BIOJOURNAL, VOL. 4, NO. 1 & 2, 195-197, JUNE & DECEMBER, 1992

RECOLONIZATION OF CHIRONOMID LARVAE (DIPTERA : CHIRONOMIDAE) IN A TROPICAL NEWLY CONSTRUCTED FRESHWATER HABITAT

Anju Srivastava, B.Mahato, P.N. Pandey M.P.Sinha and V.Pandey[1]
Department of Zoology,
Ranchi University, RANCHI - 834008.

ABSTRACT

The communication deals with the details of recolonization process of chironomid population in a newly constructed freshwater reservoir. Out of eight taxa belonging to family chironomidae, recorded during the study, *Chironomus sp.* was found to be the pioneer species in colonization. The colonization started within a week while the colonization equilibrium reached within ninety days - a period longer than the reported ones from temperate waters.

INTRODUCTION

The chironomid larvae, an, important group of macrobenthic community are vrey common in freshwater habitats from the polar region to the tropics, which on account of their small size and great power of tiding over periods of food shortage, together with their capacity to live in habitats containing a scanty supply of oxygen, readily subsist where other animals would find the food supply insufficient or the environment unsuitable to their mode of life. The chironomids have attracted many workers throughout the globe to work from different views due to their role in nutrient cycling in lakes by virtue of their burrowing, respiration and excretion (Wetzel . 1975), their relationship to eutrophication (Johnson and Brinkhurst, 1971; Dermott *et al.*, 1977; Sinha, 1988) their role as water quality indicators (Saether, 1975, 1979; Sinha *et al.*, 1989). However only a few studies have been carried out on the recolonization of the chironomids of tropical habitats (Bishop , 1973; Hynes, 1975; Benzie, 1984) and these are mainly concerned with drift while no such work has been done in Indian subcontinent so far. The present communication records the trend of recolonization of the chironomid population in a newly constructed reservoir.

MATERIALS AND METHODS

Monthy sampling were done for two years (July 1986 to June 1988) from five sampling stations (S-1, S-2, S-3, S-4 and S-5) with the help of artificial basket sampler (10 X 10 X 6cm.) and modified scoop sampler (12.5 X 12.5 X 12.5 cm.) from newly constructed Latratu Reservoir located between latitude 23°13.38' N to 23°14.57' N and longitude 84°4.52' E to 85°5.71' E with 8.64 km. shore-line and 44.60 square miles catchment area. S-1 was located at the area already colonized by chironomids

1 P.G. Deptt. of Zoology, T.P.S. College, Patna.

while S-2, S-3 S-4 and S-5 were located at the newly flooded areas of the reservoir. The samples were sieved (B.S.No. 60), washed and hand picked to separate and then preserved in 5% fromaldehyde solution for further qualitative and quantitative studies. Identification of chironomid larvae was made following the key and methods described by Mason Jr. (1973) and the nature of substrate was examined visually.

RESULTS AND DISCUSSION

Out of the 8 taxa of chironomidae recorded during the present investigation, *Chironomus sp.* was first to appear at all the stations in July 86, hence was pioneer species among the chironomids. Thereafter *Glyptotendips* (at S-2 & 3), *Orthocladius sp.* (at S-2 & 3), *Coelotanypus* sp. (at S-3) appered in August'86 and *Kiefferulus* sp. (at s-3&4), *Polypedilum* sp. (at S-2,3 &4), *Tanypus* sp. (at S-3) appeared in september'86 while the *Procladius* sp. (at S-3) was recorded in October '86. Thus the process of recolonization started within a week and the colonization equilibrium was reached within 90 days a period longer than the reports of Retallack *et al.* (1981), Benzine (1984) and Swink and Novotny (1985) probably due to the characteristics of the substrate failing to provide the required resources, just after denudation.

From number of taxa view point upto August '86 only one taxon was recorded at all stations while at S-2 & S-3 the same trend was found upto September '86. Thereafter the colonization process proceeded and completion of colonization was recorded in different months at different station such as at S-2 in February '86 (7 taxa), at S-3 March '86 (8 taxa), at S-4 in January '87 (8 taxa) and at S-5 in January '87 (7 taxa). At station S-1 all the taxa were present but not continuously, with marked fluctuation in population density varying from 50/m2 in September '86 to 2752/m2 in March '87.

So far the densities of colonizing taxa of Chironomidae are concerned, in the beginning (July '86) very poor population was observed at all the sampling stations. Lower densities were recorded at S-2 and S-3 even after 30 days of onset of colonization and thereafter a sharp increase in the population of colonizing taxa was observed which showed completion of the process by nearly stabilized population density. The different sampling stations revealed the completion of population equilibrium at different time viz. at S-2 in February '87 (2458/m2), at S-3 in March '87 (3469/m2), at S-4 in January '87 (3725/m2) and at S-5 in January '87 (3084/m2), As pointed out earlier at S-1 the range of population density variation was 50/m2 (September '86) to 2752/m2 (March '87).

The time required for densities to achieve colonization equilibrium have ranged from several days (Sheldon, 1977) to several months (Williams and Hynes, 1977) depending upon rates of hydrological turnover, potentiality of high colonization and limnological conditions for more resiliency to stress of the water body which are more in lotic than lentic systems. The slow recolonization and delay in colonization equilibrium during present study in comparison to the reports of other tropical studies was probably due to low nutrient and food value in the beginning in the substrata and lack of vegetation owing to construction of the reservoir which is expected to be poor in detritus and silt. Drifting appeared to be the probable mechanism in initial colonization as reported by Gore (1979), however, aerial contribution of colonization can also be attributed to achieve the equilibrium.

REFERENCES

Benzie, J.A.H. 1984. The colonization mechanism of stream benthos in a tropical river (Menik Ganga : Sri Lanka). Hydrobiologia, 111: 171-179.

Bishop, J.E. 1973. Limnology of small Malayan river Sengai Gombak (W. Junk , the Hugue), pp-485.

Dermot, R.M., Kalff, J., Leggett, W.C. and Spence, J. 1977. Production of *Chironomus,* Proc. Biomass in Lake M., 34:2001-2007.

Gore, J.A. 1979. Patterns in initial benthic recolonization of a reclaimed coal stripmined river channel. Can.J. Zool., 57: 2429-2439.

Hynes, H.B.N. 1975. Downstream drifts of invertebrates in a river in southern chana. Freshwat. Biol., 5: 515-532.

Johnson, M.G. and Brinkhurst, R.D. 1971. Production of bethic macroinvertebrates of Bay of Guinte and Lake Ontario. J. Fish. Resi. Bd. Canada, 28 : 1699-1714.

Mason, Jr. W.T. 1973. An introduction to indentification of chironomid larvae. U.S. Env. Protect. Agency, Cinncinati, Ohio. pp. 1-90.

Ratallack, J.T., Tsui, P.T.P, and Aleksiuk, M. 1981. Natural colonization of an artificial stream bed in the Athabasca oil sands area of Alberta, Canada. Verh. internat. Verein. Limnol., 21: 799-803.

Saether, O.A. 1975. Nearetic chironomids as indicators of lake typology. Verh. internat. Verein. Limnol., 19: 3127-3133.

Saether, O.A. 1979. Chironomid communities as water quality indicator. Holartic-Ecology, 2: 65-74.

Sinha, M.P. 1988. Studies on polluted water Ecosystems. Ph.D. Thesis, Ranchi Univer., Ranchi.

Sinha, M.P., Pandey, P.N. and Mehrotra, P.N. 1989. Some aspects of biological studies of organically polluted urban stream of Ranchi. II. Macrobenthic fauna. Indian Zoologist, 13(1&2) : 79-83.

Sheldon, A.L. 1977. Colonization curves: application to stream insects on seminatural substrates. Oikos, 28: 256-261.

Swink, U.D. and Novotny, J.F. 1985. Invertebrate colonization rates in the tail water of a kentucky flood control reservoir. J. Freshwat. Ecol., 3(1): 27-34.

Wetzel, R.C. 1975. Limnology (W.B. Saunders co. Toronto), pp. 743.

Williams, D.D. and Hynes, H.B.N. 1977. The ecology of temporary streams. II General remarks on temporary streams. Int. Rev. Ges. Hydrobiol., 62: 53-62.