FISH STUPEFYING PLANTS EMPLOYED BY TRIBALS OF SOUTHERN RAJASTHAN—A PROBE

PRABHAKAR JOSHI
Department of Botany, University of Rajasthan, Jaipur 302004, India.

ABSTRACT

Bhils, Garasias, Damors and Kathodias are the important tribes dwelling in the southern portion of Rajasthan. Fishing involving the use of fish-poisons is not an uncommon practice in these tribes. In this paper an inventory of such plants is given.

INTRODUCTION

WHETHER it resulted from an attempt to club the baffling, elusive fish with the 'accidental' coincidence of a particular tree branch from the bank, a bough or a tree crashing into the water body or still any other, the sight of more than the needed number of fishes lying still on the water surface would have left primitive man of the primeval forests gaping with wonder. It was indeed a useful discovery made not only in a region or two, but by primitive societies the world over. As it did not affect the palatability, it became a technique, curiosity or the scarcity of one source might have led to a quest for the search of more. The 'poisoned' fishes needed no special treatment during their dressing or cooking. On eating them no health hazards were posed. Moreover, the method was convenient and hence was accepted as a standard one.

During ethnobotanical surveys carried out by the author amongst the tribes inhabiting the Aravalli hill ranges, plants employed by them to catch fishes formed one of the important lines of investigation, the findings of which are being communicated.

Area covered: Four of the five districts inhabited by the tribals i.e., Banswara, Dungarpur, Udaipur and Sirohi.

Tribes: Bhils (the largest tribe of Western India), Garasias, Damors and Kathodias (a monkey eating, *Catechu* collecting tribe migrated from Maharashtra).

TECHNIQUES USING FISH POISONS

The most commonly practised technique of introducing the poison in the waters is simply mashing the appropriate quantity of the plant/part in water near the water body and dumping the mass into water. Rarely, the material is thrashed and steeped in water and the resultant liquid poured at the spot where fishes are available. In a solitary case i.e., the barks of *Aegle marmelos* (root) and *Butea monosperma* (stem) are washed together repeatedly in the water body for the desired results. *Euphorbia neriifolia* dendrons are carried to the pond or stream where from his perch on a large boulder the tribal chops off pieces with sickle or axe and flings them on fish shoals wherever visible.

For the success of their endeavours the tribals ascertain that the water is shallow, still or slow flowing for the simple reason that the ingredients would be dispersed off before they function or even if some fishes were affected, catching them would be tedious. Thus, in slow flowing waters a person drops the fish poison while one or two slightly downstream spread a cloth to block the floating, apparently lifeless fishes.

PLANTS USED

The plants employed by the tribals of Southern Rajasthan as fish-poisons are enumerated in table 1. Plants marked by asterisks are those figuring rarely or not at all in literature[1-9].

Voucher specimens of the plants under reference are deposited in the Herbarium, Department of Botany, University of Rajasthan (RUBL).

DISCUSSION

That the tribals of Southern Rajasthan recognize and utilize a fairly large number of fish poisons is obvious. Of these, *Balanites aegyptiaca*, *Casearia tomentosa*, *Euphorbia neriifolia* and *Holoptelia integrifolia* are the more popular species and their use is widespread. But for a few, the Bhils are aware of nearly all of

Table 1 *Fish stupefying plants used by tribes of Southern Rajasthan*

Plant & Family	Local names	Part used	Banswara	Dungarpur	Udaipur	Sirohi
Acacia pennata (L.) Willd. (Mimosaceae)	Aankral (B), Cheela (B,K) Khadvel (K)	Stem bark	–	B	B, K	–
Aegle marmelos (L.) Corr. (Rutaceae)	Bael (B)	Root bark (with *Butea monosperma* stem bark)	–	B	–	–
Albizia procera (Roxb.) Benth. (Mimosaceae)	Safed Siris, Dholo Siras (B) Goriyo (G)	Stem bark	–	B	–	G
Balanites aegyptiaca (L.) Delile (Balanitaceae)	Hingudi, Hingwal (B)	Fruit	–	B	–	–
	Hingon (G)	Stem bark	B	B	B	G
		Root	B	B	–	–
**Blumea lacera* (Burm. f.) DC. (Asteraceae)	Phatakdi (B)	Entire plant	B	–	–	–
**Butea monosperma* (Lam.) Taub. (Fabaceae)	Khankro (B,D,G,K) Chhola (K)	Stem bark	–	B	K	–
**Cassia auriculata* L. (Caesalpiniaceae)	Anwal (B,G)	Stem bark	–	–	–	G
Casearia tomentosa Roxb. (Flacourtiaceae)	Moonja (B) Mojal (K,B)	Fruits	–	B	B, K	–
**Chrozophora rottleri* (Geis.) Juss. ex Spreng (Euphorbiaceae)	Gubra (B) Dekhachowkdi (B,D)	Leaves	–	B, D	–	–
Derris indica (Lam.) Bennett (Fabaceae)	Karanj, Kanji (B,K,G)	Seeds	B	B	B, K	–
Euphorbia neriifolia L. (Euphorbiaceae)	Thuar, Thor (B,K,G,D)	Stem	B	B, D	B, K	G
**Holoptelia integrifolia* (Roxb.) Planch. (Ulmaceae)	Kanjeri, Kanjeru, Kanjedi (B,G), Papad (K)	Stem bark	–	B	–	–
		Leaves	–	B	B, K	–
**Garuga pinnata*. Roxb. (Burseraceae)	Kankad (K)	Stem bark	–	–	K	–
Millettia auriculata Baker ex Brandis (Fabaceae).	Gojvel (B)	Root	B	B	–	–
Ougeinia oojeinensis (Roxb.) Hochreut. (Fabaceae)	Tanaj, Tivas, Tunnia (B)	Stem bark	B	B	–	–
Xeromphis spinosa (Thunb.) Keay (Rubiaceae)	Mendula, Mendol (B)	Fruit	B	B	–	–
**Schleichera oleosa* (Lour.) Oken. (Sapindaceae)	Kusum (G)	Stem bark	–	–	–	G
Terminalia arjuna (Roxb. ex DC.) Wt. & Arn. (Combretaceae)	Kohera (B)	Stem bark	B	B	–	–
**Verbascum chinense* (L.) Sant. (Scrophulariaceae)	–	Leaves	B	–	–	–

B = Bhils; G = Garasias; K = Kathodias; D = Damors.

these plants. A majority of the species are of common occurrence, perhaps this may be the reason why collection and storage of plant material for fishing is not in vogue although the use of powder of dried plant materials has been reported[10]. *E. neriifolia* is the only plant from this inventory which is cultivated but that too for forming live fences and not primarily as a fish-poison. Cultivation of plants for their piscicidal value as prevalent in some societies[11] is virtually absent here.

Although the efficacy of the used part may vary plant-wise and within the same plant region-wise (as evidenced by the choice of fruit, stem bark and root of *B. aegyptiaca* in different localities though usage of the bark has been more often mentioned in literature) in general, bole/stem barks are most commonly utilized (often slashed from a thicker portion of the stem e.g. *Acacia pennata*), seeds, root or root bark, the least.

No specificity was observed as to the usage of a definite fish-poison on a particular species or group of fishes.

Some of the plants utilized by the tribes of Rajasthan are used by other tribes of the country too e.g. *Acacia pennata* amongst the Garos[12], *Casearia tomentosa* by the Santhals[13], the Pandos[14] and many others, *Millettia auriculata* amongst the tribes inhabiting Madhya Pradesh[15] and *Xeromphis spinosa* by the Tharus of Uttar Pradesh[16], Garos of Meghalaya[12] and dwellers of Mizoram[17]. *Verbascum chinense* has been reported to be used by the Dangies[18] (in Northern Gujarat—an adjoining region).

Aegle marmelos forms an interesting case. It is mentioned by Watt in his work[3] that the fruits of the wild plants (uncultivated only) are very intoxicating and used in "Northern, Western and Central India". The bark is known as a fish-poison in Celebes (Sulawesi) of Indonesia[8]. The use of the root bark alone has been reported from Nepal[19], however, the Bhils wash the stem bark of *Butea monosperma* along with (observed in Patanpur in Dungarpur District).

The potential of *Blumea lacera* against insects has been inferred from its reputation among the natives of Konkan for successfully driving off flies and other insects[2].

Action mechanism: The toxicity of various plants of established piscicidal value has been attributed to the presence of saponins, alkaloids, glycosides and essential oils[3, 6]. Lamba[20] gives five classes viz (i) rotenone and allied substances (ii) saponins. (iii) tannins, (iv) resins and (v) unknown principles. The ways by which the piscicidal toxins possibly bring about the fishes to a 'stupefied', 'intoxicated' or 'paralysed' state that have been suggested by earlier workers (reviewed by Lamba) are: entering the blood stream—thereon spreading to vital organs, the central nervous system where they impair respiratory reactions in mitochondria (rotenone and allied substance) or cause paralysis; preventing oxygen uptake by lowering surface tension between water and gills (Saponins); acting on blood they might cause haemolysis; and directly affecting muscle activity.

Tribal opinions: Painstaking interrogations of the tribals during surveys brought forward their following observations on the immediate effect of the poison on the fishes: (i) the fishes get blind. "It burns their eyes as chillies do", (ii) the fishes get intoxicated and swim about, reeling, madly flipping their tails, (iii) the fishes lose consciousness, (iv) the fishes are paralysed, (v) the fishes die.

Dropping *Casearia tomentosa* in waters would result in the fishes coming to lie snout up vertically at the surface.

It would be worthwhile to investigate whether the sight is affected or not at least initially before the general effect takes over.

CONCLUSION

Some of the fish-poisons e.g. *Derris*, *Lonchocarpus*, *Millettia* and *Tephrosia* are commercial sources of rotenone and related compounds of established insecticidal value[21]. The prospects of further research on other piscicidal plants aiming to put them to better uses e.g. against insects and cold-blooded pests of nuisance to mankind needs no emphasis, especially in times when the need for safer insecticides and pesticides has been fully realized.

ACKNOWLEDGEMENTS

The author is indebted to Dr S. Sharma for valuable suggestions, Dr S. K. Jain (N.B.R.I., Lucknow) and Prof. N. Chandra for encouragement, the officers of the Forest Department of Rajasthan for providing field facilities and the CSIR for the award of a fellowship.

14 November 1985; Revised 26 February 1986

1. Drury, H., *The useful plants of India*, William H. Allen and Co., London, 1873.
2. Watt, G., *A dictionary of economic products of India*, W. H. Allen and Co, London, 6 Vols. 1889–93.
3. Watt, G., *The commercial products of India*, Today

& Tomorrow's Printers & Publishers, New Delhi, 1966 (Repr. ed.), **26**, 546.
4. Chopra, R. N., Badhwar, R. L. and Nayar, S. L., *J. Bombay Nat. Hist. Soc.*, 1941, **42**, 854.
5. Chopra, R. N., Badhwar, R. L. and Ghosh, S., *Poisonous plants of India*, I.C.A.R., New Delhi, 2 Vols. 1965 (Rev. ed.).
6. Chopra, R. N., Nayar, S. L. and Chopra, I. C., *Glossary of Indian medicinal plants*, C.S.I.R., New Delhi, 1956.
7. Dastur, J. F., *Useful plants of India and Pakistan*, Taraporewala Sons. and Co. Pvt. Ltd., Bombay, 1964.
8. Anonymous, *The Wealth of India: A dictionary of Indian raw materials and industrial products—Raw materials*, C.S.I.R., New Delhi, 11 Vols., 1948–76.
9. Uphof, J. C. Th., *Dictionary of economic plants*, H. R. Englemann (J. Cramer), Weinheim (Bergstrasse), 1959.
10. Meharda, B. L., *History and culture of the Girasias*, Adi Prakashan, Jaipur, 1985, 67.
11. Weiss, E. A., *Econ. Bot.*, 1973, **27**, 191.
12. Rao, M. K. V. and Shanpru, R., In: *Glimpses of Indian ethnobotany*, (ed.) S. K. Jain, Oxford and I. B. H. Publishing House, New Delhi, 1981, 158.
13. Goel, A. K., Sahoo, A. K. and Mudgal, V., *A contribution to the ethnobotany of Santal Pargana*, B.S.I. Howrah, 1984, 23. 14. Sinha, R. K., *Pando Janjati*, Madhya Pradesh Hindi Granth Academy, Bhopal, 1983, 74.
15. Jain, S. K., *Bull. Bot. Surv. India*, 1963, **5**, 226.
16. Maheshwari, J. K., Singh, K. K. and Saha, S., *The ethnobotany of the Tharus of Kheri District, Uttar Pradesh*, N.B.R.I., Lucknow, 1981, 37.
17. Shukla, U., Baishya, A. K. and Ali, S., *Bull. Bot. Surv. India*, 1978, **20**, 50.
18. Shah, G. L. and Gopal, G. V., *J. Econ. Tax. Bot.*, 1982, **3**, 362.
19. Anonymous, *Medicinal Plants of Nepal*, Bull. Department of Medicinal Plants. No. 3, Thapathali Kathmandu, Nepal, 1970.
20. Lamba, S. S., *Econ. Bot.*, 1970, **24**, 134.
21. Anonymous, *The Wealth of India: A dictionary of Indian raw materials and industrial products—Industrial products*, C.S.I.R., New Delhi, 1960, Vol. 5, p. 23.

ANNOUNCEMENT

SCHOOL ON TOXICOLOGY OF PESTICIDES

The School on Toxicology of Pesticides, being organized at Regional Research Laboratory, Hyderabad, will be held during October 20–31, 1986. It primarily aims at providing to the participants the benefit of a rich experience available in the areas of: biological evaluation of new/known compounds against target and non-target organisms acute, sub-acute and supplementary toxicity, structure activity relationship, target enzyme interaction and selectivity, delayed neurotoxicity, immunotoxicity, metabolism, synergism and potentiation, residues, persistence, hazards and toxicological statistics. Risk assessment and safety, regulations, registration requirements, environmental health criteria.

The School will be conducted at the Regional Research Laboratory, Hyderabad from **October 20 to 31, 1986** and consists of 36 hours of lecture sessions and 36 hours of workshop.

Details can be had from: Dr Syed S. H. Qadri, Scientist-EII and Head, Toxicology Unit, Regional Research Laboratory, Hyderabad 500 007.