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Fish Stupefying Plants Used by the Tribes of Nandurbar District.

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ABSTRACT

The present paper deals with the identification of those plants which are used as natural toxins for capturing fishes from Nandurbar district of Maharashtra. Nandurbar district is tribal district, is rich in ethno biological diversity, its different tahasils have their own toxicant plants which can be used for capturing fishes. So this ethno biological survey was conducted in different tahasils of Nandurbar district viz Akkalkuwa, Dhadgaon, Shahada, Taloda, Nandurbar and Navapur. As fishes are the important source of protein for poor people living near the banks of rivers, they use few plants which are natural toxicants for fishes and capture the fishes. During this study, a number of toxicant plants are identified with the help of the people living near the river and dams. The general information related to vernacular name of the plant in different tahasil and plant parts used, have been identified by elders and knowledgeable people. Plants are identified taxonomically with the help of Botanist of Jijamata Education Society's, Department of Botany For UG, PG and Research, Arts, Science and Commerce College, Nandurbar, Maharashtra. Extensive literature was also consulted for identification.

Key words: Fishes, fish, Toxic, poisonous plants, Narmada, Tapi river.

Introduction

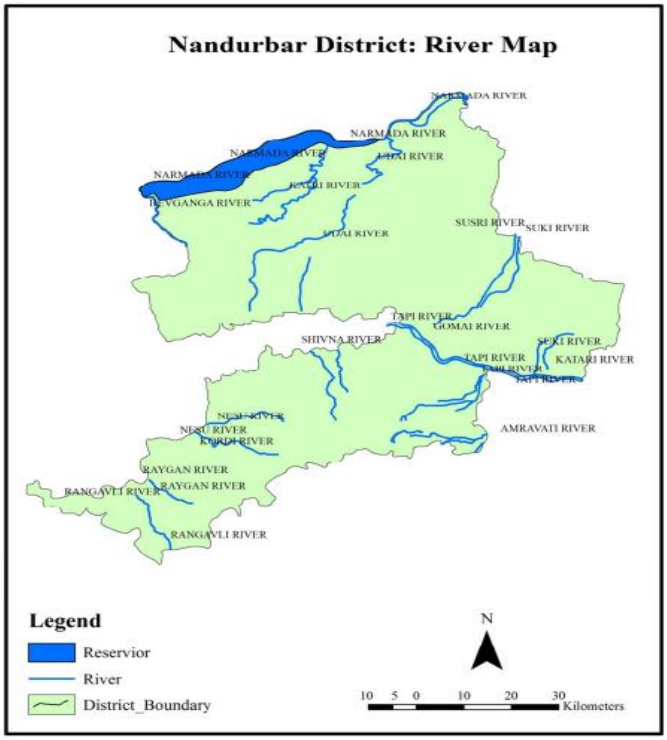
The District Nandurbar is newly formed from the district Dhule. It came into existence with effect from 1st July 1998. Headquarter of this district is Nandurbar itself. The ancient name of this region was Rasika. Later under the Yadavas, it was called as Seunadesa after king Seunachandra who ruled over it. With the advent of Muslims, the name was changed to Khandesh to suit the title Khan given to the Faruki Kings. The entire area of Khandesh included two-district viz., Dhule and Jalgaon and was administered as one district with headquarters at Dhule. However in 1906 for administrative purposes the Khandesh was divided into two districts known as west Khandes and East Khandesh. In the year 1950, a new Tahsil Akkalkuwa was created and with the reorganization of states in 1956, the region was included in Bombay State and subsequently i.e. in 1960 it became a part of Maharashtra state. While doing so, 38 villages, each from Nandurbar and Nawapur tahsils, 43 villages from Talode and 37 villages from Akkalkuwa tahsils were transferred to Gujarat State. In 1971 Census, Akrani Mahal was upgraded as Akrani Tahsil. In 1961, the name of the district was changed from west Khandesh to Dhulia and later on to Dhule district with Dhule as its headquarters. In July 1998, after creation of Nandurbar district, 6 Tahsils comprising of 933 villages were transferred to Nandurbar district.Nandurbar district consists of six tahsils viz. Akkalkuwa, Akrani, Talode, Shahade, Nandurbar and Nawapur. There were 930 villages in 1991 Census, which rose to 947 with 17 new villages in 2001 Census. In 2011 census, the number of villages decreased to 943.

In the study area two major rivers that constitute the drainage system of the study region are Tapi and Narmada. These rivers are flowing from East to West. In Nandurbar district as a whole lies the drainage basin of the Tapi River except for a small area in the extremes north, this drains into the Narmada Rivers. The rivers small streams originated in the Satpuda range and more important amongst tributaries are like tapi, Gomati, Vaki, Dehali etc. In summer season most of these streams are dried those are Rangavali, Raiyangan, Kordi and Amaravati the main southern tributaries of the Tapi River. Nese and Shivan rivers meet Tapi River in the Gujarat State. Barrages and dams have been constructed on the Tapi River under the schemes of state government of Maharashtra. Ukai dam's back water is most useful for fishing of Nandurbar district [Map- 1].

Plants are the important source of medicines for treating different human and animal diseases. A number of animal and human diseases are treated by the administration of different doses of plants extract. These plants used in treating human ailments and animal diseases are may be considered poisonous and their beneficial effects often occur at lower doses whereas overdose can induce poisoning (Botha and Penrith, 2008). These plants produce toxic substances such as alkaloids, glucosides, picrotoxins, resins, tannins, toxalbumins, saponins etc. Some of the toxins are harmful to humans and animals life, under certain conditions (Katewa et al, 2007). Now if we come in case of fishes which are important cheap and rich source of high quality proteins for poor people. Traps and nets are important tools used for capture fishes from rivers and streams but use of various plants as fish poison is also very old practice in the history of human kind. Plant species with ichthyotoxic properties that are frequently used, have subsequently been less studied. Hence, the communication gives the detailed information of various plants, which are used as fish toxicants by the people.

Material and methods

Plants are observed, identified, and their parts used for collection of fishes are identified. In the first step, extensive and frequent field observation was done by field visits of the different fields. Now the plants and their parts used as fish poison are identified with the help of local tribal communities of different fields. Plants were identified taxonomically by referring to different Botanist. Extensive literature search helps to verify the name of plants and their use in fish poisoning. Traps and nets are an important tools used for capture fishes from rivers and streams but use of various plants as fish poison is also very old practice in the history of human kind. A number of toxins extracted from different plants parts were used to stun fishes when it passes through the gills or in some cases when ingested. The fishes then float on surface and captured easily by traps and nets.



Map- 1 Shows water bodies for fishing

Result and discussion

The study revealed that different species of plants belonging to different families have poisonous effects on fish and animals. The plants are arranged alphabetically, each by its botanical name followed by the family name, local names and notes on harmful effects were reported along (Graph 01 and Table 01).

1. *Abrus precatorius* L. (Gunj) – Fabaceae family member, *Abrus precatorius* is a woody, climbing shrub known for its distinctive red and black seeds.The seeds of this plant are highly toxic and can be lethal to both humans and animals if ingested. In the context of fishing, these seeds are used to stun fish. When the toxin from the seeds passes through the gills or is ingested by fish, it causes them to exhibit abnormal behaviors, possibly due to a nervous breakdown and a lack of oxygen. The affected fish come to the surface, where they can be easily collected by fishermen and locals using cloth or cast nets. Importantly, the poison has a narcotic and debilitating effect on fish without killing them.

2. *Acacia auriculiformis* (Akashya) belongs to the Mimosaceae family, *Acacia auriculiformis* is a fast-growing evergreen tree native to Australia. The fruit paste of this tree is used as a fish poison. The specific mechanism of its toxicity and how it affects fish behavior would require further research.

3. *Acacia pinnata* (Jangli babul) belongs to the Mimosaceae family, It is a thorny shrub or small tree with yellow flowers and feathery leaves. The crude stem bark of *Acacia pinnata* is pounded and used as a fish poison. The details of how this bark affects fish would also benefit from further investigation.

4. *Acacia catechu* (Katha, Khair) belongs to the Mimosaceae family and utilizes powdered stem as its fish toxin. This deciduous tree boasts brown to dark grey bark and pinnate leaves. Fish capture involves the use of the powdered stem, although specific toxins and their effects on fish necessitate further exploration.

5. *Acacia nilotica* (Babul) falls under the Mimosaceae family and employs various plant parts, including fruits, flowers, bark, and more, all powdered for fish capture. This thorny tree features small yellow flowers and pods. To unravel the exact mechanisms of toxicity and their implications for fish, additional research is essential.

6. *Achyranthus aspera* L., a flowering herb in the Amaranthaceae family, employs its whole plant processed into a paste for fish poisoning. Characterized by green or purplish stems and lance-shaped leaves, *Achyranthus aspera's* toxic effects on fish merit investigation into its underlying compounds.

7. *Adiantus capillus veneris* (Hansraj) hails from the Pteridaceae family and utilizes a paste made from its entire plant as a fish poison. This delicate fern features finely divided fronds. Further research should aim to uncover the specific toxins and their impacts on fish behavior.

8. *Agave Americana* L. (Ketaki) in the Agavaceae family processes its leaves into a paste for fish poison. This succulent plant, native to the Americas, boasts spiky leaves. Investigation into the compounds responsible for its toxic properties is warranted.

9. *Argemone maxicana* L. (Satyanashi, Pivaladhotra), a member of the Papaveraceae family, employs its seeds and root as toxic parts. This erect, spiny annual herb with yellow flowers yields narcotic seeds that can induce various symptoms in humans. The powdered seeds stun fish without killing them when introduced to stagnant water, and the root paste serves as a fish poison. Research into specific toxins and their effects on both fish and humans is of interest.

10. *Ageratum conyzoides* L., part of the Asteraceae family, utilizes its entire plant processed into a paste for fish poisoning. This herbaceous plant is characterized by lavender or blue flowers. Investigating the compounds responsible for its toxic effects on fish would provide valuable insights.

11. *Balanites aegyptiaca* (Banchadi) belongs to the Balanitaceae family and is known for its thorny, drought-resistant nature, featuring small yellowish-green flowers and oval fruit. Its stem bark is utilized as a fish toxin, pounded to immobilize fish. Additional research is needed to uncover the precise toxins responsible for stunning fish and to understand their impact on fish behavior.

12. *Barleria prionitis* (Vajradanti), a member of the Acanthaceae family, is characterized by its spiny shrub form and vibrant orange flowers. The entire plant of *Barleria prionitis* is processed into a paste and employed as a fish toxin, stunning fish for collection. Further investigation is required to identify the specific chemical constituents responsible for its toxicity and to understand their effects on fish behavior.

13. *Butea monosperma* (Palas), belonging to the Fabaceae family, is a deciduous tree adorned with bright orange-red flowers. Its root bark serves as a fish toxin when pounded or converted into a paste, rendering fish immobilized. Further research endeavors could unveil the specific toxins responsible for its impact on fish.

14. Careya arborea (Kumbhi), a substantial deciduous tree within the Lecythidaceae family, features pale yellow or greenish-yellow flowers. The stem bark of Careya arborea is crushed or processed into a paste for use as a fish toxin, immobilizing fish for collection. Investigation into the nature of the toxic compounds and their influence on fish behavior is imperative.

15. *Catunaregam spinosa* (Kharhar), a thorny shrub in the Rubiaceae family, produces small white flowers and reddish fruits. Its stem bark is employed as a fish toxin, either pounded or transformed into a paste. Delving into the specifics of the toxins involved and their effects on fish behavior is an area of interest for future research.

16. *Caesalpinia bonduc* (Senna), a spiny shrub within the Caesalpiniaceae family, boasts yellow flowers and hard, prickly fruits. Its roots are transformed into a potent fish toxin when pounded or converted into a paste. Further research endeavors could shed light on the specific toxic compounds responsible for their impact on fish.

17. *Costus speciosus* (Keokand), a herbaceous plant in the Zingiberaceae family, features striking red or yellow flowers. The rhizomes of *Costus speciosus*, when pounded or processed into a paste, serve as a fish toxin. Investigating the precise toxins and their effects on fish behavior represents a significant area of interest.

18. *Crotalaria retusa* (San), a slender herb within the Fabaceae family, bears yellow flowers and elongated pods. Its roots, when pounded or transformed into a paste, function as a fish toxin. Research endeavors could uncover the nature of these toxins and their effects on fish.

19. *Cyathocline purpurea* (Chotagunj), characterized by purple or pink flowers, is a plant within the Asteraceae family. Its roots, when pounded or converted into a paste, are employed as a fish toxin. The study of the specific toxins and their effects on fish behavior is deemed essential in this context.

20. *Diospyros peregrine* (Makad tendu), belonging to the Ebenaceae family, is a tree distinguished by black fruit and robust wood. Leaves of Diospyros peregrine, transformed into a paste, are utilized as a fish toxin. Investigating the compounds responsible for its toxicity and their influence on fish behavior holds significant promise for insights and knowledge.

21. *Elephantopus scaber* L. (Minjur Chundi), a member of the Asteraceae family, is a herbaceous plant featuring serrated leaves and small flowers. The entire *Elephantopus scaber* plant is pounded or processed into a paste and employed as a fish toxin. However, further research is necessary to identify the specific toxins involved and their effects on fish.

22. *Erythrina suberosa* Roxb. (Pangara), found within the Fabaceae family, is a small to medium-sized tree known for its red or orange flowers. The stem bark of *Erythrina suberosa* is pounded or transformed into a paste for use as a fish toxin. Research endeavors could delve into the nature of the toxins responsible for stunning fish and their impact on fish behavior.

23. *Flemingia wightiana* Graham (GhodaKorra), a leguminous shrub in the Fabaceae family, features trifoliate leaves and small yellow flowers. The roots of *Flemingia wightiana* are pounded or converted into a paste, serving as a fish toxin. Investigating the specific toxins and their effects on fish represents a valuable avenue of research.

24. *Gardenia latifolia* Soland. (Papda), a small tree belonging to the Rubiaceae family, bears large, fragrant, white flowers. The stem bark of *Gardenia latifolia* is pounded or processed into a paste and utilized as a fish toxin. Understanding the chemical constituents responsible for its toxicity and their effects on fish behavior holds significance.

25. *Garuga pinnata* Roxb. (Kehad), a medium-sized deciduous tree within the Burseraceae family, boasts fragrant flowers and small, round fruits. The fruits of *Garuga pinnata* are transformed into a paste and employed as a fish toxin. Further research endeavors could explore the specific toxins present in these fruits and their effects on fish.

26. *Gloriosa superba* L. (Jhagdaphool) from the Liliaceae family is a climbing plant known for its showy, tubular flowers and distinctive leaves. Its rhizome serves as a fish toxin when pounded or processed into a paste. Research opportunities lie in uncovering the nature of the toxins found in *Gloriosa superba* and their impact on fish behavior.

27. *Haldina cordifolia* (Karam), a medium-sized tree in the Rubiaceae family, features heart-shaped leaves and small yellow flowers. The stem bark of *Haldina cordifolia* is pounded or converted into a paste and used as a fish toxin. Investigating the specific toxins responsible for its effects on fish is a subject of interest.

28. *Holarrhena pubescens* (Korya), a small to medium-sized tree within the Apocynaceae family, bears white, fragrant flowers. The stem bark of *Holarrhena pubescens* is pounded or transformed into a paste, serving as a fish toxin. Understanding the chemical constituents responsible for its toxicity and their effects on fish is important.

29. *Holoptelea integrifolia* (Papri), a large deciduous tree in the Ulmaceae family, possesses serrated leaves and small green flowers. Its leaves are processed into a paste and used as a fish toxin. Investigating the specific toxins and their effects on fish behavior is essential to gain a deeper understanding.

30. *Hygrophilas pinosa* T. Anders. (Gokulkanta), a herbaceous plant in the Acanthaceae family, features spikes of purple flowers. The roots plant are pounded or converted into a paste, serving as a fish toxin. Further research could elucidate the compounds responsible for its toxic effects on fish.

31. *Lepidagathis cristata* Willd. (Bhuinagia) belongs to the Acanthaceae family and is a herbaceous plant known for its showy spikes of purple or white flowers. The entire plant is utilized as fish poison when pounded or made into a paste. Investigating the specific toxins and their effects on fish behavior is crucial.

32. *Leucas aspera* (Agia) from the Lamiaceae family is a herbaceous plant with small white or pale blue flowers. Its whole plant serves as fish toxin when pounded or processed into a paste. Research could reveal the nature of the toxins responsible for stunning fish and their impact on fish behavior.

33. *Madhuca indica* J.F.Gmel. (Mahua), a member of the Sapotaceae family, is a large tree known for its edible flowers and fruits. The seeds are powdered and used as fish poison. Further research could explore the specific toxins in the seeds and their effects on fish.

34. *Nyctanthes arbour-tristis* Linn. (Harsingar), a small tree in the Nyctanthaceae family, boasts fragrant white flowers. The stem bark of *Nyctanthes arbour-tristis* is pounded or made into a paste and used as fish poison. Investigating the chemical constituents responsible for its toxicity and their effects on fish is important.

35. *Ocimum gratissimum* Linn. (Ban tulsi), a fragrant herb from the Labiatae family, features green leaves and white or lavender flowers. The entire plant is pounded or processed into a paste, serving as a fish toxin. Research could delve into the specific toxins involved and their effects on fish.

36. *Ougeinia oojeinensis* (Tiwas), a medium to large-sized tree in the Fabaceae family, has pinnately compound leaves. Its leaves are pounded and used as fish poison. Further research is needed to identify the specific toxins responsible for stunning fish and their effects on fish behavior.

37. *Parthenium hysterophorus* L. (Congress grass) is an invasive weed with white, daisy-like flowers. The entire plant is used as fish toxin when made into a paste. Investigating the nature of the toxins and their impact on fish is of interest.

38. *Phoenix dactylifera* L. (Date Palm) is a palm tree from the Arecaceae family, known for its sweet date fruits. The entire plant is used as fish poison when made into a paste. Research could explore the specific toxins responsible for stunning fish and their effects on fish behavior.

39. *Plumbago zeylanica* L. (Chitaber), a herbaceous plant in the Plumbaginaceae family, features slender spikes of white or pale blue flowers. The roots of plant are pounded or made into a paste and used as fish poison. Investigating the specific toxins and their effects on fish is essential.

40. *Polygonum glabrum* Willd. (Manj) is a slender annual herb often found in wet places and near streams, belonging to the Polygonaceae family. The entire plant is pounded or processed into a paste and used as fish poison. Research could elucidate the specific toxins responsible for stunning fish and their effects on fish behavior.

41. *Polygonum pubescens* Bl., a member of the Polygonaceae family, is a slender annual herb commonly found in wet places in hill forests, as well as in sandy alluvial soil near streams, moist soils prone to flooding, and along margins of ponds and irrigation ditches. It's frequently seen as a weed in fields and along paths. The entire plant is made into a paste and used as fish poison. Investigating the specific toxins responsible for stunning fish and their impact on fish behavior is essential.

42. *Pongamia pinnata* (Karanj), belonging to the Fabaceae family, is a medium-sized tree known for its seeds, which have various traditional uses. The seeds are pounded and used as fish poison. Further research could explore the specific toxins in the seeds and their effects on fish.

43. *Pterocarpus marsupium* Roxb. (Bija, Kino tree) is a tree with distinctive reddish wood, part of the Fabaceae family. The entire plant of is pounded or made into a paste and used as fish poison. Investigating the chemical constituents responsible for its toxicity and their effects on fish is important.

44. *Rosa micrantha* Borrer ex Sm. (Gulab) is a plant known for its fragrant flowers and belongs to the Rosaceae family. The entire plant is used as fish toxin when made into a paste. Research could explore the specific toxins responsible for stunning fish and their effects on fish behavior.

45. *Senna alata* (Crude pounded bark is used as fish poison) is a shrub or small tree with bright yellow flowers, classified under the Fabaceae family. The crude pounded bark is used as fish poison. Investigating the chemical constituents responsible for its toxicity and their effects on fish is important.

46. *Schleichera oleosa* (Kusum) is a medium-sized tree known for its oil-rich seeds and belongs to the Sapindaceae family. The seeds of *Schleichera oleosa* are pounded and used as fish poison. Further research could explore the specific toxins in the seeds and their effects on fish.

47. *Senna tora* (Chakora) belongs to the Caesalpiniaceae family and is used as fish poison by pounding or making a paste from the entire plant. Investigating the specific toxins responsible for stunning fish and their impact on fish behavior is essential.

48. *Shorea robusta* Roxb.exGaertn.f. (Sal) from the Dipterocarpaceae family utilizes the seeds or stem bark, pounded or made into a paste, as fish poison. Research could explore the nature of the toxins responsible for stunning fish and their effects on fish.

49. *Solanum chrisotrichum* Schltdl (Accho) is part of the Solanaceae family, and its roots are pounded or made into a paste and used as fish poison. Further research is needed to identify the specific toxins responsible for stunning fish and their effects on fish behavior.

50. *Sphaeranthus indicus* L. (Mudi sag) is an Asteraceae family plant where the entire plant is pounded or made into a paste and used as fish poison. Investigating the specific toxins and their effects on fish behavior is essential.

51. *Sterculia urens* Roxb. (Kurlu) belongs to the Sterculiaceae family, and its stem bark is pounded or made into a paste for use as fish poison. Investigating the specific toxins responsible for stunning fish and their impact on fish behavior is essential.

52. *Terminalia crenulata* Roth. (Saja) is a member of the Combretaceae family. The stem bark of is pounded or made into a paste and used as fish poison. Research could explore the nature of the toxins responsible for stunning fish and their effects on fish.

53. *Tephrosia purpurea* (Haran khuri) from the Fabaceae family is known for producing tephrosin, a chemical toxic to fish. Interestingly, the root powder of fish poison is also used for brushing teeth, and it has been employed by shepherds to care for animals bitten by snakes. The root is used as fish poison due to its tephrosin content. Further research into the effects of tephrosin on fish behavior and its potential applications is noteworthy.

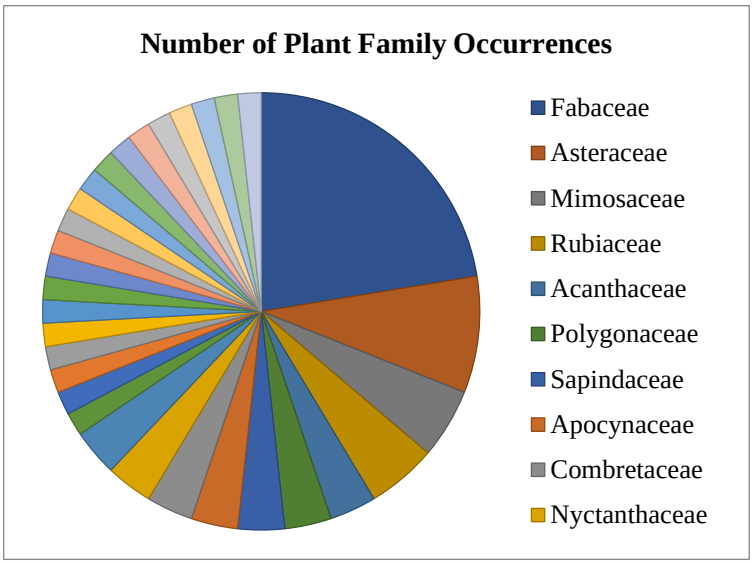
54. *Trianthema monogyna* L (Pathar Chatti) belongs to the Aizoaceae family, and its entire plant is pounded or made into a paste and used as fish poison. Investigating the specific toxins responsible for stunning fish and their impact on fish behavior is essential.

55. *Trichosanthes tricuspidata* Lour. (Indravan) is a member of the Cucurbitaceae family, and the paste made from the fruits is used as fish poison. Research could explore the specific toxins in the fruits and their effects on fish.

56. *Ventilago denticulata* Willd. (Kivti) belongs to the Rhamnaceae family, and its stem bark is pounded or made into a paste and used as fish poison. Investigating the specific toxins responsible for stunning fish and their impact on fish behavior is essential.

57. *Wrightia tinctoria* (Muiya) is a member of the Apocynaceae family, and its root bark is pounded or made into a paste and used as fish poison. Research could explore the nature of the toxins responsible for stunning fish and their effects on fish.

58. *Xanthium strumarium* L. (Kathu) is classified under the Asteraceae family, and its root paste is used as fish poison. Investigating the specific toxins responsible for stunning fish and their impact on fish behavior is essential.



Graph 01: Number of Plant Family Occurrences

Tribes in this district are fond of fishing and often spend the whole day for this purpose. For stupefying fish through the usage of fish poisons, the selection of a suitable water body of rivers and dams is very important. For this, the tribal's prefer shallow water bodies and slow-flowing or stagnant water. Sometimes, during fishing from rivers, the water flow is precluded either by diverting the water current in to small ponds or by constructing a temporary wall of mud and stones.

The plants or their parts are crushed directly in or outside the water body and thrown in the stagnant water to avoid the dispersal of its ingredient before it affects the fish. Bio-active principles, such as saponins, tannins, alkaloids, glycosides, essential oils etc. act on fishes as a stomach poison, contact poison, respiratory and neuro-poisons. Their live activity is paralysed. Thus, the fish poison makes the fish float in a dazed state and come to the surface of the water, from where they are captured easily. However, the tribal observations regarding fish poison are that the fish lose consciousness and the effect of fish poison does not adversely change the taste and quality of fish and affect human health. After catching fishes, tribes have opened the temporary mud wall.

The poison has a narcotic and debilitating action on the fish, without killing them. The sporin produces foam when entering in the water and it paralyzes the fish. At the beginning, all fishes are paralyzed, but those that are in deep pools and those that have not been picked up by fishermen were revived. Plant extract also alters the physico-chemical properties of the water bodies, which ultimately cause decline of small fishes in the stream and rivers. The toxicant released from the paste or slurry of these plants not only affects the fishes but also damage the stream biota like periphyton and macrobenthos. Loss of juveniles and small fishes occurs, as a result of poisoning of streams. Poison flow downstream over a long distance killing all fry and fingerlings of fish.

Different parts of various plants used as fish poisoning in streams and stagnant or semi stagnant waters. Leaves of *Agave Americana* crushed and the pest was directly employed in the stagnant water of stream and rivers. While, leaf extract of *Cactus rambans* and crushed seed of *Madhuca indica* is very popular for fish toxicants in the pools and riffles. The small balls are thrown into the river where the fish swallow the balls whole. As with the previous methods, the stupefied fish floats to the surface for easy capture. The two primary chemicals that occur in most plants used for stunning fish are Saponin and Rotenone.

Table. 01: List of Plant Family

Sr no.	Family	Number of Occurrences	Percentage of Representation
1	Fabaceae	13	22.41%
2	Asteraceae	5	8.62%
3	Mimosaceae	3	5.17%
4	Rubiaceae	3	5.17%
5	Acanthaceae	2	3.45%
6	Polygonaceae	2	3.45%
7	Sapindaceae	2	3.45%
8	Apocynaceae	2	3.45%
9	Combretaceae	2	3.45%
10	Nyctanthaceae	2	3.45%
11	Solanaceae	2	3.45%
12	Lamiaceae	1	1.72%

13	Papaveraceae	1	1.72%
14	Pteridaceae	1	1.72%
15	Agavaceae	1	1.72%
16	Balanitaceae	1	1.72%
17	Papaveraceae	1	1.72%
18	Amaranthaceae	1	1.72%
19	Zingiberaceae	1	1.72%
20	Lecythidaceae	1	1.72%
21	Rubiaceae	1	1.72%
22	Caesalpiniaceae	1	1.72%
23	Ulmaceae	1	1.72%
24	Zingiberaceae	1	1.72%
25	Fabaceae	1	1.72%
26	Liliaceae	1	1.72%
27	Sterculiaceae	1	1.72%
28	Pteridaceae	1	1.72%
29	Apocynaceae	1	1.72%
30	Ulmaceae	1	1.72%
31	Asteraceae	1	1.72%

Saponins is the one of the group of glucosides found in many plant species with known foaming properties when mixed with water Saponins, toxins normally break down in the digestive system and enter the bloodstream. Fishes take in Saponins directly into their bloodstream through their gills. The toxin acts on the respiratory organs of the fish. Saponins also cause the breakdown of red blood cells that help the toxin to spread quickly. Fishes that are washed away into untainted water revive and can return to their pre-toxic condition. Because of this, the fishermen would have to gather the stunned fish quickly as they floated to the surface.

Rotenones Plants containing rotenones are the second most utilized fish poison. Rotenone is an alkaloid toxin, in a group called flavonoids and stuns fish by impairing their oxygen consumption. The plant is toxic only to cold-blooded creatures and is found almost exclusively among the family comprised of legumes (Papilionaceae, Mimosaceae, Cesalpiniaceae).

Conclusion

The plant species used as a fish poison by tribals are 58 listed in this paper. These plants cause a physiological impact on fish. The plant toxins target the resources. But some other species which are not targeted are also affected. These also have an impact on the wider aquatic environment. Incalculable loss of juvenile and small fishes occurs, as a result of poisoning of streams. Poison flow downstream over a long distance killing all fry and fingerlings of fishes. Therefore, use of plant extract and other poisoning should be strictly banned in the streams, rivers and other aquatic resources.

The dataset on fish poisoning plants reveals a variety of plant species from different families employed for this purpose. The most prevalent family is Fabaceae, accounting for approximately 22.41% of the entries, followed by Asteraceae at 8.62%. Mimosaceae and Rubiaceae each represent 5.17% of the dataset. Additionally, various other families like Acanthaceae, Polygonaceae, Sapindaceae, Apocynaceae, Combretaceae, Nyctanthaceae, and Solanaceae contribute 20.69% collectively. This diversity of plant families highlights the widespread use of different plant species for fish poisoning across various regions.

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References

1. Acharya D. and Shrivastava A. 2008. Indigenous Herbal Medicines: Tribal Formulation and Traditional Herbal Practices. Avishkar Publishers Distributors, Jaipur, ISBN 9788-81-7910-252-7.

2. Anonymous 1998. Gazetteer of Madhya Pradesh. Bhopal.

3. Archana, U., Khan, A., Sudarshanam, A., Sathya, C., Koshariya, A.K., Krishnamoorthy, R., 2023. Plant Disease Detection using ResNet, in: 2023 International Conference on Inventive Computation Technologies (ICICT). Presented at the 2023 International Conference on Inventive Computation Technologies (ICICT), IEEE, Lalitpur, Nepal, pp. 614–618. https://doi.org/10.1109/ICICT57646.2023.10133938

4. Badola SP & Singh HR, Fishing methods in Garhwal hills, Proc Nat Acad Sci India, 47 (B) III 1977 177-181. 11 Joshi KD, Wanton destruction of fishery resources in upland waters: A case study, In: Fish diversity in Protected Habitats, (Nature Conservators Publication), 8 2004 249-254.

5. Bahuguna SN, Kumar Ashok & Bisht Bhawna, Alaknanda ki tin pramukh nadiyon me matsya sanrakshan evam prabandhan, (Proc Uttaranchal me Matsyakii ki Bhavi Sambhavnaayen, 28-29 Oct 2005, HNB Garhwal University, Srinagar-Garhwal), 125-127.

6. Begossi, A. 1996. Use of ecological methods in ethnobotany: diversity indices. Economic Botany. 50: 280–289.

7. Bioinformatics Centre, 1998 Traditional Uses of Mangrove Plant Products in India National Institute of Oceanography, Goa, India. http://www.indianocean.org/bioinformatics/mangrove/MANGCD/Use2.htm

8. Caius, J.F. 2003. In: The Medicinal and Poisonous Plants of India, Scientific Publishers, Jodhpur, India. Pp: 20-280.

9. Carilnayagam M., Ravin R. and Kandaswamy 1996. Plants used by Kattunayakkas for stupefying fishes. J.Econ.Taxon.Bot., Addl.Ser.12, 287-288.

10. Chopra, R.N., Badhwar, R.L. and Ghosh S. 1949. In: Poisonous Plants of India, Vol.-1, ICAR, New Delhi. Pp: 62-170.

11. Heda Nilesh Kamal kishor and Kulkarni KM 2009. Fish stupefying plants used by the Gondtribal of Mendha village of Central India. Indian Journal of Traditional Knowledge., 8(4), 531-534.

12. Islam M. 1996. Ethnobotanical studies of certain piscicidal plants of Assam and its neighboring areas. News and Biosphere, 1(1), 7-11.

13. Jain, S.K. 1991. In: Dictionary of Indian Folk Medicine and Ethnobotany, Deep Publications, New Delhi. Pp: 15-98.

14. Jain, S.K. 1999. In: Dictionary of Ethnoveterinary Plants of India, Deep Publications, New Delhi. Pp: 62-280.

15. Jain, S.K. and Rao, R.R. 1977. In: A handbook of field and Herbarium methods, Today & Tomorrow's Publishers, New Delhi. Pp: 10-140.

16. Jeba Sonia J, D. J. Joel Devadass Daniel, Dr. R. Sabin Begum, Pathan, A.K.N.K., Dr. Veera Talukdar, Solavande, V.D., 2023. AI Techniques for Efficient Healthcare Systems in ECG Wave Based Cardiac Disease Detection by High Performance Modelling. https://doi.org/10.5281/ZENODO.7562589

17. Joshi P. 1986. Fish stupefying plants employed by tribals of southern Rajasthan – A probe. Curr. Science. 55(14), 647-650.Katewa, S.S., Galav, P.K., Nag, A. and Jain, A. 2008. Poisonous plants of the Southern Aravalli Hills of Rajasthan. Indian Journal of Traditional Knowledge. 7(2): 269–272.

18. Kalita Bhagaban, Dutta Amalesh & Choudhury M, 2007. Herbal fish toxicant used by fishers of Karbi-Anglong district, Assam, Indian J Traditional Knowledge, 6 (2) 334-336.

19. Khairnar, A.S., Gomase, P.V., Khan, T.A., Khan, P.A., Patil, M.B., 2018. Begonia picta Sm.: A New Record to Nandurbar And. Bionature 38, 333–336.

20. Khan, P.A., Patil, M.B., 2016. Caterpillar of Trichoplusia sp (Lepidoptera) affects on *Azadiracta indica* or Vice-Versa: An Anomalous Behavior. International Journal of Science Info 1, 298–303. https://doi.org/10.5281/zenodo.7562399

21. Kumar Vivek and Sikarwar R.L.S. 2003. Plants used as fish poison by tribals of Surguja district of Chhattisgarh, India. Ethnobotany, 15, 87-89.

22. M. B. Patil, P. A. Khan, 2017. Ethnobotanical, phytochemical and Fourier Transform Infrared Spectrophotometer (FTIR) studies of *Catunaregam spinosa* (Thunb.) Tirven. Journal of Chemical and Pharmaceutical Sciences 10, 950–955. https://doi.org/10.5281/ZENODO.7562415

23. M. B. Patil, T. A. Khan, Khan, P.A., 2018. Ipomoea clarkei Hook.f. : A New Record to Nandurbar and Dhule District Flora of Maharashtra. Online International Interdisciplinary Research Journal 8, 42–49. https://doi.org/10.5281/ZENODO.7562577

24. Neuwinger, H.D. 2004. Plants used for poison fishing in tropical Africa. Toxicon. 44(4): 417–430.

25. P. A. Khan, 2014. Tissue culture studies in Hemidesmus indicus (L.) R. Br. https://doi.org/10.5281/ZENODO.7558911

26. Patil, M.B., Khan, P.A., 2016. Review: Techniques towards the Plant Phytochemical Study. IJSI 1, 157–172. https://doi.org/10.5281/zenodo.7559052

27. Patil, M.B., Khan, P.A., 2017. Ethnobotanical, phytochemical and Fourier Transform Infrared Spectrophotometer (FTIR) studies of Catunaregam spinosa (Thunb.) Tirven 10. https://doi.org/10.5281/zenodo.7562415

28. Pawar S., Patil M.V. and Patil D.A. 2004. Fish stupefying plants used by tribals of North Maharashtra. Ethnobotany, 16, 136-138.

29. Raizada M.B. and Verma S.B. 1937. Indian plants reported as fish poison. Indian Forester, 63,198.

30. Rajasekharan, P.E. and Shivanand, T.N., 2001 Blood Flower The Hindu Newspaper section: features 2-18-02.

31. Seigler, D.S., 2002 "Lecture Notes", Plant Biology 263, Plants and Their Uses.

32. Sharma S.K. 1997. Addition to the fish stupefying plants employed by tribals of southern Rajasthan. J. Econ. Taxon. Bot., 21(1), 249.

33. Sundriyal, M., Sundriyal, R.C., Sharma, E. and Purohit, A.N. 1998. Wild edibles and other useful plants from Sikkim Himalaya, India. Oecol Mont. 7: 43–54.

34. Tag, H., Das, A.K. and Kalita, P. 2005. Plants used by the Hill Miri tribe of Arunachal Pradesh in ethnofisheries. Indian Journal of Traditional Knowledge. 4 (1): 57–64.

35. Tanveer. A. Khan, M. B. Patil, Khan, P.A., 2020. *Henckelia Bifolia* (D. Don) A. Dietr. New Distributional Records for Maharashtra. Indian Forester 146, 461–462. https://doi.org/10.5281/ZENODO.7562565

36. Viswanathan, N. and Joshi, B.S.1983. Toxic constituents on some Indian Plants. Current Science. 52: 1-8.

37. Wagay, N.A., Rafiq, S., Khan, A., Kaloo, Z.A., Malik, A.R., Pulate, P.V. 2023. Impact of Phenolics on Drought Stress and Expression of Phenylpropanoid Pathway Genes. In: Lone, R., Khan, S., Mohammed Al-Sadi, A. (eds) Plant Phenolics in Abiotic Stress Management. Springer, Singapore. https://doi.org/10.1007/978-981-19-6426-8_13

38. Yumnam, J.Y. and Tripathi, O.P. 2013. Ethnobotany: plants use in fishing and hunting by Adi tribe of Arunachal Pradesh. Indian Journal of Traditional Knowledge. 12 (1): 157–161.