory experiment was conducted to assess the ovicidal action of some of the botanical pesticides (leaf extracts of *Santalum album* L, *Datura metel* L, *Calotropis gigantea* (L), *Saraca asoca* (Roxb.). The results indicate that leaf extract of *Santalum album* was found to be the best registering mean ovicidal action of 36.13% at 3% concentration and 22.47% at 5% concentration while the corresponding values of Saraca *asoca* was61.85% at 3% and 53.24 at 5% concentrations. Leaf extract of *Datura metel* was found to be the second best at both the concentrations.

Introduction

Tetranychus afrindicus has been recorded as a new pest of Vasok (*Adhatoda vasica*) attacking undersurface of leaves during February 2019 causing chlorosis of leaves. This mite was not earlier known from West Bengal. Since, no study was undertaken earlier on efficacy of botanical pesticides against this mite species, it was thought desirable to undertake a laboratory experiment to evaluate the efficacies of some medicinal plant extracts viz., *Santalum album, Datura metel, Calotropis gigantea* and *Saraca asoca* towards causing mortality, repellency and ovicidal action. The present communication pertains to the result of ovicidal action of the aforesaid leaf extracts while the results of the other aspects of this study will be published elsewhere.

Materials & Methods

For studying ovicidal action of *Tetranychus afrindicus* occurring on *Adhatoda vasica*, the technique of Yanar *et al.* (2011) was followed. In this, the test mite was allowed to lay eggs on excised leaves kept on wet cotton pads in a petridish overnight and the next morning, after the eggs had been laid, the adult females were removed. The eggs laid on excised leaves were counted and encircled with a marker. Thereafter, the extracts of 4 plants, *Santalum album, Datura metel, Calotropis gigantea* and *Saraca asoca* were sprayed on the freshly laid eggs in two concentrations, *viz.* 3% and 5%. Another petridish containing one more excised leaf with freshly laid counted number of eggs was kept unsprayed to act as control treatment. Observations towards hatching of eggs were recorded after every 24 hrs till all the eggs hatched in the unsprayed excised leaf kept as control. The percentage of hatching was calculated using the formula:-

[PR= (NC-NT)/(NC+NT) × 100]

(McDonald *et al.* 1970)

NC= Number of mites in control disc

NT= Number of mites in treated disc

The data thus collected were subjected to statistical analysis by using ANOVA

The percentage mortality was determined and transform to Arc-sine square root values for analysis of variance (ANOVA).

Results and Discussion

The data pertaining to ovicidal action of different plant extracts have been presented in Table-1.

Table1: Relative efficacy of plant extracts towards ovicidal action of different concentrations of plant extracts at different intervals

Treatments	% of eggs hatched at different intervals			
	72 hrs	96 hrs	120 hrs	Mean
Datura metel 5%	30.66 (33.93)	40.04 (39.55)	50.29 (45.45)	40.79 (39.98)
Datura metel 3%	48.23 (44.27)	52.17 (46.53)	62.28 (52.40)	55.56 (48.48)
Saraca asoca 5%	42.65 (41.06)	51.37 (46.07)	65.71 (54.46)	52.91 (46.96)

Saraca asoca 3%	52.55 (46.75)	58.50 (50.18)	74.50 (60.00)	57.18 (49.42)
Santulum album 5%	18.87 (26.11)	22.55 (28.69)	26.00 (30.98)	22.47 (28.64)
Santulum album 3%	32.50 (35.06)	35.70 (36.99)	40.00 (39.52)	36.13 (37.25)
Calotropis gigantia 5%	38.20 (38.47)	41.44 (40.36)	55.00 (48.16)	42.70 (41.09)
Calotropis gigantia 3%	50.50 (45.57)	55.00 (48.16)	64.00 (53.43)	54.83 (48.06)
Control	55.56 (48.48)	70.50 (57.42)	80.00 (63.79)	68.68 (56.28)
SEM $^{+}_{-}$	0.63	0.79	0.99	0.80
CD 0.05	1.90	2.30	3.00	2.40

Figures in parentheses are angular transformed values

At 24 hrs interval with 3% concentration
No eggs hatched at this interval either in treatments or in control.

At 48 hrs interval with 3% concentration
No eggs hatched at this interval either in treatments or in control.

At 72 hrs interval with 5% concentration
The lowest % of hatching was 10.87 in case of *Santalum album* which was significantly superior to all other treatments. A mong the treatments, *Saraca asoca* registered the highest percentage of hatching and can be arranged in the decreasing order as below:-
5% *Santalum album* (18.87)<*Datura metel* (30.66) <*Calotropis gigantea* (38.20) < *Saraca asoca (42.65)*
All the treatments were significantly superior to the next one, arranged in increasing order. The % of hatching in case of control was 55.56%.

At 72 hrs interval with 3% concentration
The efficacy was in the same order as was seen in case of 5% concentration. The lowest % of hatching was in case of *Santulum album* which was 32.5 and maximum in case of *Saraca asoca* 52.55%. The % of hatching of different treatments can be arranged for more efficacious to less efficacious as below:-
3% *Santalum album(*32.5) <*Datura metel* (48.23) < *Calotropis gigantea (50.55)* < *Saraca asoca (52.55).*
It may be mentioned, that *Santalum album* was superior to all other treatments, while *Datura metel* was superior to *Calotropis gigantea* and the latter was superior to *Saraca asoca*. In case of control the percentage of hatching was 55.56%.

At 96 hrs of interval with 5% concentration
At 5% concentration the lowest % of hatching was 22.55 in case of *Santalum album* and the highest % of hatching was in *Saraca asoca* where it was 51.37%. The treatments can be arranged from more efficacious to less efficacious as below :-
Santulum album (22.55) < *Datura metel* (40.04) <*Calotropis gigantea* (41.44) <*Saraca asoca* (51.37)
It may be mentioned that the efficacy of both *Datura metel* and *Calotropis gigantea* were statistically at par having no significant difference between themselves. Though, of

course, *Calotropis gigantea* was superior to *Saraca asoca*.

At 3% concentration, the result of efficacy towards ovicidal action was in the order as mentioned earlier and can be arranged from more efficacious to less efficacious as below:- *Santalum album* (35.70) <*Datura metel* (52.17) < *Calotropis gigantea* (55.00) <*Saraca asoca* (58.55) In case of control % of hatching was 70.50

At 120 hrs of interval with 5% concentration

The trend was same as was observed in earlier cases and the treatments can be arranged from most efficacious to less efficacious as below:- *Santalum album* (26.00) <*Datura metel* (50.29) <*Calotropis gigantea* (55.00) <*Saraca asoca* (65.71)

Santalum album was superior to all other treatments, *Datura metel* was superior to *Calotropis gigantea* and *Calotropis gigantea* was superior to *Saraca asoca*. The % of hatching in control was 80.00.

At 3% concentration, the treatments can be arranged from more efficacious to less efficacious toward causing % of hatching as below:-

Santalum album (40.00) < Datura metel (62.28) < Calotropis gigantea (64.00) < Saraca asoca (74.50)

Between *Datura metel* and *Calotropis gigantea*, there was no significant difference but *Calotropis gigantea* was significantly superior to *Saraca asoca*.

Mean % of ovicidal action at 5% concentration , the mean % of hatching can be arranged from more efficacious to lowest efficacious as below:-

Santalum album (22.47) <*Datura metel* (40.33) <*Calotropis gigantea* (44.88) <*Saraca asoca* (53.24)

In this case also, *Santalum album* was superior to *Datura metel, Datura metel* was superior to *Calotropis gigantea* and the latter was superior to *Saraca asoca*.

Mean % of hatched eggs at 3% concentration, the trend was similar as observed in the previous cases. The relative efficacy can be arranged in decreasing order as below:- *Santalum album* (36.13) <*Datura metel* (54.22) <*Calotropis gigantea* (56.50) <*Saraca asoca* (61.85)

In this case also, *Santalum album* was superior to all the others.

Discussion

Little work has been done regarding efficacy of botanical pesticides towards ovicidal action on mites infesting medicinal plants. However, some of the studies which have been made earlier are of Isman *et al.* (2007), Yanar *et al.* (2011), Kumar *et al.* (2009), Tunc 2000. Yang *et al.* (2007), etc., who assessed botanical pesticides for ovicidal action against mite species. None of the authors studied the bio-efficacy of the botanical pesticides taken up in the present study and therefore the present result cannot be compared with any of the earlier studies.

Conclusions

The experiment reveals that all the plant extracts in both the concentrations which were tested have proved their efficacy towards ovicidal action, but the degrees of efficacy varied.

Among the treatments, *Santalum album* was found to have the maximum ovicidal action as evident from the fact that only 36.13% and 22.47% eggs hatched at 3% and 5% respectively while, in case of control the mean percentage of hatching was 68.68%.

Datura metel was the second best where the mean percentage of hatching was 54.22% and 40.33% at 3% and 5%, respectively and 53.24% at 3% and 5%, respectively.

References

Tunc, I., B. M. Berger, F. Erler, F. Dagli. 2000. Ovicidal activity of essential oils from five plants against two stored-product insects. *J. Stored Products Res*., 36:161-168.

Yang HZ, J.H. Hu , Q. Li , H.J. Li, H.Q. Liu , T.S. Yao, H.D. Lei 2007. Primary studies of acarocidal activity of twenty plants extracts against Panonychus citri. *Southwest China Journal of Agricultural Sciences* 20(50): 1012-1015.

Isman M .B., C.M Machial , S. Miresmailli , L.D Bainard. 2007. Essential oil-based pesticides: new insights from old chemistry. In: Ohkawa, H., H. Miyagawa, P. Lee (eds.) *Pesticide Chemistry*. Wiley, Weinheim, pp. 201-209.

Kumar N .A., S. Cobanoglu , C. Yalcin 2009. Acaricidal, repellent and oviposition deterrent activities of *Datura stramorium* L. against adult *Tetranychus urticae* Koch. *J. Pest Sci*., DOI 10.1007/S 10340-009-0284-7.

Yanar, D., I. Kadioglu & A. Gokce 2011. Ovicidal activity of different plant extracts on two-spotted spiter mite (*Tetranychus urticae* Koch) (Acari: Tetranychidae).*Scientific Research and Essays* 6(14): 3041-3044.

McDonald, L.L.; R.H Guy & R.D. Speirs.1970. *Preliminary evaluation of new candidate materials as toxicants, relents and attractants against stored product insects.* Marketing Research Report 882(ARS, USDA) Washington: 8.

ON THE ORIGIN OF THE NAME PAINTED LADY FOR *VANESSA CARDUI* (LINNAEUS, 1758) (LEPIDOPTERA: NYMPHALIDAE)

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The Painted Lady is among the most widely distributed butterflies known, being found on every continent except Antarctica (Shields, 1992). The butterfly is common in Europe and was among those named by the creator of the binomial system of classification, Carolus Linnaeus in 1758. The English name for the butterfly, Painted Lady is believed by some to be a euphemism for a lady of easy virtue, referring to the fact that the butterfly is found almost all over the world, as are ladies who practice the oldest profession.

The name Painted Lady was believed to have been coined by James Petiver (1665-1718), an apothecary who coined English names for several butterflies, including Admirals, Tortoiseshells and Brimstone. However, Salmon *et al.* (2001) state that although Petiver published this name, it was an already current folk name for the butterfly.

Since the global distribution of butterflies was unknown in 1699, when the name was published in Petiver's *Musei Petiverani Centuria Prima Rariora Naturae Continens* series, it is unlikely that the