

SHORT COMMUNICATION I

EFFECT OF OXADIAZON ON CLARIAS GARIEPINUS: I INCUBATION PERIOD AND HATCHING SUCCESS

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ABSTRACT

The effect of oxadiazon, (a herbicide applied in irrigated paddy fields and fadama) on incubation period and hatching success of *Clarias gariepinus* was investigated. At the concentration of 1800ug/l applied under field conditions, the incubation period was not significantly affected ($p>0.05$) while the number eggs hatched were significantly depressed ($p<0.05$). However, with longer exposure, the percent number of eggs hatched increased but not to the level observed in the control (water). This may be attributed to gradual removal of the active components of oxadiazon from the water column. The presence of oxadiazon at concentration applied in the field therefore poses a potential threat to the recruitment of *C. gariepinus* in areas where it is applied. Keywords: *Clarias gariepinus*, eggs, hatching success, incubation period, oxadiazon.

INTRODUCTION

Most stream and river flood plains (also known as fadama in certain areas) serve as breeding ground to various species of fish during flood when such areas are inundated. In recent times, some of these flood plains have been developed into irrigated fields which serve as spawning and feeding grounds, being attracted by the flooded fields rich flora and fauna. Modern farming techniques employ agrochemicals, which have various effects on the fisheries. For example, oxadiazon is used for weed control in flooded rice plots, in irrigated

area. When these plots are drained usually four days after application of the chemical, the water is discharged into nearby streams or rivers. Chemical residues found in aquatic environments can pose a risk to aquatic organisms (Osibanjo *et al.*, 1994). Early life stages are often the most susceptible (Sprague, 1990). Some work have been done on the effects of pollutants on developing fish eggs (Mironov, 1967; Hasen and Schimmel 1975; Wilson, 1976; Onwuteaka, 1987). This work investigated the effect of oxadiazon on the incubation period and hatching success of *Clarias gariepinus*.

MATERIALS AND METHODS

Fertilized eggs were obtained by artificial breeding of male brood *C.gariepinus* as described by Hogendoorn and Visman (1980). The test media, rain water (which served as control) and 1800ug/l of oxadiazon were placed in 100mm diameter glass petri dishes at room temperature under static conditions. Fertilized eggs were introduced to the media that had been left for various periods ranging from one to five days. Each test and its control were replicated five times and contained 100 fertilized eggs. The incubation time and the hatching percentage for each test were determined as described by Osuigwe and Nwachukwu (1994). The results obtained were subjected to statistical analysis using t-test.

RESULTS:

The average incubation period recorded for fertilized eggs left in the two media for 1-5 days are given in Figure 1, while the average percent number of eggs hatched for the same period is shown in Figure 2. Statistical analysis indicated no significant difference ($p>0.05$) for incubation period irrespective of the number of days in the media. On the other hand, the mean values obtained for hatching rate (%) were highly significant ($p<0.05$).

DISCUSSION

While the mean values for incubation period for eggs in the control experiment generally remained more or less the same for the five days test period, the values for eggs exposed to oxadiazon decreased with time towards the values observed for eggs incubated in water (Fig. 1).

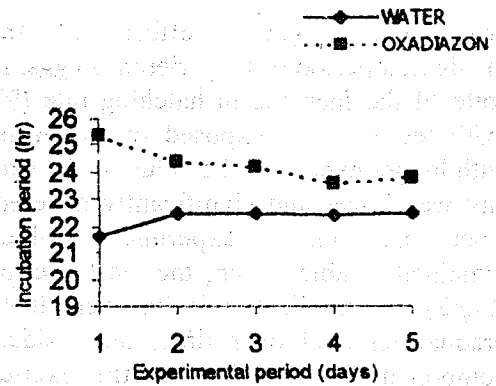


Fig. 1 Variation in egg incubation period (hr) with exposure time (days) to oxidiazon - water solution.

Oxadiazon may contain some components, which depress incubation period of fertilized eggs of *C. gariepinus* even though the effect was minimal. Since incubation period for eggs exposed to oxadiazon decreased with time during the test period, it is suggested that some of the components responsible for the negative influence may have been removed with time by evaporation, microbial degradation or other mode of degradation and decomposition or even by settling (Lowestoft, 1979). However, in spite of increase in incubation time for fertilized eggs in oxadiazon, the values obtained were still similar to figures reported by Viveen *et al* (1986) for *C. gariepinus* eggs under normal incubation. The implication is that oxadiazon at the concentration usually applied under field condition (1800 μ g/l) has no

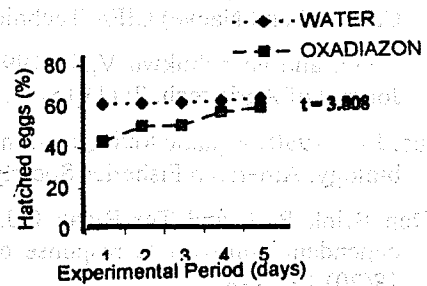


Fig. 2: Variation in hatching rate (%) of eggs with exposure time (days) to oxadiazon-water solution

pronounced negative effect on the incubation period of *C. gariepinus* eggs. In spite of the increase in hatching rate (%) exhibited by eggs exposed to oxadiazon with longer exposure, the value on the fifth day was lower and significantly different from the control experiment, which remained stable over the test period (Fig.2). The implication is that even after a gradual removal over time, the residual components of oxadiazon still exerted enough adverse effects on the fertilized eggs as to substantially depress the hatching rate (%) on the fifth day. This is in agreement with the observation by Van Den Brink and Ter Braak (1999) that a variety of adverse effects arise from sub-

lethal exposure to chemicals. From this study, there is no doubt that oxadiazon at the concentration used in irrigated fields (1800µg/l) has a pronounced adverse effect on the hatching process of fertilized eggs of *C. gariepinus*. Therefore, it poses a threat to the *C. gariepinus* component of the fishery since this chemical enters the aquatic system directly or indirectly through discharges and run-offs. More work on this chemical especially its effect on other exploited species and long duration tests is advocated so as to assess its impact on other fish and also help to determine water quality criteria for aquatic organisms.

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