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DIVERSITY OF WILD EDIBLE PLANTS TRADITIONALLY USED BY THE LOCAL INHABITANTS OF SOUTH INDIAN STATE OF TAMIL NADU

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ABSTRACT

Indigenous communities in different parts of the world use wild edibles plants as supplementary food to increase dietary diversity. In South India, wild edible plants have been in use since time immemorial and they were the important source as a food supplement. Therefore, it is necessary to document indigenous knowledge of the local populace regarding the wealth of wild edible plants, ensuring their long lasting existence. Thus, the present study was carried out among the inhabitants of the Keeriparai village of Kanniyakumari district, Tamil Nadu, south India, in order to make an inventory of the utilization of wild edible plants as dietary supplements. A total of 60 plant species belonging to 33 families were recorded. Enumeration of a list of species, plant part used, method of consumption and the harvesting time is presented. Euphorbiaceae with 6 species is the most utilized family followed by Apocynaceae (5 species), Fabaceae and Solanaceae (4 species each), Amaranthaceae and Annonaceae with at least three species in each. Trees with 23 species were found to be the most dominant growth form followed by herbs with 17 species. Based on parts used fruits with 37 species were recorded to be the most used plant parts followed by aerial parts.

Key words: Ethnobotany; Tamil Nadu; Wild edible plants

Introduction

Global food security and economic growth now depends on a declining number of plant species. In human history, 40- 100,000 plant species have been regularly used for food, fibers, shelter, industrial, cultural and medicinal purposes (Magbagbeola et al., 2010). However, only a small number of plants are widely used. The remaining plant diversity is underutilized (Jaenicke and Hoschele-Zeledon, 2006). Underutilized plants contribute immensely to family food security and serve as means of survival during times of drought, famine, shocks and risks (Assefa and Abebe, 2011). They can also supplement nutritional requirements due to their better nutritional value (van Andel, 2006; Hunde et al., 2011). With alarming increase in human population and

depletion of natural resources, it has been felt necessary to explore the possibility of use of new plant resources having potential for food, fodder, energy and industrial uses. Many neglected and underutilized species are nutritionally rich and adapted to low input agriculture. The erosion of these species can have immediate consequences on the nutritional status and food security of the poor (Dansi et al., 2012).

The use of wild plant resources has been an integral part of cultural, religious and health aspect of numerous indigenous and rural communities across the globe (Sawian et al., 2007; Jeeva, 2009; Gajurel and Doni, 2020). Out of about 422000 recorded plant taxa globally, nearly 20000 species are reported to be wild edible and more than 85% of world population depends on less than 20 plant taxa for their daily caloric need (Rashid et al., 2015). In Indian subcontinent alone, about 9500 wild plant are utilized for food, medicine and other purposes of by indigenous communities (Jain and Tiwari, 2012). Today the knowledge regarding these wild edibles and their use remains restrained to elderly people of the community. Perusal of literature reveals that several studies have been carried out on wild edible plants across the Tamil Nadu state (Ramachandran, 2007; Arinathan et al., 2007; Rasingam, 2012; Ramachandran and Udhayavani, 2015; Sarvalingam et al., 2015), but in particular, none of the workers have investigated the diversity and use of wild edible plants of Kanniyakumari district, Tamil Nadu. Assuming the importance, the present study was undertaken with the aim of documenting the indigenous knowledge on wild edible plants among the rural inhabitants of Keeriparai and its environs of Kanniyakumari district, Tamil Nadu, India.

Materials and Methods

Study area

The present study was conducted at Keeriparai and its vicinity of Kanyakumari district ($77^0$15'E, $8^0$29'N) (Figure 1). Keeriparai is a small Village/hamlet in Thovalai Block in Kanniyakumari District of Tamil Nadu State, India. It comes under Thadikkarankonam Panchayath. It is located 29 KM towards North from District head quarters Nagercoil. The climate of the area is favorable warm and humid. The summer starts from March to May followed by southwest monsoon from June to September. The mean annual rainfall was 167.64 mm and varied from 70 mm (minimum during February) to 442 mm (maximum - October). The mean monthly temperature varied from a maximum of 32.6^0C in the month of May to a minimum of 22.5^0C in December. Rice (*Oryza sativa*) is the staple food of the rich and poor, alike in the area. Agriculture is the main occupation of the people of the area, and some of them are involved in rubber tapping. They follow the age-old culture and tradition to utilize the wild resources for food and medicinal requirements. Besides, the wild edible plants also play a vital role in revenue generation as they are being sold regularly in local markets.

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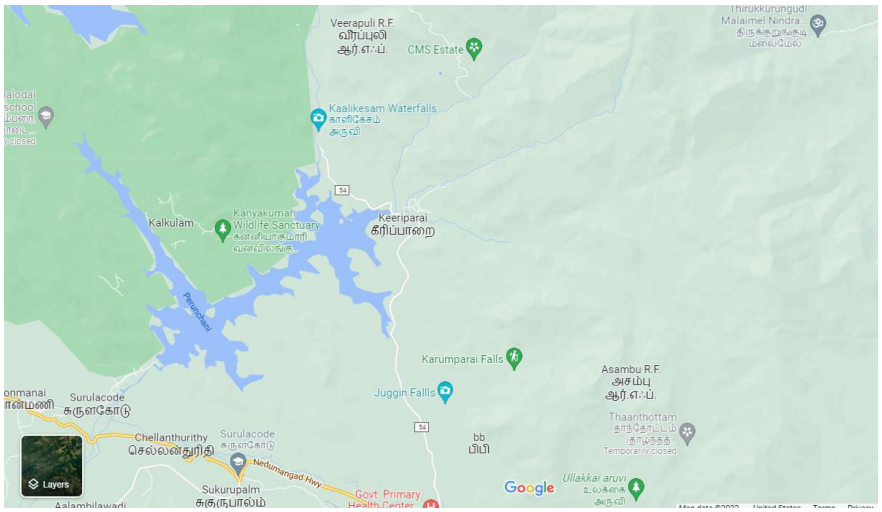

Figure 1. Map of the study area.

Field study

For ethnobotanical data collection, various surveys were conducted from 2020 to 2021 (mostly from April to February) in the study area. During this period, the diet of the people was examined in detail. The information on wild edible plants was collected through semi-structured and open-ended interviews with 70 inhabitants-men (42.85%) and women (57.14%). including teachers, students, shopkeepers, workers, seasonal nomads, and housewives. According to the respondent necessity and response, interviews were conducted into the local common language (Tamil). Most of the people interviewed were 40 years old. We were accompanied by locals during the survey who toured various habitats of plants and obtained data were noted down in the field notebook. All collected wild edible plants (in alphabetical order) and concerning data like scientific names, families, voucher numbers, local names, English names, local names in Tamil, used part(s), mode of consumption, life form, season and use value is summarized in Table 1.

Plant collection and identification

For identification, each mature plant (during flowering and fruiting stages) was collected in the months of mid-April to mid- February from 2020 to 2021. In the second phase collected wild edible plants were pressed, dried, poisoned, and mounted on standard herbarium sheets. Plant specimens were identified by Dr. T.S. Shynin Brintha at the Department of Botany, Scott Christian College (Autonomous), Nagercoil, Tamil Nadu, India using the ‘’Flora of the Presidency of Madras” (Gamble, 1957) and were confirmed by matching with Herbarium specimens. Finally, each species name was conformed from “The Plant List Database’’. If a species was recognized in database, it was classified as taxonomically valid (i.e., "accepted"). Based on the information presented above, the status of synonyms was determined, and verified synonyms were eliminated. After identification and assigning voucher numbers of plants,

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specimens were deposited at the Herbarium of Scott Christian College, Nagercoil, Tamil Nadu, India.

Results

In the present study, a total of 60 wild food plants belonging to 50 genera and 33 families (31 Angiosperm families; Pteridophytes and Gymnosperms were monospecific) were reported (Table 1). The family Euphorbiaceae (6 species) contributed the highest number of species followed by Apocynaceae (5), Fabaceae and Solanaceae (4 species each), Amaranthaceae and Annonaceae (3 species each), Arecaceae, Convolvulaceae, Moraceae, Myrtaceae, Passifloraceae, Rhamnaceae and Sapindaceae (2 species each) remaining 9 families such as Apiaceae, Asparagaceae, Cactaceae, Caesalpiniaceae, Cornaceae, Cucurbitaceae, Cycadaceae, Erythroxylaceae, Lythraceae, Marsileaceae, Nelumbonaceae, Nyctaginaceae, Primulaceae, Rubiaceae, Rutaceae, Salicaceae, Talinaceae, Verbenaceae and Vitaceae shared with one species each (Table 2; Figure 2).

Habit-wise distribution of wild edible plants shows that 38% of the species found were trees (23 species), followed by herbs (28%; 17 species), climbers (22%; 13 species) and shrubs (12%; 7 species) (Figure 3). All reported edible plants are used by locals as a fresh in season or some of them were preserved in a dried form to overcome food crises throughout the year. The fruits of most plants (37 species) were used in food followed by aerial parts (15 species), stem (3 species), tubers (3 species) and roots (1 species) (Figure 4). Wild plants were used in three stages viz., young parts, and mature parts, mature and young. Most vegetables (except herbal tea plants, condiments, and fruits) were used young stages because most leafy vegetables become hard at the maturity stage and even lose their nutritional value as well.

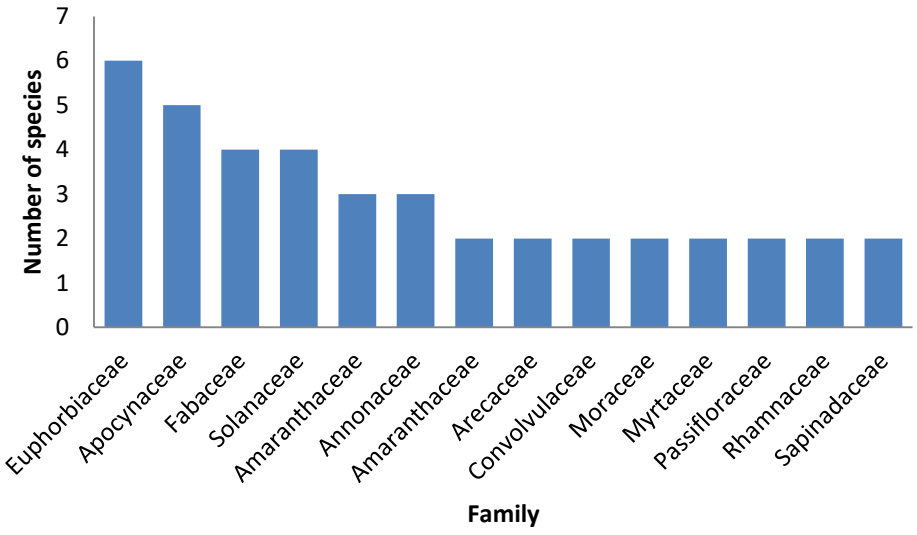

Figure 2. Dominant families of wild edible plant species

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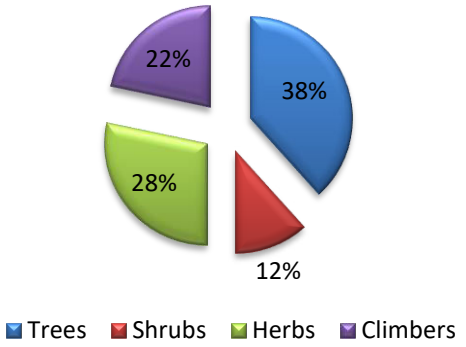

Figure 3. Percentage of different growth forms/habit of recorded wild edible plants species.

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Table 1. Preference of wild edible plants by the local people of Keeriparai and its environs

Sl. No	Botanical Name	Family	Common Name	Local Name	Habit	Part Harvested	Purpose of Harvest	Season of Harvest
1	*Aegle marmelos* (L.) Corr	Rutaceae	Wood Apple	Vilvam	Tree	Fruit	Household	March to June
2	*Amaranthus viridis* L.	Amaranthaceae	Pigweed	Kuppaikeerai	Herb	Leaves	Household & Economic	Throughout the year
3	*Annona squamosa* L.	Annonaceae	Custard apple	Munthiri	Tree	Fruit	Household & Economic	August-November
4	*Annona reticulata* L.	Annonaceae	Netted custard apple	Ramachita	Tree	Fruit	Household	September-January
5	*Annona muricata* L.	Annonaceae	Prickly custard apple	Mullu-sitha-pazham	Tree	Fruit	Household & Economic	April-October
6	*Artocarpus heterophyllus* Lam.	Moraceae	Jack Fruit	Palapalam	Tree	Fruit	Household & Economic	June-August
7	*Artocarpus hirsutus* Lam.	Moraceae	Wild jack	Aaeni	Tree	Fruit	Household & Economic	December-March
8	*Borassus flabellifer* L.	Arecaceae	Palmyra palm	Panampazham	Tree	Fruit	Household	March-September
9	*Mangifera indica* L.	Anacardiaceae	Mango	Mampazham	Tree	Fruit	Household & Economic	January-May
10	*Phyllanthus emblica* L.	Euphorbiaceae	Indian Gooseberry	Kattu Nelli	Tree	Fruit	Household & Economic	June-September
11	*Physalis minima* L.	Solanaceae	Little Gooseberry	Sodakku thakkaali	Herb	Fruit	Household	Throughout the year
12	*Psidium guajava* L.	Myrtaceae	Common guava	Koyya	Tree	Fruit	Household & Economic	Throughout the year
13	*Syzygium cumini* (L.) Skeels	Myrtaceae	Indian	Naaval	Tree	Fruit	Household &	June-July

14	*Solanum torvum* Sw.	Solanaceae	Blackberry Prickly Nightshade	Sundakkai	Herb	Fruit	Economic Household & Economic	July-March
15	*Solanum americanum* Mill.	Solanaceae	American Nightshade	Manathakkali	Herb	Leaves	Household & Economic	March-November
16	*Tamarindus indica* L.	Caesalpiniaceae	Tamarind	Puli	Tree	Fruit	Household & Economic	October-December
17	*Phyllanthus acidus* (L.) Skeels	Euphorbiaceae	Malay Gooseberry	Cheema Nelli	Tree	Fruit	Household & Economic	June-August
18	*Carissa spinarum* L.	Apocynaceae	Conkerberry	Sirukila	Shrub	Fruit	Household & Economic	February-April
19	*Ziziphus jujuba* Mill.	Rhamnaceae	Jujube	Elanthai	Tree	Fruit	Household & Economic	April to May
20	*Ziziphus oenopolia* (L.) Mill.	Rhamnaceae	Jackal Jujube	Elanthai	Shrub	Fruit	Household	July-November
21	*Coccinia grandis* (L.) Voigt	Cucurbitaceae	Ivy gourd	Kovakkai	Climber	Fruit	Household & Economic	December-April
22	*Hemidesmus indicus* (L.) R. Br. ex Schult.	Apocynaceae	Indian Sarsaparilla	Nannari	Climber	Root	Household & Economic	November-February
23	*Cissus quadrangularis* L.	Vitaceae	Edible vine	Pirandai	Climber	Stem	Household	June-January
24	*Alternanthera sessilis* (L.) R.Br. ex DC.	Amaranthaceae	Sessile joyweed	Ponnankannikeerai	Herb	Leaves	Household & Economic	Throughout the year
25	*Amaranthus viridis* L.	Amaranthaceae	Wild Amaranth	Kuppaikeerai	Herb	Leaves	Household & Economic	Throughout the year
26	*Cardiospermum halicacabum* L.	Sapinadaceae	Balloon vine	Mudakattan	Climber	Leaves	Household & Economic	June-November
27	*Opuntia dillenii* (Ker Gawl.) Haw.	Cactaceae	Indian fig	Kalli Pazham	Shrub	Fruit	Household	November-

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28	*Solanum trilobatum* L.	Solanaceae	Thai Nightshade	Thoothuvalai	Climber	Leaves	Household	February January-August
29	*Passiflora foetida* L.	Passifloraceae	Stinking Passion flower	Kurangu Pazham	Climber	Fruit	Household	October
30	*Cycas circinalis* L.	Cycadaceae	Sago-palm	Chalankai	Tree	Fruit	Household	December-February
31	*Pithecellobium dulce* (Roxb.) Benth.	Fabaceae	Madras thorn	Kodukka puli	Tree	Fruit	Household & Economic	June
32	*Anacardium occidentale* L.	Anacardiaceae	Cashew nut	Kola mavu	Tree	Fruit	Household & Economic	November-April
33	*Rivea hypocrateriformis* Choisy	Convolvulaceae	Common Night Glory	Musuttai Kodi	Climber	Leaves	Household	December-February
34	*Vigna trilobata* (L.) Verdc.	Fabaceae	Wild Gram	Kattupayar	Herb	Fruit	Household	July-December
35	*Clitoria ternatea* L.	Fabaceae	Butterfly Bean	Kakkattan	Climber	Flower	Household	Throughout the year
36	*Erythroxylum monogynum* Roxb.	Erythroxylaceae	Red cedar	Sembulichan	Shrub	Fruit	Household	Throughout the year
37	*Embelia ribes* Burm.f.	Primulaceae	Vidanga	Vayuvidangan	Climber	Fruit	Household	March-August
38	*Flacourtia indica* (Burm.f.) Merr.	Salicaceae	Madagascar plum	Katukalai	Tree	Fruit	Household	November-March
39	*Breynia retusa* (Dennst.) Alston	Euphorbiaceae	Cup Saucer Plant	Aattacherukola	Shrub	Fruit	Household	February-September
40	*Flueggea leucopyrus* Willd.	Euphorbiaceae	Spinous fluggea	Vellaipoola	Shrub	Fruit	Household	June-September
41	*Canavalia ensiformis* (L.) DC.	Fabaceae	Jack bean	Chattavarai	Climber	Fruit	Household	September

42	*Adenia hondala* (Gaertn.) W.J.de Wilde	Passifloraceae	Hondala	karimutukk	Climber	Leaves	Household	- October September to January
43	*Alangium salviifolium* (L.f.) Wangerin	Cornaceae	Sage leaved alangium	Azhinjil	Tree	Leaves	Household	March-May
44	*Marsilea quadrifolia* L.	Marsileaceae	Four Leaf Clover	aaraikkeerai	Herb	Leaves	Household	Throughout the year
45	*Phyllanthus indofischeri* Bennet	Euphorbiaceae	Indian Gooseberry	Nelli	Tree	Fruit	Household & Economic	October-January
46	*Asparagus racemosus* Willd.	Asparagaceae	Indian Asparagus	Sathavari	Climber	Tuber	Household & Economic	August-September
47	*Ceropegia spiralis* Wight	Apocynaceae	Spiral Ceropegia	Parai Pandam	Herb	Tuber	Household	August-December
48	*Caralluma umbellata* Haw.	Apocynaceae	Umbelled Caralluma	Kallimulaiyaam	Herb	Stem	Household	March-April
49	*Boerhavia diffusa* L.	Nyctaginaceae	Common Hogweed	Mookarattai	Herb	Leaves	Household	August-December
50	*Caralluma adscendens* (Roxb.) R.Br.	Apocynaceae	Antiobesity plant	Muyal kombu chedi	Herb	Stem	Household	March-April
51	*Ipomoea aquatica* Forssk.	Convolvulaceae	Water Morning Glory	Vallai-k-kirai	Climber	Leaves	Household	November-March
52	*Trapa natans* var. b*ispinosa* (Roxb.) Makino	Lythraceae	Water chestnut	Karimbolam	Herb	Leaves	Household	September-May
53	*Nelumbo nucifera* Gaertn.	Nelumbonaceae	Lotus	Tamarai	Herb	Tuber	Household	July-December
54	*Canthium coromandelicum* (Burm.f.) Alston	Rubiaceae	Wild jessamine	Karay Chedi	Shrub	Fruit	Household	April-June
55	*Lantana camara* L.	Verbenaceae	Lantana weed	Unni Chedi	Herb	Fruit	Household	Throughout

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56	*Phoenix sylvestris* (L.) Roxb.	Arecaceae	Silvester Palm	Inthupaanai	Tree	Fruit	Household	the year April-December
57	*Baccaurea courtallensis* (Wight) Müll.Arg.	Euphorbiaceae	Mootapalam	Mootilpazham	Tree	Fruit	Household & Economic	January-June
58	*Schleichera oleosa* (Lour.) Merr.	Sapindaceae	Ceylon Oak	Poovanam	Tree	Fruit	Household	March-June
59	*Talinum paniculatum* (Jacq.) Gaertn.	Talinaceae	Ceylon Spinach	Pasalai Keera	Herb	Leaves	Household	October-January
60	*Centella asiatica* (L.) Urb.	Apiaceae	Indian Pennywort	Vallarai	Herb	Leaves	Household	Throughout the year

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Table 2. Family-wise distribution of wild edible plants of the study area

Sl. No.	Family	Genus	Species
1	Euphorbiaceae	4	6
2	Apocynaceae	4	5
3	Fabaceae	4	4
4	Solanaceae	2	4
5	Amaranthaceae	2	3
6	Annonaceae	1	3
7	Amaranthaceae	2	2
8	Arecaceae	2	2
9	Convolvulaceae	2	2
10	Moraceae	1	2
11	Myrtaceae	2	2
12	Passifloraceae	2	2
13	Rhamnaceae	1	2
14	Sapinadaceae	2	2
15	Apiaceae	1	1
16	Asparagaceae	1	1
17	Cactaceae	1	1
18	Caesalpiniaceae	1	1
19	Cornaceae	1	1
20	Cucurbitaceae	1	1
21	Cycadaceae	1	1
22	Erythroxylaceae	1	1
23	Lythraceae	1	1
24	Marsileaceae	1	1
25	Nelumbonaceae	1	1
26	Nyctaginaceae	1	1
27	Primulaceae	1	1
28	Rubiaceae	1	1
29	Rutaceae	1	1
30	Salicaceae	1	1
31	Talinaceae	1	1
32	Verbenaceae	1	1
33	Vitaceae	1	1

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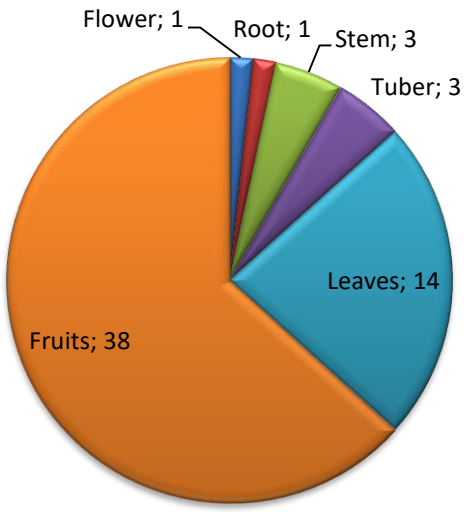

Figure 4. Percentage of parts used.

In the study area, the availability of wild edible plants was 8 species in April, 15 species in May, 30 species in June, 30 species in July, 32 species in August, 18 species in September, 9 species in October, 6 species in November, and two species in December. Although most recorded species were available in other months, the period listed in Table 2 was regarded as the most favorable for collecting, consuming, and storing wild food plants (April to December). However, the availability of most plants for consumption and storage was optimum from June to August.

The majority of leafy vegetable and fruits are consumed in fresh form through seasonal preference and selection. Thus, it can be stated that the consumption of wild edible plants is a common livelihood option of the people of the study area to fulfill the food and nutritional requirements for all the age groups from the children to the elderly people. The high usage of wild edible plant indicates availability and ease of accessibility of various wild resources coupled with vast associated traditional knowledge on its utility. This indicates the huge gene pool diversity of wild edible plants in the region, which further provides scope for suitable agro-horticultural research interventions for improving economic and livelihood security of the people of the study area.

Discussion

From time immemorial the wild edible plants have been a source of 'hidden harvest' which had supplemented the community with food and income (Heywood, 1999; Grivetti and Ogle, 2000). Tamil Nadu historically has been an agricultural state of India cherishes rich ethnobotanical knowledge about medicinal and edible plants since ancient times. The plant wealth of the state is fully utilized by the local inhabitants as food and medicine. They consume the wild edible plants either eaten raw or cooked by boiling in water. In view of the

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food security of local populace, the present study was conducted, and provides detailed information on the diversity and use of wild edible plants used by the local community of Keeriparai village of Kanniyakumari district. The present study confirmed the uses of 60 plant species that are being used for various purposes in the form of wild edible. Fruits were the most utilized plant part (37 species) followed by aerial parts (15 species), stem (3 species), tubers (3 species) and roots. The majority of edible plants are consumed in fresh form through seasonal preference and selection. Thus, the present study reflects the vast traditional knowledge and preference and dependency of the people on wild edible plants to meet their sustenance. Dependency on wild plants for day to day activities and consumption of many wild plants for various dietary requirements by the indigenous people of Tamil Nadu state have already been highlighted in different studies (Ramachandran, 2007; Arinathan et al., 2007; Ramachandran and Udhayavani, 2015). The high usage of wild edible plants indicates availability and ease of accessibility of various wild resources coupled with vast associated traditional knowledge on its utility (Doni and Gajurel, 2020). The potential contribution of wild edible plants towards meeting the daily nutritional requirement of the rural population has also been highlighted previously (Lockett et al., 2000; Agrahar-Murugkar and Subbulakshmi, 2005). Rigorous empirical documentation of this knowledge is imperative as it may be lost forever (Sukumaran et al., 2021).

Conclusion

The present study indicates the huge gene pool diversity of wild edible plants of the area, which further provides scope for suitable agro-horticultural research interventions for improving economic and livelihood security of the local communities of the area. Moreover, integrating wild-plant-related knowledge in the school and university curriculum would familiarize the youths with these important wild species and their associated indigenous knowledge.

Authors' contributions

TSSB designed the objectives and plan of work. SJ carried out the field work, analysed the data and wrote the manuscript. TSSB helped in data analysis, interpretation of results and finalization of the manuscript.

Compliance with ethical standards

Conflict of interest: The authors declare that they have no conflict of interest.

Ethical issues: None.

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