D-18: Effect of temperature on *Dactylogyrus vastator* Nybelin, 1924 population of *Cyprinus carpio* L

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Temperature is one of the major environmental factors which influence the population dynamics of *D. vastator*. Different species of dactylogyrids behave differently with season and each species of *Dactylogyrus* probably has an optimal temperature favouring its population growth, which may depend on its particular geographical area or location. Most published accounts report that *D. vastator* invasion of carp is maximal in the warmest months of the year, i.e. from June to August and may drop to zero in September to October.

Fish used in this study were brought in from Munton & Fison and kept in 160 l aquarium for 2 weeks at 17°C before the start of the experiments.

To study the effect of temperature on *D. vastator* populations at 12°C and 22°C, at each temperature experimental fish were reared in 6 separate 8 l tanks. Fish tanks were maintained at a constant temperature by an immersed electric water heater. Twenty fish of 1.12 mean (± 1.14) (range 1 - 11 worms per fish) *D. vastator* infection per fish were placed in each tank. One complete tank was sampled each week for 6 weeks at 12°C.

To study the effect at 19°C 2 sets of experiments were performed. In experiment I, 12 tanks with 8 l of water were used and in experiment II, 2 tanks with 20 l of water were used.

In all experiments the fish necroscopy was carried out and the gills from each side were removed and placed in separate plastic dishes with aquarium water of the same temperature. The number of *Dactylogyrus* were counted using an Olympus stereomicroscope.

The data was interpreted using a Cricket Graph to show the variation of parasite number with time.

Under all the different temperature regimes the mean number of *D. vastator* per fish increased initialy, reaching the maximum and then showing a diminution to the minimum level or even to zero.

The total abundance of *D. vastator* at 12°C increased continuously to week 5, and at 19°C in experiment I increased up to the 4th week at a rapid rate, followed by a decline towards the minimum values. In experiment II at 19°C the abundance increased initially at a rapid rate to week 2 and then remained at a constant level after which a decline in the abundance was observed to week 7 followed by an increase to week 12. At 22°C *D. vastator* abundance increased dramatically to week 8, then remained more or less the same with only a slight increase to week 10 followed by a sharp decline to the minimum value.

Generally in all temperature experiments there was an increase in the abundance of *D. vastator* but the length of time taken varied. At 12°C and 22°C the abundance reached a high value later than at 19°C. The results of these experiments thus suggest that the optimum of the 3 temperatures tested for *D. vastator* was 19°C. Temperature will have an effect on oviposition, the speed of development of the embryo, the duration of oncomiracidial life, the speed of maturation of juvenile and the longevity of matured/adult worms. The optimum for reproduction and propagation for *D. vastator* has been reported to lie between 24 - 28°C or 22-24°C The drop in variance to mean ratio in *D. vastator* populations and thus the lower degree of aggregation may reflect density dependent death of parasites, perhaps due to an immune resonse.