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FRACTIOUS ROLE OF PESTCIDES AND HERBICIDES ON MEDICINAL HERBS DIVERSITY OF A TROPICAL SOUTH INDIAN VILLAGE

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ABSTRACT

Plants are now occupying important position in recent researches and modern life style also. The present research work conducted at different kinds of ecosystems of Vadamugam Vellode village of Erode District, Tamil Nadu. In the present study diversity of medicinal plants of six selected sites of V.Vellode was recorded. To know the impact of agricultural practices three natural ecosystems and three agricultural sites were selected. In the present study 36 species of medicinal plants of 21 families were recorded. Present study suggested that limited usage of herbicides and natural fertilizers can promote the growth medicinal plants.

INTRODUCTION

Plants are now occupying important position in allopathic medicine, herbal drugs of the modern world[1]. A study of WHO depicts that over 80%of the world's population directly depends on the natural diversity and its associated traditional system of medicine for their primary healthcare demands[2].

Based on the data of the species already described India is tenth among the plant rich countries of the world, fourth among the Asian countries. Moreover, India is also one among the 12 mega biodiversity centers of the world by having over 47,000 plants species. Its diversity is due to the presence of 16 different agro-climatic zone.

In India about 90 % of plant materials are collected from wild sources, many of the plants have become rare, threatened, endangered or vulnerable due to the destructive harvesting. The Ethno-botanical survey indicates that about 8,000 species of medicinal plants are used by many tribal communities for traditional medicine preparation. India is wealth of medicinal plants which are widely used by all section of peoples either directly as folk remedies or different indigenous system of medicine or indirectly in the pharmaceutical preparations of modern medicines[3]. The knowledge about indigenous medicinal plants has been accumulated in the course of many centuries based on different indigenous medicinal systems such as Ayurveda, Unani and Siddha and it is reported that traditional healers use 2500 herbal plant species and among them 100 species serve as regular sources of medicine[4].

Information about distribution of the medicinal plants and their relevance with other social practices play an important role in the scientific research, particularly when the literature and field work data have properly evaluated[5].

Traditional medicine still remains the main choice of a majority of people for treating various diseases and aliments. Management in various forms of diseases like hepatitis, diabetes, cardiovascular disorders, hepato-protective, antibacterial, antifungal and wound healing etc., are made[6].Approximately 166 companies import crude extract of medicinal and aromatic plants from India. Nearly 90 % of plant species are collected from wild habitat[7].

In this regard exploring the diversity of medicinal plants in different kinds of ecosystem is important. Therefore, in this present research work we select different kinds of ecosystems of Vadamugam Vellode village of Erode District, Tamil Nadu. In addition to the study on the diversity of the medicinal plants, on factors affecting the ethno-botanical diversity also focused.

MATERIALS AND METHOD

Study Area: Vadamugam Vellode is a village panchayat located in Erode District of Tamil Nadu. It is located at 15 km on the way to Chennimalai from Erode. Agriculture is the main profession of people of Vellode.

Fig. 1: Google Map of V.Vellode Lake

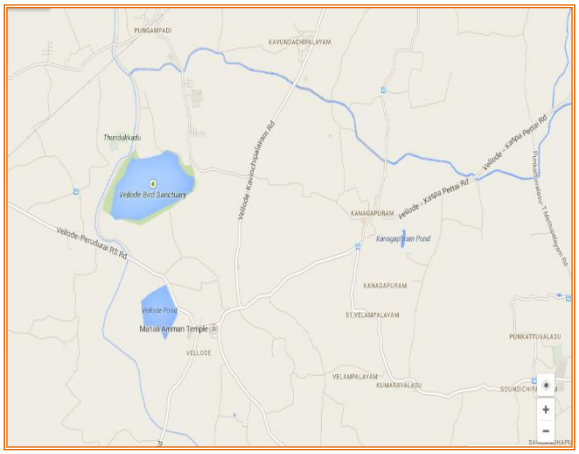

Fig. 2: Satellite Image of V.Vellode Lake

In the present study diversity of medicinal plants of six selected sites of V.Vellode was recorded. To know the impact of agricultural practices three natural ecosystems and three agricultural sites were selected.

Site 1:LBP canal bank, which run western side of the village and acted as a main lotic water body which brings water from Lower Bhavani dam, **Site 2:**V.Vellode lake, the lentic water body covers almost 96 hac. and holds water throughout the year, **Site 3:** T. Vellode lake, the lentic water body covers 34 hac. holds water for eight months only (these two lentic water bodies provide water for the agricultural practices for the V.Vellode), **Site 4:**paddy field with varieties like IR20, ADT36, Bhavani and Ponni, **Site 5:**turmeric field with varieties like samba, No.10 and No.8, **Site 6:**sugarcane fields with different varieties

Collection and Identification: All collected herbs and theirportions were properly preserved by pressing and drying method. All these herbs were identified by the assistance of Botanical Survey of India (Southern Zone), Coimbatore.

RESULTS

Present study includes the documentation of medicinal plants in selected sites (table 1) and survey on the chemical composition of pesticides and weedicides used by farmers of V.Vellode Village.

Enumeration of medicinal plant diversity:

In the present study 36 species of medicinal plants of 21 families were recorded. The recorded details about the medicinal herbs of selected sites were enumerated as follows.

Site 1: LBP Canal Bank

The site harbors medicinal plants of 4 Euphorphiaceae, 3 Amaranthaceae and Lamiaceae, 2 Acanthaceae, Solanaceae, Poaceae, Asteraceae and Fabaceae. Where, families including Cyperaceae, Papaveraceae, Molluncinaceae, Phyllanthaceae, Zygophyllaceae, Apocynaceae, Sapindaceae, Vitaceae, Cucubitaceae, Passifloraceae and Menispermaceae were counted only one species in this site.

Site 2: Vadamugam Vellode Lake

The lake supports medicinal herbs of Euphorbiaceae (4), Amaranthaceae (3), Acanthaceae (3), Asteraceae (3), Lamiaceae (3), Solanaceae (2), Poaceae (2) and Fabaceae (2). In this site families including Cyperaceae, Xanthorrhoceae, Papaveraceae, Nyctaginaceae, Mollunginaceae, Phyllanthaceae, Polygalaceae, Zygophyllaceae, Apocynaceae, Sapindaceae, Vitaceae, Cucurbitaceae, Passifloraceae and Menispermaceae represented by only one species.

Site 3: Thenmugam Vellode Lake

In this lake ecosystem, medicinal herbs of 4 Euphorpheaceae, 2 Amaranthaceae, 2 Poaceae, 2 Asteraceae were observed. Families including Fabaceae, Cyperaceae and Nyctaginaceae were recorded with only one species.

Site 4: Paddy Field

In the present study, at selected paddy field 4 species of Euphorbiaceae, 2 species of Amaranthaceae, Lamiaceae, Poaceae, and Asteraceae and 1 species of Solanaceae, Fabaceae, Cyperaceae and Phyllanthaceae were recorded.

Site 5: Turmeric Filed

In turmeric field medicinal herbs of families like Euphorpheaceae (4), Amaranthaceae (2), Lamiaceae (2), Poaceae (2), Asteraceae (2), Fabaceae (2) were observed. In addition, families including Solanaceae, Phyllanthaceae, Zygophyllaceae and Vitaceae were also counted with their only one representative species.

Site 6: Sugarcane Field

In this site 13 medicinal herbs including 4 Euphorbiaceae, 2 Amaranthaceae, 2 Poaceae, 2 Asteraceae and with only one species of families including Fabaceae, Solanaceae and Cyperaceae were also observed.

Chemical composition of pesiticides and weedicides:

Survey on the usage of weedicides with local farmers suggested that the following common components of them are carbofuron, endosulfan, malathion, carbaryl, cypermethrin, finfronil, cartap-hydrochloride, dimethoate, monochrotophos and lambda-cyhalothrin, etc.

DISCUSSION

Since time immemorial, conservation of natural resource has been an integral part of several indigenous communities. Nature worship has been a key force in determining human attitudes towards conservation and sustainable utilization of biodiversity. Various indigenous communities all over the world lived in harmony with nature and thus conserved biodiversity. Furthermore, habitat alteration, over-exploitation, pollution and introduction of exotic species also threatened the global biological resources. This lead to the fat depletion of biodiversity in different ecosystems and adversely affected the ecological balance and socioeconomic status of the people. These directly or indirectly contribute to the welfare and stability of the environment and society.

The results revealed that the natural fields have high level of diversified medicinal plants. However, the pressures from agricultural practices restrict the medicinal plants diversity of agricultural fields. The trenches of agri-fields generally harbor the wide varieties of medicinal plants. These areas also acted as alternative fields for most of the crop pests. The repeated usage of herbicides and pesticides are the prime factor for the restriction of medicinal plants in these sites. Especially, application of weedicides on trenches results high restriction on the diversity of the medicinal plants.

In combine application of high amount of artificial fertilizers, improper crop rotation, preference to hybrid species or non-native species and irregularities in monsoon were increases the pressures against medicinal plants diversity of the selected agricultural sites. In natural sites competition from exotic plant species, over grazing and improper boundary maintenance causes the serious pressure against the diversity of medicinal plants.

Present study suggested that limited usage of herbicides and natural fertilizers can promote the growth medicinal plants. However, availability of plenty of medicinal plants not alone essential. Therefore, awareness about usage of medicinal plants and their advantages among younger generation is the most required factor for the nature bound life of our human society.

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Table 1: Recording of medicinal plants diversity among the selected sites of Vellode

S. N.	Species Name	S1	S2	S3	S4	S5	S6
1	*Cynodon dactylon* (L.) Pers.	P	P	P	P	P	P
2	*Cyperus rotundas* (L.)	P	P	P	P	Ab	P
3	*Dactyloctenium aegyptium* (L.)	P	P	P	P	P	P
4	*Acalypha indica* (L.)	P	P	P	P	P	P
5	*Achyranthus aspera* (L.)	P	P	Ab	Ab	Ab	Ab
6	*Aloe barbadensis* (L.) Mill.	Ab	P	Ab	Ab	Ab	Ab
7	*Alternanthera sessilis* (L.) R. Br.	P	P	P	P	P	P
8	*Amaranthus viridis* (L.)	P	P	P	P	P	P
9	*Andrographis paniculata* (Burmf.)	P	P	Ab	Ab	Ab	Ab
10	*Argemone mexicana* (L.)	P	P	Ab	Ab	Ab	Ab
11	*Barleria prionitis* (L.)	P	P	Ab	Ab	Ab	Ab
12	*Boerhavia erecta* (L.)	Ab	P	P	Ab	Ab	Ab
13	*Datura metal* (L.)	P	P	Ab	Ab	P	P
14	*Elipta prostrata* (L.)	Ab	P	Ab	Ab	Ab	Ab
15	*Euphorbia heterophylla* (L.)	P	P	P	P	P	P
16	*Euphorbia hirta* (L.)	P	P	P	P	P	P
17	*Glinus lotoides* (L.)	P	P	Ab	Ab	Ab	Ab
18	*Justica adhatoda*	Ab	P	Ab	Ab	Ab	Ab
19	*Leucas aspera* (L.)	P	P	Ab	P	P	Ab
20	*Ocimum sanctum* (L.)	P	P	Ab	P	Ab	Ab
21	*Ocium americanum* (L.)	P	P	Ab	Ab	P	Ab
22	*Parthenium hysterophorus* (L.)	P	P	P	P	P	P
23	*Phyllanthus niruri* (L.)	P	P	P	P	P	P
24	*Phyllanthus reticulates* (L.)	P	P	Ab	P	P	Ab
25	*Polygala chinensis* (L.)	Ab	P	Ab	Ab	Ab	Ab

26	*Solanum nigram* (L.)	P	P	Ab	P	Ab	P
27	*Tephrosia purpurea* (L.) Pers.	P	P	Ab	Ab	P	Ab
28	*Tribulus terrestris* (L.)	P	P	Ab	Ab	P	Ab
29	*Tridax procumbans* (L.)	P	P	P	P	P	P
30	*Vinca rosea* (L.)	P	P	Ab	Ab	Ab	Ab
31	*Cardiospermum halicacabum* (L.)	P	P	Ab	Ab	P	Ab
32	*Ciccus qaudrangularis* (L.)	P	P	Ab	Ab	P	Ab
33	*Clitoria ternatea* (L.)	P	P	Ab	Ab	P	Ab
34	*Coccinia indica* (L.)	P	P	Ab	Ab	Ab	Ab
35	*Possiflora foetida* (L.)	P	P	Ab	Ab	Ab	Ab
36	*Tinospora cardifolia* (Thunb.)	P	P	Ab	Ab	Ab	Ab

Note: S1: LBP canal, S2: Vellode Lake, S3: Paddy fields, S4: Turmeric fields, S5: Sugarcane fields and S6: Short term crops (P - Present; Ab- Absent)

Table 2: Taxonomy of the medicinal plants of Vellode village (Contd.)

S. N.	Species Name	Common Name	Family
1	*Cynodon dactylon* (L.) Pers.	Dog's tooth grass	Poaceae
2	*Cyperus rotundas* (L.)	Purple nut sedge	Cyperaceae
3	*Dactyloctenium aegyptium* (L.)	Crow foot grass	Poaceae
4	*Acalypha indica* (L.)	Indian nettle	Euphorbiaceae
5	*Achyranthus aspera* (L.)	Devil's horse whip	Amaranthaceae
6	*Aloe barbadensis* (L.) Mill.	Indian Aloe	Xanthorrhoeaceae
7	*Alternanthera sessilis* (L.) R. Br.	Sessile joy weed	Amaranthaceae
8	*Amaranthus viridis* (L.)	Green amaranth	Amaranthaceae
9	*Andrographis paniculata* (Burmf.)	King of bitters	Acanthaceae
10	*Argemone mexicana* (L.)	Maxican poppy	Papaveraceae
11	*Barleria prionitis* (L.)	Porcupine flower	Acanthaceae
12	*Boerhavia erecta* (L.)	Hogweeds	Nyctaginaceae
13	*Datura metal* (L.)	Devill's trumpet	Solanaceae
14	*Elipta prostrata* (L.)	False daisy	Asteraceae
15	*Euphorbia heterophylla* (L.)	Painted Euphorbhia	Euphorbiaceae
16	*Euphorbia hirta* (L.)	Cat's hair	Euphorbiaceae
17	*Glinus lotoides* (L.)	Lotus sweet juice weed	Mollunginaceae
18	*Justica adhatoda*	Malabar nut	Acanthaceae
19	*Leucas aspera* (L.)	Leucas	Lamiaceae
20	*Ocimum sanctum* (L.)	Holy basil	Lamiaceae
21	*Ocium americanum* (L.)	Lime hairy	Lamiaceae
22	*Parthenium hysterophorus* (L.)	White top weed	Asteraceae
23	*Phyllanthus niruri* (L.)	Seed under leaf	Euphorbiaceae

24	*Phyllanthus reticulates* (L.)	Black honey shrub	Phyllantahceae
25	*Polygala chinensis* (L.)	Indian milk wort	Polygalaceae
26	*Solanum nigram* (L.)	Black night shade	Solanaceae
27	*Tephrosia purpurea* (L.) Pers.	Wild indigo	Fabaceae
28	*Tribulus terrestris* (L.)	Bull head	Zygophyllaceae
29	*Tridax procumbans* (L.)	Coat buttons	Asteraceae
30	*Vinca rosea* (L.)	Rosey periwinkle	Apocynaceae
31	*Cardiospermum halicacabum* (L.)	Ballon plant	Sapindaceae
32	*Ciccus qaudrangularis* (L.)	Devil's backbone	Vitaceae
33	*Clitoria ternatea* (L.)	Butterfly pea	Fabaceae
34	*Coccinia indica* (L.)	Baby water melon	Cucurbitaceae
35	*Possiflora foetida* (L.)	Wild water lemon	Passifloraceae
36	*Tinospora cardifolia* (Thunb.)	Guduchi	Menispermaceae

Photos of recorded medicinal plants among various sites of Vellode village