Promoting indigenous knowledge of *Stixis suaveolens* (Roxb.) Baill.: A neglected underutilized wild edible and medicinal plant for enhancing food and health security among the Ao tribe of Mokokchung district, Nagaland, India

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Research

Abstract

Background: Neglected and underutilized species (NUS) are valuable plant resources that have immense potential for improving food and health security. *Stixis suaveolens* (Roxb.) Baill. is an endemic plant species belonging to the family Resedaceae and a climbing shrub that has great ethnobotanical significance among the Ao tribe of Nagaland. However, its ethnobotanical importance has not been quantitatively evaluated.

Methods: This study investigates the traditional knowledge system and its use pattern through Relative Frequency of Citation (RFC) and Plant Parts Value (PPV).

Results: The species showed a high RFC value (0.77), demonstrating the importance and recognition of the species among the informants. PPV analysis showed that fruits have the highest usage value (0.46) compared to other parts like flowers (0.23), roots (0.15), and leaves (0.15). The results demonstrate a clear utilization pattern, with fruits serving as the primary edible component, while other plant parts are mainly associated with therapeutic uses.

Conclusions: The findings highlight *S. suaveolens* as promising NUS, emphasizing the need for its conservation, sustainable use, promotion, and further scientific validation.

Keywords: Ao tribe, *Stixis suaveolens,* neglected and underutilized species, Nagaland.

Background

Wild edible plants (WEP) are an integral part of the food system and contributed immensely to food security and health care among indigenous populations. However, in recent years, increasing attention has been directed toward neglected and underutilized species (NUS) because of their potential to support sustainable food systems and enhance resilience in rural

and marginal environments. The Northeastern region of India particularly Nagaland, is home to diverse indigenous communities, among which the Ao tribe of Mokokchung district possesses rich traditional knowledge of plant resources. This traditional knowledge is intrinsic to their culture, food, and traditional medicine (Pegu *et al*. 2024; Bawri *et al*. 2024). Nevertheless, traditional knowledge associated with these plants is mainly transmitted orally and is increasingly at risk of erosion due to socio-cultural changes driven by globalization. The erosion of traditional knowledge associated with these plants poses a serious threat not only to cultural heritage but also to the conservation of valuable plant resources (Pegu *et al*. 2026). *S. suaveolens* (Roxb.) Baill., locally known as "Anjongmesila" among the Ao tribe, is a climber that grows abundantly in the forest fringes and partially shaded areas. Traditionally, it serves as a source of wild food and medicine in its various parts. Its fruits are consumed as food and are also used in the treatment of respiratory ailments. The root, flower and leaf parts are also known to be used for the treatment of bleeding conditions and rheumatic pains. However, there have been no quantitative studies carried out on its utilization among the Ao community of Nagaland. Therefore, this study focuses on the documentation of indigenous knowledge regarding *S. suaveolens* and its usage pattern through ethnobotanical analysis. This study represents one of the first quantitative assessments of the species in this region and provides a scientific basis for sustainable utilization, conservation, and potential integration into food and healthcare systems. Despite their narrow taxonomic focus, species-specific ethnobotanical studies provide important insights into indigenous knowledge systems and generate baseline information for the conservation, sustainable utilization, and scientific evaluation of culturally significant plant resources.

Materials and Methods

Study area

The study was conducted in the Mokokchung district of Nagaland, inhabited by the Ao ethnic community. It is situated in a latitude of 26°32'N and longitude of 94°51'E, spanning a total land area of about 1719 km² (Figure 1). The climate of the region is humid subtropical, receiving an annual rainfall of 2500 mm. The region supports tropical and subtropical forests, which contain numerous medicinal and edible plants.

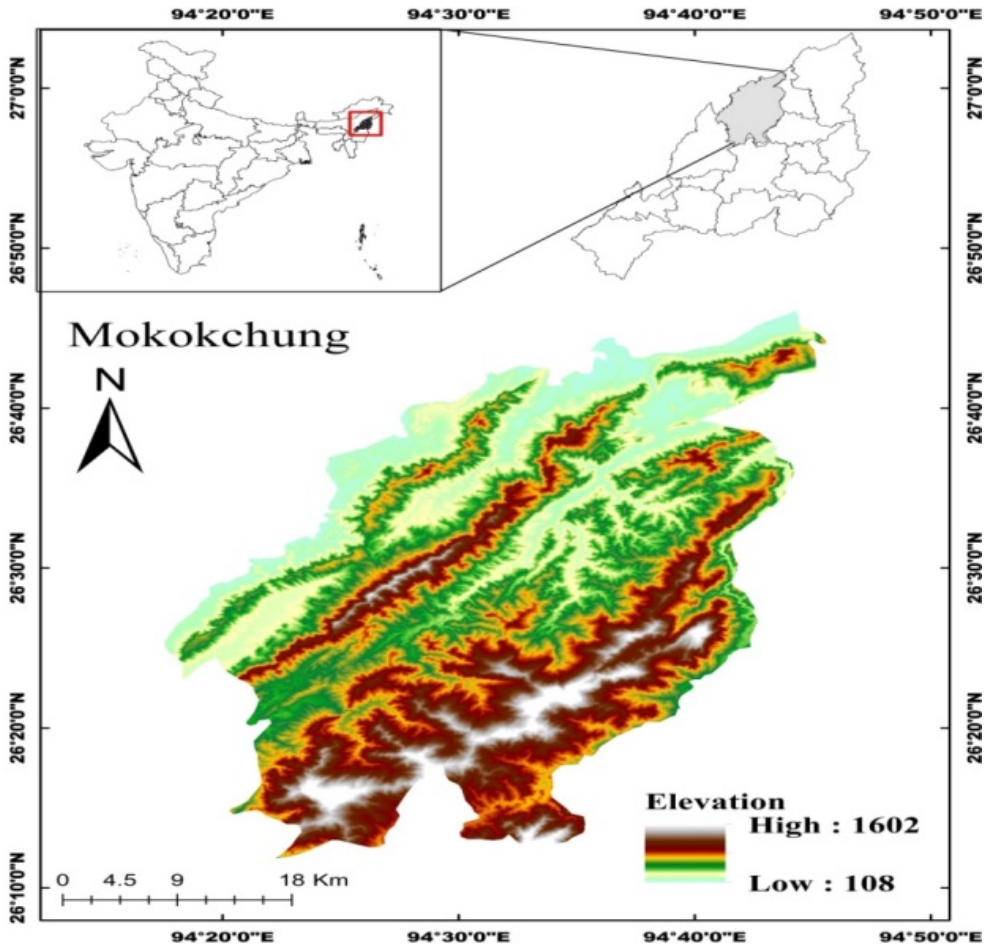

Figure 1. Study area of Mokokchung district, Nagaland.

Figure 2. Morphological features of *Stixis suaveolens* (Roxb.) Baill. showing plant habit, leaves and fruiting structures, collected from Mokokchung district, Nagaland, India.

Taxonomic identification of plant specimen

Plant specimen was identified with the help of regional flora (Deorani & Sharma 2007) and the name has been updated using World Flora Online (WFO 2023). Morphological characteristic such as leaves, stems, and fruits were recorded during field surveys and is shown in Figure 2. The herbarium specimen was prepared according to taxonomic procedure (Rao & Jain 1977) and submitted at the Department of Forestry, Nagaland University.

Data Analysis

Ethnobotanical analysis of the study was conducted using quantitative methods to evaluate the significance and utilization of the species. The analysis was based on the calculations of Relative Frequency of Citation (RFC) and Plant Part Value (PPV). The entire ethnobotanical data collected was analysed through Microsoft Excel.

Relative Frequency citation (RFC)

The Relative Frequency of Citation (RFC) was used to assess the cultural importance of the species. Higher RFC values indicate greater recognition and cultural importance of the species among the informants (Chaachouay *et al*. 2020). It was calculated using the following formula:

$$RFC=FC/N$$

Where: RFC = Relative Frequency of Citation (ranges from 0 to 1), FC = Number of informants mentioning the species, N = Total number of informants

Plant Part Value (PPV)

The Plant Part Value (PPV) was calculated to determine the relative importance of different plant parts used by the informants. Higher PPV values indicate more frequently utilized plant parts (Albuquerque *et al*. 2006). It was calculated using the following formula:

$$PPV=\text{Number of citations of a plant part} / \text{Total number of citations of all plant parts}$$

Results

Demographic characteristics of informants

During the study, a total of 26 informants from the Ao community of Mokokchung district were interviewed. The informants represented diverse age groups and genders, reflecting diverse traditional knowledge holders within the community. The majority of informants acquired their knowledge through familial transmission (80.76%), while a smaller proportion learned through self-interest (19.23%) (Table 1). Knowledge of traditional medicine was mainly held by the older people, where the highest number of respondents belonged to the age group above 70 years (38.46%), then the next most represented age group 61 to 70 years (34.61%) and 51 to 60 years (19.23%), while the last is 41 to 50 years (7.69%).

Table 1. Demographic data of informants

Variable	Categories	No. of persons	Percentage
Gender	Male	19	73.08%
	Female	7	26.92%
Age group	Below 40 years	0	0
	41-50 years	2	7.69%
	51-60 years	5	19.23%
	61-70 years	9	34.61%
	Above 70 years	10	38.46%
Education	No formal education	6	23.07%
	Primary education	12	46.15%
	Secondary education	5	19.23%
	Graduate	3	11.53%
	Postgraduate	0	0
Profession	Traditional healer	14	53.84%
	Farmer	7	26.92%
	Labor	5	19.23%
Source of knowledge	Family inheritance	21	80.76%
	Self interest	5	19.23%

Among the informants, 20 individuals reported the use of *S. suaveolens*, resulting in an RFC score of 0.77, indicating its widespread use among the community. The fruits of the plant were consumed as food but were also used in treating respiratory ailments. On the other hand, flower, roots and leaves were used for medicinal purposes, mainly for bleeding and arthritis problems, respectively. PPV analysis showed that fruits had the highest use value (0.46), followed by flowers (0.23), while roots and leaves had lower values (0.15 each). These results indicate that fruits are the predominant plant part utilized. The quantitative evidence generated in this study contributes to a better understanding of the utilization pattern of the species and provides a basis for its future evaluation as a neglected and underutilized species.

Discussion

The present study establishes *S. suaveolens* as an important neglected and underutilized species with significant ethnobotanical value among the Ao tribe of Nagaland. The high Relative Frequency of Citation indicates its widespread recognition and cultural importance, reflecting its reliability and frequent utilization in traditional practices. From the observed usage, it is clear that there is functional specialization in the plant parts, where the fruits are used as food, while the roots and leaves have therapeutic uses. The usage of different parts of the plants indicates specialization in function, where the fruits help in the provision of nutrition and medicinal value, while the roots and leaves are used for medicinal uses. These shows highly developed systems of indigenous knowledge and implies that the plant contains active bio-compounds. The prevalence of fruits based on the high PPV value (0.46) can be explained by their availability and their significance as a food source. As evidenced in ethnobotany literature, edible parts of plants are used more often because they are easy to access and play a significant role in nutrition (Giday *et al*. 2009). The low PPV values for roots and leaves imply that they are specifically used within health care rather than in everyday dieting. The fact that there is a noticeable decrease in ethno-medicinal knowledge in the younger generation can be seen as further indication of the gradual deterioration of the knowledge systems, which may have been caused by cultural changes as well as reliance on more contemporary health care systems (Joshi *et al*. 2016).

Promoting *S. suaveolens* through systematic documentation, awareness programs, and integration into local food systems could enhance its utilization and conservation. Additionally, community conservation measures, along with the use of such plants in development and nutritional initiatives, may play an important role in biodiversity conservation and sustainable resource management (Mabhaudhi *et al*. 2018). The ethnobotanical knowledge of the Ao tribe reflects a close human–nature relationship, highlighting the need for its preservation and promotion of such traditional practices for future generations.

Conclusion

This present study highlights *S. suaveolens* as an important neglected and underutilized plant with significant potential for enhancing food and healthcare systems among the Ao community. High RFC and PPV values indicate its cultural and practical significance. Promoting such species can contribute to sustainable resource utilization and conservation of indigenous knowledge. The study also provides baseline ethnobotanical information that may support future conservation and scientific evaluation of this culturally important species. Further phytochemical and pharmacological studies are recommended to validate its traditional uses.

Declarations

List of abbreviations: RFC – Relative Frequency of Citation, PPV – Plant Part Value, NUS – Neglected and Underutilized Species, WEP – Wild Edible Plants.

Ethics approval and consent to participate: The participants were informed about the purpose of the research. Verbal consent was taken before conducting the interview.

Consent for publication: Not applicable.

Availability of data and materials: Data will be made available from the corresponding author upon reasonable request.

Competing interests: The authors declare no competing interests.

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Author contributions: JP conducted the fieldwork and drafted the manuscript. GY conceived the study and supervised the research. JP and GY read and approved the final version of the manuscript.

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Literature cited

Albuquerque UP, Lucena RF, Monteiro JM, Florentino AT, Almeida CDFC. 2006. Evaluating two quantitative ethnobotanical techniques. Ethnobotany Research and Applications 4:51-60.

Bawri A, Pegu J, Baro D, Teron R. 2024. Diversity of medicinal plants traditionally used by Ao Naga tribe in the treatment of cancer in Mokokchung district of Nagaland, India. Journal of Economic & Taxonomic Botany 48(4).

Chaachouay N, Benkhnigue O, Khamar H, Zidane L. 2020. Ethnobotanical study of medicinal and aromatic plants used in the treatment of genito-urinary diseases in the Moroccan Rif. Journal of Materials and Environmental Sciences 11(1):15-29.

Deorani SC, Sharma GD. 2007. Medicinal plants of Nagaland. Dehradun.

Giday M, Asfaw Z, Woldu Z, Teklehaymanot T. 2009. Medicinal plant knowledge of the Bench ethnic group of Ethiopia: An ethnobotanical investigation. Journal of Ethnobiology and Ethnomedicine 5(1):34.

Joshi RK, Satyal P, Setzer WN. 2016. Himalayan aromatic medicinal plants: A review of their ethnopharmacology, volatile phytochemistry, and biological activities. Medicines 3(1):6.

Mabhaudhi T, Chibarabada TPG, Chimonyo VGP, Murugani VG, Pereira LM, Sobratee N, Modi AT. 2018. Mainstreaming underutilized indigenous and traditional crops into food systems: A South African perspective. Sustainability 11(1):172.

Pegu J, Bawri A, Disco Singh Y, Yam G, Lingu I. 2026. Phytochemical and bioactive profiling of a traditional herbal remedy (Kharmoli) for gastrointestinal disorders in Northeast India. National Academy Science Letters 1-11.

Pegu J, Bawri A, Yam G, Talom D, Rochill I, Imlikumba, Teron R. 2024. Traditional remedies for diabetes used by the Ao (Naga) tribe in Mokokchung district, Nagaland, India. Plant Science Today 11(1):381-387.

Rao RR, Jain SK. 1977. A handbook of field and herbarium methods. Today & Tomorrow's Printers and Publishers.

WFO. 2023. World Flora Online. Available from: http://www.worldfloraonline.org (Accessed 22/02/2026).