SOME DRAGON FLIES OF DISTRICT MANSEHRA (N.W.F.P.)

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ABSTRACT

24 species of Odonata were recorded from district Mansehra. Of these, 9 are zygopterous and 15 are anisopterous species. All of these except *Aristocypha trifasciata* (Selys) are new records for this area. Moreover, *Ictinogomphus angulosus*

(Selys) is a new record for Pakistan.

INTRODUCTION

The Odonata of Pakistan are well-explored (Laidlaw, 1915; 1920; Fraser, 1933; Yousaf, 1972; Chishti, 1979; Niazi, 1984 and Khaliq, 1990)_ but their distribution throughout the country is not extensively studied. A single species, *Aristocypha trifasciata* (Selys), was reported uptil now from Mansehra district (Khaliq; 1990). A survey was, therefore, conducted to explore the odonate fauna and its distribution in this district. The localities visited for this purpose were.

1. Athersheshi
2. Kahutka
3. Khaki
4. Mangloor
5. Qalandarabad
6. Khathburna
7. Khajbaili
8. Gahari

SPECIES COLLECTED

Suborder Anisoptera

Super family: Libelluloidea
Family: Libellulidae
Sub family : Libellulinae

1. *Acisoma panorpoides panorpoides* (Rambur)
2. *Crocothemis servilia* (Drury)
3. *C. erythraea* (Brulle)
4. *Diplacodes lefebvrei* (Rambur)
5. *D. trivialis* (Rambur)
6. *Orthetrum taeniolatum* (Schneider)
7. *O. glacum* (Brauer)
8. *O. pruinosum neglectum* (Rambur)
9. *O. triangulare triangulare* (Selys)
10. *Pantala flavescens* (Fabricius)
11. *Palpopleura sexmaculata sexmaculata* (Fabricius)
12. *Sympetrum commixtum* (Selys)
13. *Trithemis festiva* (Rambur)

Family: Gomphidae
Sub family: Lindeniinae

1. *Ictinogomphus angulosus* (Selys)

Super family: Aeshnoidea
Family: Aeshnidae
Sub Family : Anactinae

1. *Anax imaculifrons* (Rambur)

Suborder Zygoptera

Superfamily: Coenagrionoidea
family: Coenagrionidae
Sub family: Ischnurinae

1. *Ischnura aurora* (Brauer)
2. *I. forcipata* (Morton)
3. *I. elegans* (Vanderlinden)

Family: Platyceemididae
Subfamily:Calicnemidinae

1. *Calicnemia eximia* (Selys)

Superfamily: Lestoides
Family: Chlorolestidae
Sub Family : Megalestinae

1. *Megalestes major* Selys

Superfamily: Calopterygoidae
Family: Calopterygidae
Sub Family : Calopteryginae

1. *Neurobasis chinensis chinensis* (L.)

Family: Chlorocyphidae

1. *Aristocypha trifasciata* (Selys)

2. *A. quadrimaculata*
   Family: Euphaeidae
1. *Bayadera indica* (Selys)

Discussion

The odonate fauna and its distribution in district Mansehra was almost un-explored. A single zygopterous species, Aristocypha trifasciata (Selys) was recorded from this area (Khaliq, 1990). The present survey resulted in 9 zygopterous and 15 anisopterous species from this district. *Ictinogomphus angulosus* (Selys) is a new record of Odonata from Pakistan.

DISTRIBUTIONAL RECORDS OF ODONATA OF DISTRICT MANSEHRA (N.W.F.P)

S. No.	Species	Ather seheshi	Kahutka	Khaki	Mangloor	Qalande rabad	Khathb urna	Khajbai li	Ghari
1.	*Acacia panorpoides panorpoides*	-	-	-	-	-	+	-	-
2.	*Crocothemis servilia*	+	+	-	-	-	+	-	-
3.	*C. erythraea*	+	+	+	-	-	-	-	-
4.	*Diplacodes lefobvri*	-	+	-	-	-	-	-	-
5.	*D. trivialis*	-	-	-	-	-	-	-	-
6.	*Orthetrum taeniolatum*	+	+	-	-	-	+	+	-
7.	*O. glacum*	+	+	+	+	+	+	+	+
8.	*O.prunosum neglectum*	+	+	+	+	+	+	+	+
9.	*O.triangulare triangulare (Selys)*	+	+	+	+	+	+	+	+
10.	*Pantala flavescens*	-	+	-	-	-	-	-	-
11.	*Palpopleura sexmaculata sexmaculata*	-	-	-	-	-	-	+	-
12.	*Sympetrum commixtum*	+	+	+	-	+	+	-	-
13.	*Trithemis festiva*	-	+	-	-	-	-	-	-
14.	*Ictinogomphus angulosus*	-	+	-	-	-	-	-	-
15.	*Anax imaculifrons*	-	-	-	-	-	-	+	-
16.	*Ischnura aurora*	+	+	+	+	+	+	+	+
17.	*I. forcipata*	-	+	-	+	+	-	-	-
18.	*I. elegans (Vanderlinden)*	-	+	-	-	-	+	-	-
19	*Bayadera indica*	-	+	-	+	-	-	-	-

20.	*Neurobasis chinensis chinensis*	+	+	-	+	+	-	-	-
21.	*Megalestes major*	-	+	-	-	-	-	-	-
22.	*Aristocypha trifasciata*	-	+	-	-	-	+	-	-
23.	*A. quadrimaculata*	-	+	-	+	-	+	-	-
24.	*Calicnemia eximia*	-	+	-	-	-	+	-	-

REFERENCES

Chishti, M.Y., 1979. Damselflies of district Faisalabad. M .Sc.Thesis,s Deptt. Ento., Univ. Agri., Faisalabad.

Fraser, F.C., 1933-34. Fauna of British India Odonata, Vol.1-2, Tayler and Francis Ltd., London.

Khaliq, A., 1990. Taxonomic studies on Zygoptera (Odonata) of Pakistan. Ph.D. Thesis, Deptt. Agric. Ento., Univ. Agric., Faisalabad, Pakistan

Laidlaw, F.F. 1915. Notes on oriental dragonflies in the Indian Museum. Rec. Ind. Mus. , 11(1-3): 197-99.

Laidlaw, F.F., 1920. A list of the dragonflies recorded from the Indian Empire with special reference to the collection of the Indian Museum. Rec.Ind. Mus.,19;145-163.

Niazi, W.A.K., 1984 Damselflies of district Rawalpindi.M.Sc Thesis, Deptt. Ento., Univ. Agric.,Faisalabad.

Yousaf, M., 1972 Taxonomic studies of Anisoptera (Odonata) of West Pakistan. Ph.D. Thesis., Deptt. Ento., Univ. Agric., Faisalabad, Pakistan

INFLUENCE OF PLANT STRESS ON TERMITE INFESTATION

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ABSTRACT

Influence of plant stress on termite infestation was studied through the parameters of foliage loss, root damage and water deficiency at two sites. Plants with 3/4 roots cut showed maximum stress and plant mortality, followed by half root cut and low irrigation frequency. Foliage loss helped in improving vitality of plants by reducing moisture loss through transpiration thereby decreasing plant mortality. Further, almost all dying and dead plants were infested by termites at Kharian while only 30% of dead plants were infested at D.I. Khan showing that termites are not

the cause of mortality of plants.

INTRODUCTION

Eucalypts being fast growing species are presently grown on farmlands as well as in forest plantations on a large scale. Mortality of saplings is always attributed to the termite infestations as the literature review reveals that in most tropical countries where eucalypts have been introduced root feeding termites are known to cause large scale mortality.

Termites have been reported as major pests of forests in India, causing damage to the roots and bark of standing trees by Dhamadhera and Rawat (1978). *Odontotermes gurdaspurensis* Holmgren and Holmgren and *O. obesus* Rambur were found damaging *Eucalyptus* spp. in the arid regions of Western Rajesthan, India. Seedlings were more susceptible to attack than mature trees (Parihar, 1981). *Mastotermes darwiniensis* Froggat has been reported causing more damage to saplings than to mature trees in Australia by Hickin (1971).

Eucalypts are the pre-dominant trees in the reafforestation programmes of Africa and India. Serious losses to these plantations by termites have been reported by Harris (1971), Rajagopal (1982) Thakur and Sen-Sarma (1980). Attack on roots of young trees by a number of non-fungus growing termite species has also been recorded in Africa and India. Midgley and Weerawardane (1986) in Sri Lanka, and Roonwal and Rathore (1984) in India have reported attack by *Nasutitermitinae* and *Trineryitermes biformis* Wasmann, respectively; but the extent of losses is not indicated. Attack by various species in India in particular recording 20-30% mortality of *Eucalyptus citriodora* due to *Microcerotermes minor* Holmgren has been reported by Roonwal (1978). Nair and Verma (1985) have reported termite species attacking roots of eucalypts in India.

Chaudhry and Ahmad (1980) have found Chlordane, Heptachlor, Dieldrin, Agritox, Aldrin and B.H.C. effective when applied in 0.12%, 0.25% and 0.5% dilution, to plant pits before planting at the rate of 1 litre of each dilution per pit soil in polythene bags containing seedlings at the rate of 50 cc of dilution per bag, and soil before filling and sowing of seeds in polythene bags at the rate of 50 cc of dilution per bag. Gul and Chaudhry (1989) have found BHC, Lorsban, sevin, Heptachlor and Malathion most effective in protecting living shisham trees from termite attack when applied in 0.25, 0.5 and 1.0% doses as soil treatment.

The influence on host plant susceptibility to insect attack are reviewed by Speight (1986). The topics dealt with include drought stress, edaphic effects, the basis of resistance and prediction models. Larsson (1989) has hypothesized that plants under abiotic stress become more suitable as food for herbivorous insects.

MATERIAL AND METHOD

Seedlings of *Eucalyptus camaldulensis* of almost equal size and vigour were taken. Since irrigation or watering was a parameter, two separate blocks duly randomized were kept for weekly and biweekly treatments. The treatments were.

i. Watering weekly
ii. Watering biweekly
iii. Seedlings with 1/2 root pruned
iv. Seedlings with 3/4 roots pruned
v. Seedlings with 1/2 leaves removed
vi. Seedlings with 3/4 leaves removed
vii. Control

For roots treatment the seedlings were removed from their polythene containers. Their roots were washed and pruned upto specified length before

planting. In the foliage treatment the specified portion of leaves were removed from the seedlings before transplanting.

The experiment was laid out on split plot design replicated thrice keeping 10 seedlings in each treatment. Observations on the survival of seedlings and termite infestation in various treatments were recorded 3 months after planting.

RESULTS AND DISCUSSION

The observation recorded on the influence of plant stress on termite infestation in various treatments are tabulated as follows:

AT KHARIAN

% Mortality of plants due to stress at Kharian (three months after planting)

Treatments	No of Dead Plants			
	R_1	R_2	R_3	Mean
WEEKLY IRRIGATION				
T_1 1/2 roots cut	50	60	10	40
T_2 3/4 roots cut	10	80	80	56.7
T_3 1/2 leaves removed	0	20	40	20
T_4 3/4 leaves removed	10	30	10	16.7
T_5 control	30	30	50	36.7
FORTNIGHTLY IRRIGATION				
T_1 1/2 roots cut	40	60	20	40
T_2 3/4 roots cut	40	70	40	50
T_3 1/2 leaves removed	10	10	10	10
T_4 3/4 leaves removed	10	40	0	16.7
T_5 control	10	40	10	20

The data in the above table show that in the weekly irrigation block a mean mortality of 40 plants occurred in the half root cut treatment and 56.7 plants died in 3/4 roots cut treatment. In the foliage removal treatment 20 plants died in half leaves removed and 16.7 plants in 3/4 leaves removed treatments. In control 36.7 plants were found dead. In the fortnightly irrigated block 40 and 50 plants died in 1/2 roots cut and 3/4 roots cut treatments, respectively. In the foliage removal treatments 10 and 16.7 plants died in 1/2 and 3/4 leaves removal treatments, respectively. 20 plants were found dead in the control.

This shows that root cut treatment caused maximum stress while removal of foliage improved the plants vitality in initial stages because of reduction in water loss through transpiration. Almost all the dying and dead seedlings were found infested by termites while healthy plants were safe from termite infestation.

% Mortality of plants due to stress at Kharian (three months after planting)

Treatments	No of Dead Plants			
	R_1	R_2	R_3	Mean
WEEKLY IRRIGATION				
1/2 roots cut	100(0)	90(10)	100(10)	96.6(6.6)
3/4 roots cut	100(10)	80(10)	90(10)	90 (13.3)
1/2 leaves removed	80(10)	100(10)	90(10)	90 (6.6)
3/4 leaves removed	100(20)	100(10)	100(10)	100 (10)
Control	100(0)	100(0)	100(10)	100 (6.6)
FORTNIGHTLY IRRIGATION				
1/2 roots cut	100(10)	100(20)	100(0)	100 (10)
3/4 roots cut	70(20)	100(0)	100(0)	90 (6.7)
1/2 leaves removed	80(30)	90(0)	100(0)	90 (10)
3/4 leaves removed	80(10)	100(10)	90(10)	90 (10)
Control	100(0)	80(20)	100(20)	93.3(13.3)

(Figures in brackets shows % plant infested by termites).

The data indicate that 70 to 100% seedlings died in various treatments but termite infestation was recorded in 0 to 30% plants. It clearly indicates that termites were not the major cause of mortality of plants.

CONCLUSION

Different types of stresses cause weakness in plants which lead to their death and in this process termites also attack. Healthy living plants are not infested by the termite.

REFERENCES

Chaudhry, M.I. and A. Ahmad (1980). Ecology and Control of Economically Important Termite species of Pakistan Final Report of PL-480 project p-26.

Dhamadhera, S.V. and Rawat, R.R. (1978). Insect pests of trees and their control. Rural Indian 41L 212-214.

Gul H. and M.I. Chaudhry (1989). Efficacy of Insecticides against termites infesting bark of living trees. Proc. Pakistan Congress Zool. Vol.9. pp 61-63 1989.

Harris, W.V. (1971). Termites, their recognition and control 2nd edn, 1986 pp. London, Longman.

Hickin, N.E. (1971). Termites - A world problem-222 pp. London, Hutchisson.

Larsson, S. (1989). Stressful times for the plant stress insect performance hypothesis. Oikos (1989): 56: 2, 277-283; 63 ref.

Midgley, S.J. and Weerawardane, N.D.R. (1986). Termite control in Sri Lanka - For. Nest. Augst. Gent. Int. Agri. Res. No.2, 3-4.

Nair, K.S.S. and Varma, R.V. (1985). Some ecological aspects of the termite problem in young eucalypts plantation in Kerala (India) Forest Ecology & Management. 12, 287-303.

Parihar, D.R. (1981). Termites affecting eucalyptus plantations and their control in arid region of India - Z. angew Ent. 92, 106-111.

Rajagopal, D. (1982). Relative incidence of termites on Exotic species of eucalyptus in Karnataka - Myforest 18, 9 - 13.

Roonwal, M.L. (1978). Bioecological and economical observations on termites of peninsular India - Z. angew. Ento. 86, 15 - 30.

Roonwal, M.L. and Rathore, N.S. (1984). New termite pests of eucalyptus in India and their control - Z. angew. Ento. 98, 225-30.

Speight, M.R; Juniper, B; Southwood, Sir. R; Southwood, T.R.E. (1986). Environmental influences on host plant susceptibility to insect attack. Insects and the plant surface (edited by Juniper, B: Southwood, Sir R.)., 309 - 316; 10 ref., 1 fig. London, U.K; Edward Arnold.

Thakur M.L. & Sen-Sarma, P.K. (1980). Current status of termites as pests of forest nurseries and plantations in India-J. Indian Acad. Wood Sci. 11, 7 - 15.