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STUDIES ON PISCICIDAL PLANTS OF NORTH-EASTERN INDIA: HOPE FOR AN INDIGENOUS PLANT POISON FOR FISH NURSERY MANAGEMENT

IN modern fisheries plant products[1-2] like rotenone[3], jugulone[4], pyrethrin and pyrethroids[5] are used to remove predatory and weed fishes from rearing ponds. The toxic action of these plant products have been observed to be of short duration depending on the concentration of the toxin. In many cases, the fishes which have been poisoned can be revived back to normalcy by transferring them to fresh water. Chemical poisons are sometimes used in fishery management However, due to their acute toxicity on fishes, sustained residual toxicity and their side effects on other aquatic organisms, they are not much acceptable. Among the plant products, the most important one is rotenone which is obtained from Derris root (*Derris trifoliata* Lour.) and is at present imported to India. Hence, there is an urgent need to find out a suitable substitute for rotenone from indigenous piscicidal plants.

Chopra *et al.*[6] have described 112 plants in India reported to have piscicidal action. Out of these, more than 40 plants occur in N.E. India[7]. The authors have collected and identified 10 plants reported to have piscicidal effect from N.E. India (Table I). Toxicity studies were carried out on 5 of them on two species of fresh water fishes commonly found in hill streams, *Puntius shalynius* (Yazdani and Talukdar), *Danio dangila* (Hamilton) and on one species of brackish water air-breathing fish, *Heteropneustes fossilis* (Bloch.). The oxicity experiments were carried out in 10 l glass jars with a minimum of 10 fishes. The plant parts were first air-dried in shade and finely powdered. The results are provided in Table II. These results indicate that the fruits of *Zanthoxylum armatum* DC (=*Z. alatum* Roxb.) have more acute toxic effect among the different plants screened. *Zanthoxylum armatum* occurs commonly in the hilly tracts of N.E. India and the fruits are extensively used for catching fishes locally.

TABLE I

Details of piscicidal plants commonly used by the N.E. Indian tribals in fishing

Batanical name	Part/s used	Local name
Croton tiglium L.	seed and fruit	Jambola gota
Eupatorum odoratum L.	leaf and shoot	Assam-lota
Milletia pachycarpa Benth.	root	Bakoa-biri; Bokol-bih; Bishloti
Myrica esculenta Buch.-Ham.	bark	Soh-phi; Keifang; Naga-teng; Kaiphal
Polygonum hydropiper L. var. *flaccidum* Steward	whole plant	Pani marieha
Polygonum hydropiper L. var. *hydropiper*	whole plant	..
Potentia fulgens Wall *ex* Lehm.	root	..
Taxus baccata L.	leaf, shoot and seed	Dingsableh
Xeromphis spinosa (Thunb.) Keay (=*Randia dumetorum* Poir.)	fruit	Dieng-makasing-khlaw; Gurol, Behnuona; Mainphal
Zanthoxylum armatum DC. (=*Z. alatum* Roxb.)	root, fruit, bark and leaf	Gaira, Tambul

TABLE II

Comparative lethal dosage of different piscicdal plants on P. shalynius, D. dangila *and* H. fossi'is

Botanical name	Part used	Minimum effective concentration (ppm)	Lethal time (hr)
Myrica esculenta Buch.-Ham.	bark	80–100	12–15
Polygonum hydropiper L. var. *hydropiper*	leaf	100–125	10–12
Potentila fulgens Wal *ex* Lehm.	root	150–200	8–10
Xeromphis spinosa (Thunb.) Keay (=*Randia dumetorum* Poir.)	fruit	120–140	10–12
Zanthoxylum armatum DC. (=*Z. alatum* Roxb.)	fruit	50–70	8–9

Some of the investigated plants for piscicidal action are *Barringtonia acutangula* (L.) Gaertn., *Croton tiglium* L., *Derris trifoliata* Lour. and *Milletia piscida* Wt.[8–11]. Many of the piscicidal plants contain saponin, alkaloids, glycosides and essential oils[7]. They mostly act on the nervous system causing paralysis or on the blood resulting in haemolysis or directly act on the muscle activity[12].

The behavioural responses of the fishes in relation to the toxins studied by the authors were similar to earlier workers made on different plants[8–11]. In the initial phase of treatment of the toxin, the fish was more active, then showed erratic movements, turned upside down and finally collapsed at the bottom of the jar. The gill movement increased at the initial phase and gradually decreased towards the lethal phase. It was also observed that the dosage required for air-breathing fishes was more compared to that of gill-breathers. Further studies on the purification of the toxins, their physiological mode of action and residual toxicity are in progress.

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REPRODUCTIVE CYCLE OF THE INDIAN MOLOSSID BAT, *TADARIDA AEGYPTIACA*

REPRODUCTIVE patterns in bats fall into five main categories[1–4]. A synchronous breeding season and monoestry was recorded for all holarctic bats[3]. Some bats possess a synchronous breeding period, *i.e.*, in families Desmodontidae[10], Phyllostomatidae[6,7], Pteropodidae, Vespertilionidae[9], Emballonuridae and Molossidae[3,8], while palaeotropical bats have seasonal polyoestry[2,5].

Tadarida aegyptiaca, a molossid bat whose reproduction has been studied, has a sharply marked synchronous sexual cycle. Animals were collected at