

POPULATION DYNAMICS OF *NEODIAPTOMUS DIAPHORUS*
KIEFER (COPEPODA : CALANOIDA) FROM
A SUBTROPICAL POND, JAMMU

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ABSTRACT

The population dynamics of *Neodiantomus diaphorus* was studied in relation to physico-chemical characteristics in Kunjwani pond, Jammu. It occurred for ten months (August - May) and showed 3 peaks during March, May and October with the highest count in March (692 nos l⁻¹). *N. diaphorus* population was low in August and September. The calanoids and cyclopoids shared inverse relationship. The relationship between occurrence of this species and different physico-chemical factors was studied.

Key-words : *Neodiantomus*, population dynamics.

The calanoid copepods have the highest number of species forming an essential part of nourishment for several common food fishes (Anonymous, 1991). The important contributions on Indian freshwater calanoids are those of Rajendran (1973), Roy (1984 a), and Sehgal (1983). Kiefer (1939) recorded two species of *Neodiantomus* from Southern India; Roy (1984 b) a new species of *Neodiantomus*, *N. tiwari* from Nilgiri district and Rao, Shrivastava, Srinivasan and Choubey (1987) *N. schmakerai* from aquatic bodies of Ujjain. The present investigation deals with population dynamics of *N. diaphorus* in relation to certain physico-chemical factors in a Kunjwani pond, Jammu.

Water and plankton samples were collected fortnightly from four stations during 1989-1990 and analysed by adopting the methods of APHA (1985). Plankton samples were preserved in 5% formalin. The counting was done by Lackey's microtransect method (APHA, 1985) and using Sedgwick rafter counting cell (Welch, 1952). Identification was done as per description by Ward and Whipple (1959) and Sehgal (1983). The population density of *N. diaphorus* is expressed as no. l⁻¹.

The seasonal average and mean range values of various physico-chemical parameters are given in Table I. The calanoids are represented by only one species, *N. diaphorus* in this pond. It occurred for ten months (August - May) and showed 3 peaks during March, May and October with the highest count in March (692 no. l⁻¹).

N. diaphorus population was low in August and September. Unfavourable environmental conditions such as lowering of water temperature, increase in

suspended matter and low food availability during monsoon may explain the poor counts observed during August and September.

The adults of *N. diaphorus* were absent during June and July. In these months larval stages were dominant and contributed 78.34 - 84.37% of total counts.

Table I - Seasonal average, annual average, standard error and mean range of physico-chemical parameters in Kunjwani pond.

Parameters	Seasonal average			Annual average ± Standard error	Mean range
	Pre- monsoon	Monsoon	Post- monsoon		
Air temperature (°C)	39.02	32.50	29.69	28.10 ± 1.02	14.13 - 39.50
Water temperature (°C)	32.34	29.52	27.37	25.29 ± 0.79	13.93 - 34.50
Depth (cm)	23.50	137.50	68.25	57.55 ± 5.85	21.75 - 143.75
Transparency (cm)	17.37	26.44	19.87	27.14 ± 1.71	9.50 - 42.25
Suspended matter (mg/l)	96.25	76.25	77.50	76.97 ± 2.67	50.00 - 112.50
pH	7.82	7.07	7.86	8.48 ± 0.16	7.02 - 9.98
Dissolved oxygen (mg/l)	4.35	3.91	6.87	7.29 ± 0.51	2.59 - 14.15
Free carbon dioxide (mg/l)	6.10	4.92	1.28	2.34 ± 0.55	0.00 - 9.19
Carbonate (mg/l)	1.13	0.00	2.32	9.83 ± 1.70	0.00 - 32.36
Bicarbonate (mg/l)	213.94	93.71	123.87	97.64 ± 10.35	20.92 - 278.06
Chloride (mg/l)	6.55	2.20	1.36	2.55 ± 0.32	1.27 - 9.65
Calcium (mg/l)	22.25	19.41	23.60	19.18 ± 0.88	12.49 - 31.30
Magnesium (mg/l)	8.64	4.92	5.72	5.21 ± 0.37	2.64 - 8.68
Total hardness (mg/l)	91.06	68.68	82.48	65.31 ± 3.41	42.00 - 113.80

Table II - Occurrence of Calanoida and common zooplanktonic groups (Average number per litre), in Kunjwani pond during 1989-90.

	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Copepoda	192	244	471	224	58	24	119	34	82	175	231	1033
Calanoida	10	22	0	0	9	6	119	20	39	62	34	692
Protozoa	60	160	72	34	39	38	31	165	52	190	73	77
Rotifera	36	176	291	88	5247	457	153	3	3	86	9	6
Cladocera	126	30	192	105	38	3	0	83	710	150	477	80
Ostracoda	3	22	436	155	706	139	203	172	62	0	18	53

Higher population density of *N. diaphorus* (119 no. l⁻¹) during October when cyclopoids were absent may be attributed to favourable environmental conditions such as water temperature (25.5° C), transparency (19.5 cm), pH (8.27), DO (9.48 mg/l), CO₃⁻ (4.65 mg/l), HCO₃⁻ (125.57 mg/l), Cl⁻ (1.45 mg/l), Ca⁺⁺ (24.17 mg/l), Mg⁺⁺ (5.9 mg/l), total hardness (84.69 mg/l) and appearance of submerged macrophytes favouring its growth. In Kunjwani pond, there is a rich growth of macrophytes represented by seven species, namely *Nitella mucronata*, *Potamogeton crispus*, *Ruppia maritima*, *Azolla pinnata*, *Wolffia arrhiza*, *Lemna minor* and *Aponogeton natans* (Dutta,

Kumar and Kumari, 1991). Sehgal (1963) stated that shallow littoral zone especially inhabited by thick aquatic vegetation is much richer in a variety of cyclopoids and calanoids though at low density.

The abundance of calanoid during March and May appeared to be the effect of high temperature, maximum solar illumination, increase in HCO_3^- , Cl^- , Ca^{++} , Mg^{++} , TH and rich availability of food. The population peak of *N. diaphorus* was observed maximum in March at water temperature (25.0°C), transparency (38.75 cm), pH (9.60), DO (7.79 mg/l), HCO_3^- (28.97 mg/l), Cl^- (1.72 mg/l), Ca^{++} (13.20 mg/l), Mg^{++} (3.74 mg/l) and TH (48.27 mg/l).

Among the various groups of zooplankton the calanoids showed inverse relationship with total rotifer population in this pond (Table II).

During the course of present study, it was observed that cyclopoids and calanoids exhibited inverse relationship except in September. In September *N. Diaphorus* and cyclopoids constituted 25% each and 50% by larval stages of copepods. The ponds with high density of calanoids contained only a few cyclopoids species and vice versa. The two planktonic forms were never found in equal proportion in the same water body (Sehgal, 1983).

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