EVALUATION OF TOXICITY EFFECT OF *DATURA INNOXIA* ROOT EXTRACT TO *CLARIAS GARIEPINUS* FINGERLINGS

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ABSTRACT
Various gariepinus was exposed 96 hours under laboratory conditions using static bioassays with continuous aeration to determine its acute toxicity. The LC_{50} of the exposed fingerlings was found to be 128.83 mg/L. The fish exhibited loss of balance, respiratory distress and swam erratically just prior to death.
Keywords: Catfish, *Clarias gariepinus, Datura innoxia,* toxicity.

INTRODUCTION
The plant, Jimson weed (Datura Sp) is of the family Solonacea. It is a shrub of Asian origin, and grows wild in different parts of Nigeria. Different parts of the plant are used for various medicinal purposes among the local populations (Gidado et al.2000). The various uses of the plant which have been reported include stimulation of central nervous system (CNS) (Manandhar, 1995) pain relief and would healing (Shah, 1982 and Zagari, 1992). Among others, it has also been reported to cause pupilary dilation, thirst, depression and drowsiness in sows (Keeler, 1981). Gidado et al (2000) examined the effects of aqueous extracts in rats. They observed significant increase in Alanine transminase (ALT), urea and calcium content of the serum. The authors suggested that the extract may be hepatoxic and nephrotoxic.

There is a dearth of information on the toxic effects of the plant to fish. Hence the present study was conducted to evaluate the toxic effect of D. innoxia root to the fingerlings of the African catfish, *Clarias gariepinus.*

MATERIALS AND METHODS
Fingerlings of the African catfish, *C. gariepinus* of the same brood stock collected from Rock water fish farm, Jos, were used for this investigation. The fish had a mean weight of 10.20± 0.38g and were stocked 10 fish per aquacium in 14 glass aquaria (60cm x 30cm x 30cm) with dechlorinated and well aerated municipal tap water. The fish were acclimated to laboratory conditions for 14 days prior to the exposure period. During the acclimation period the fish were fed twice daily (1800h and 1400h) at 4% of their body weight with laboratory formulated feed (Table 1). Mortality was less than 2 % during acclimation. They were not fed for 48 hours prior to and during the exposure period, which lasted 96 hours. Methods for acute toxicity tests as recommended by UNEP (1989) were employed.

Table 1 Ingredient and proximate composition of diet fed to Clarias gariepinus

INGREDIENT	DIET
Fish Meal	30
Soyabean Meal	35
Meat & Bone Meal	10
Rice Bran	15
Corn Oil	3
Vitamin & Mineral Mix	5
Starch	2
PROXIMATE COMPOSITION	
Crude Protein	44.5
Crude Fat	8.6
Crude Fibre	5.1
Ash	16.4
NFE	25.5

Fresh samples of *D. innoxia* roots were collected from University of Agriculture Makurdi between the months of March and May 2001. They were washed and sun-dried to constant weight. The dried samples were pounded into a fine powder and sifted using 0.25mm sieve. 500g of the fine powder was dissolved in 2 litres of distilled water at room temperature, 23±0.5°C for 24 hours. The extract was filtered using Whatman's filter paper (No. 1) using a vacuum pump. The filtrate was freeze-dried and stored in the refrigerator for use.

The freeze-dried extract was dissolved using distilled water and delivered into each of the test glass aquaria at the following concentrations: 200, 180, 160, 140, 120, 100 and 0.00mg/L. The 0.00mg/L served as the control experiment. Ten fish were exposed to each of the seven concentrations in replicates. The toxicant solutions and test water were renewed after 48 hours in each bioassay. Water characteristics were monitored every 24 hours using methods described by APHA (1985).

The behaviour and general conditions of the fish were observed before, during and after each bioassay. The fish were examined for mortality. Fish were considered dead when there is no response to gentle prodding. Dead fish were recorded and removed immediately from test solutions to avoid fouling the media until the end of the 96-hour exposure period. The 96-hour LC50 was determined as a probit analysis using the arithmetic method of percentage mortality data. The lower and upper confidence limits of the LC_{50} were determined as described by UNEP (1989). Results were subjected to statistical analysis with Duncan's multiple-range F-test for significant different ($P<0.05$) between the various concentrations of *D. innoxia* and the control.

RESULTS

At contraction 200mg/L, 90% mortality was recorded. At concentrations 100mg/L and 120mg/L, mortality recorded were 30% and 45% respectively. Increase in the concentration of the toxicant resulted in higher mortalities. In the control group no mortality was recorded through the 96-hour exposure period (Table 2). The 96-hour LC_{50} was determined to be 128.83mg/L with lower and upper confidence limits being 93.83 and 234.42mg/L respectively.

The abnormal behaviour observed in fish exposed to *D. innoxia* root extract was characterized by: respiratory distress, loss of balance, gulping of air and erratic swimming before death. The reactions to the toxicants were more pronounced in tanks containing higher concentrations. Fish in the control group did not show any abnormal behaviour.

The water quality parameters in the various treatment tanks fluctuated slightly (Table 3). The dissolved oxygen values decreased slightly with increase in concentration of the toxicant. Free carbon dioxide and total alkalinity values were slightly increased at higher concentration of the toxicant compared to the control. The temperature and pH values did not show much variations. Generally, the water quality parameters determined did not show any significant difference ($P>0.05$) between the various concentrations of *D. innoxia* and the control.

Table 2: Mortality rate of *Clarias gariepinus* exposed to acute concentrations of *D. innoxia* root extract for 96 hours.

Concentrations (mg/L)	Log	Time for 50% mortality (h)	Mean Total mortality (%)	Mean Probit value
200.00	2.30	24(0.00)	90(0.06)	6.28(0.2)
180.00	2.25	30(6.10)	80(0.08)	5.84(0.4)
160.00	2.20	42(6.00)	65(6.06)	5.39(0.5)
140.00	2.15	54(6.00)	50(0.02)	5.23(0.1)
120.00	2.08	-	45(5.05)	4.87(0.4)
100.00	2.00	-	30(0.06)	4.72(0.2)
0.00		-	-	-

Mean with standard deviation in parentheses.

Table 3: Water quality parameters during acute bioassays with *C. gariepinus* exposed to *D. Innoxia*

Parameters	200.00	180.00	160.00	140.0	120.00	100.00	0.00
Temperature (C)	19(75 (0.63)	19.75 (0.63)	19.76) (0.64)	20.05 (0.20)	20.00 (0.71)	20.00 (0.40)	20.05 (0.12)
Dissolved Oxygen (mg/L)	6.83 (0.83)	6.98 (0.90)	6.98 (0.90	7.21 (1.13)	7.71 (0.35)	7.82 (0.27)	8.08 (0.49)
Free carbon Dioxide (mg/L)	5.28 (0.51)	5.32 (0.48)	5.09 (0.44)	4.93 (0.45)	3.83 (0.23)	2.78 (0.84)	2.55 (0.35)
Total alkalinity (mg/L)	31.15 (3.54)	30.45 (3.77)	30.45 (3.71)	30.31 (3.35)	30.00 (3.56)	29.05 (3.32)	29.00 (3.32)
$_{p}H$	7.00 (0.04)	7.00 (0.02)	7.08) (0.02)	7.02 (0.03)	7.04 (0.01)	7.03 (0.03)	7.03 (0.03)

Mean with standard deviation in parenthesis.

DISCUSSION

Results obtained from this research revealed that the 96-hour LC_{50} for the African catfish exposed to *D. innoxia* was 123.83mg/L with lower and upper confidence limits of 93.93 and 234.42mg/L respectively. Although much work has not been done on the toxicity of *Datura* sp for most fish species, there are some documented information on the effects of some parts of this plant on other organisms. Zagari, (1992) reported that the plant is used for respiratory decongestion and wound healing. Its use in the stimulation of the central nervous system has been documented (Manandhar, 1995). Gidado et al (2000) working on rats reported that the leaves of *D. Stramonium* were hepatoxic and nephrotoxic.

The restlessness, loss of balance, erratic swimming and respiratory distress reported in this study have earlier been reported by Wise et al. 1987; Okwuosa and Omoregie, 1995 and Omoregie et al (1998) when they exposed fish to acute concentrations of different toxicants. In this investigation mucus accumulation was observed on body surfaces and gill filaments of dead fish. According to Annune (1994) mucus accumulation results from increase in the activity of mucus cells subsequent to exposure to pollutants. This results in an increase in the production of mucus over the body of the fish.

The physico-chemical parameters of the test solutions fluctuated slightly during the bioassays but was not thought to have affected fish mortality since they were within the suggested tolerance range (Mackereth, 1963).

In conclusion, *D. innoxia* root extracts in the concentrations used in this study appear to have deleterious and dose-dependent toxic effects to catfish fingerlings.

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ASPECTS OF THE BIOLOGY OF THE LAGOON CRAB, *CALLINECTES AMNICOLA* (DEROCHEBURNE) IN BADAGRY, LAGOS AND LEKKI LAGOONS, NIGERIA.

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ABSTRACT

A preliminary report of the size, composition, growth pattern and food habits of the blue crab, *Callinectes amnicola* (De Rocheburne) in the Badagry, Lagos and Lekki Lagoons is presented. The collection of crabs from the three lagoons covered the period May 1999 to October 2000. The carapace length of the crabs for Badagry lagoon ranged from 2.2cm to 16.4cm with weight of 4.4g to 252.6g. The crabs showed a unimodal size distribution. For the Lagos Lagoon, crabs sizes ranged from 3.5cm to 16.8cm and weighted 3.2g to 277.1g. The sizes of crabs in the Lekki Lagoon ranged from 3.5cm to 16.1cm and weighted 3.5g to 262.7g. Crabs from the three lagoons exhibited negative allometric growth. The food items of the crabs were similar in the three lagoons and comprised mainly of mollusc shells, fish parts, shrimps and crab appendages and occasionally of higher plant materials.

INTRODUCTION

The blue crab, *C amnicola* is a very popular food item in the diet of the coastal communities in West Africa. It is caught in the creeks, lagoons and the adjacent inshore marine waters. Previous reports on its occurrence in the Lagos Lagoon where it supports a major fishery were made by Fagade (1969) and Solarin (1998). The fishery was carried out mostly by women during the rainy season (June to November). Aspects of the biology of the blue crab in the Badagry lagoon was studied by Lawal-Are (1998).

Williams (1974) reported the occurrence of the crab along the coast of Senegal to Cameroon while Kwei (1978) studied the size composition, growth pattern and maturity in Mukwe and Sakumo Lagoons in Ghana. This is a preliminary report on aspects of the biology of *C. amnicola* in the Badagry, Lagos and Lekki Lagoons. three major lagoons in South – Western Nigeria.

MATERIALS AND METHODS

The Badagry, Lagos and Lekki Lagoons (Fig. 1) are part of a continuous system of creeks and lagoons lying along the coast of Nigeria from the border with the Republic of