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A survey of some medicinally important plants of the Euphorbiaceae family used by the Santhal tribes of Santhal Pargana

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Plants belonging to Euphorbiaceae family are widely used in rural India since it has important secondary metabolites like flavonoids, phenols, triterpenes, polysterols, etc. The objective of the ethnomedicinal survey was to study the different plants of the Euphorbiaceae family that are used by the Santhal tribe of Santhal Pargana. In this study 10 plants were found to be effective against many human diseases. The different plants surveyed included *Jatropha gossypifolia*, *Euphorbia* species*, Phyllanthus* species, *Tragia involucarata* and *Ricinus communis*. These plants are being used for the treatment of various ailments like dental problems, eye infection, cough and cold, cancer, ulcers, wounds, jaundice, etc. *Ricinus communis* and *Jatropha gossypifolia* are used for treating rheumatism, *Phyllanthus nirurii* and *P. amarus* for diarrhea and jaundice. For treating skin infection and other related diseases *Euphorbia neriifolia*, *E. hirta* and *E. thymifolia* are used by the Santhals. *Euphorbia neriifolia* is even used for the treatment of their cattle. The various parts used are leaves, stem, flowers, bark, roots, seeds and latex. The medicinal plants used by them can form huge source of therapeutic compounds for different scientific purposes.

Keywords: Ethnomedicinal survey, Euphorbiaceae, Santhal Pargana, Tribe

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Family Euphorbiaceae is one of the largest families of flowering plants, composed of over 300 genera and 8000 species[1] and about 195 species are found in India[2]. The family is very diverse in range, composed of all sorts of plants ranging from large woody trees through climbing lianas to simple weeds that grow prostrate to the ground[3].The plant is distributed worldwide in varied environmental conditions ranging from dry desert to tropical rain forest. JD Hooker (Flora of British India, Vol 5, 1925) gave the first account of Euphorbiaceae family for the Indian subcontinent. He described 600 species for this region. This complexity in habitat has induced variability in its morphology and gene expression thus making Euphorbiaceae an interesting family. In order to adapt, it produces variety of medicinally important secondary metabolites. As a result ethnomedicinal application of Euphorbiaceae family is diverse. The Santhal's, 'folk medicine practitioners' (Guru) have been using these plants to treat various diseases since time immemorial (Fig. 1). These people live in close proximity with the forests and regard them as deities. The formulations of the medicinal plants may differ from one person to the other. The knowledge is always kept a secret and is passed on from one generation to the other orally and seldom written down (Fig. 2). The main objective of this survey was to study the different plants of the family Euphorbiaceae used by the tribe of the Santhal Pargana, Jharkhand, India and to highlight how

Fig. 1 — Guru (Rosa Soren) 2nd from right

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Fig. 2 — Elias Baskey grinding medicine

biological resources, found in nature is being utilized by the tribal population of Jharkhand. The different plants surveyed included *Jatropha gossypifolia* (Fig. 3), *Euphorbia* species (Fig. 4 & Fig 5), *Phyllanthus spp* (Fig. 6), *Tragia involucarata* (Fig. 7) and *Ricinus communis*.

Materials and Methods

The study area

The Santhal Pargana is one of the commissionaires of Jharkhand with its headquarters at Dumka and a geographical area of 14,206 sq. km. It lies between 23º 40'-25º 18' N latitude and 86º 28'-87º 57' longitude. It consists of six districts namely Dumka, Pakur, Deoghar, Godda, Jamtara and Sahibganj. It has a population of 5.56 million and shares 20.8% population of Jharkhand (Fig. 8). The division is a natural abode of 29.88% of tribal population that shares 23.6% of the total tribal population of Jharkhand. Agriculture is the main occupation of the region[4].

Data collection and sampling techniques

The survey was conducted by visiting the houses of the folk medicine practitioners, interviewing them and accompanying them to the natural habitat of the plants. The actual interviews were conducted using semi-structured questionnaire and the guided field walk method described by Martin[5] and Maundu[6]. The majority of the Gurus were reluctant to discuss and reveal citing business insecurity as the reason. Some of them revealed but did not disclose the exact formulation which they prescribe. The Gurus mostly used those plants which are easily available.

Fig. 3 — *Jatropha gossypiifolia* L.

Fig. 4 — *Euphorbia neriifolia* L.

Fig. 5 — *Euphorbia hirta* L.

Fig. 6 — *Phyllanthus amarus* L.

Fig. 7 — *Tragia involucrata*L.

Fig. 8 — Map of the study Area.

They never completely harvest the entire species from a particular habitat. Repeated inquiries on medicinal applications of the plant from different Gurus of the Santhal tribe were made to ascertain the correctness of the information. A particular plant was attributed to be medicinally important for a particular ailment when two or more Gurus suggested the same plant for the ailment. Information regarding appropriate season and time of collection were also obtained (Table 1). The collected plants were identified with the help of Haines Floras (1925)[7].

Results

The interview data collected from the Gurus were tabulated and analysed. It reveals that there are 10 species of Euphorbiaceae plants which are widely used by the Santhal people for treating various ailments. The study shows that *E. antiquorum*, *E. neriifolia*, *E. thymifolia*, *E. hirta*, *Emblica officinalis*, *P. amarus*, *R. communis*, *T. involucarata*, *J. gossypifolia* and *P. nirurii* of the Euphorbiaceae family are used by the Santhal tribe. The fruit, seed, stem, bark, latex and sometimes the whole plant is used for medicinal purpose (Table 1). *E. neriifolia* is being used to treat multiple ailments like Jaundice, whooping cough, skin infection and eye infecjion. For treatment of jaundice several plants such as *E. antiquorum*, *E. neriifolia*, *P. niruri* and *P. amarus* are being used *R. communis, J. gossypifolia*

Table 1 — Interview

S. No	Local Name	Scientific Name	Part Used	Disease	Time of collection	Season of collection
1	Etkec’	*Euphorbia antiquorum* L.	Leaf, Stem, Latex	Whooping Cough, Jaundice, Wounds	Morning(5a.m-8a.m) Morning	Winter, May, June All season
2	Etkec’	*Euphorbia neriifolia* L.	Leaf, Stem, Latex	whooping cough, jaundice, Skin infection, ulcers, eye Infection (cattle)	Morning	Winter, May, June All season
3	Sin Sengel	*Tragia involucarata* L.	Roots	Nervous disorder	Morning	All season
4	Pussy Towa	*Euphorbia hirta* L.	Latex	Conjunctivitis, Skin diseases	Morning	Winter and Rainy
5	Eradom	*Ricinus communis* L.	Fruits, seeds, Leaves	Eye infection, Rheumatism, Neonatal bathing	Any time	Winter, Jan-March All except summer
6	Bhernda	*Jatropha gossypifolia* L.	Fruits, seed, Stem	Rheumatism, Dental	Any time Morning	Nov- Feb All season
7	Amla	*Emblica officinalis* L.	Fruits, seed, Bark	Anti-venom, Allergies, Dysentery, Vision enhancer, hair fall	Any time	Winter
8	Tandi Meral	*Phyllanthus nirurii* L.	Whole plant	Diarrhea, dysentery, jaundice	Any time	(after harvest) (Sep-Oct)
9	Pussy Towa	*Euphorbia thymifolia* L.	Latex, Whole plant	Eye infection, Skin diseases	Morning	Winter, Jan-March
10	Tandi Meral	*Phyllanthus amarus* L.	Whole plant	Diarrhea, dysentery, Jaundice	Any time	After harvest, (Sep-Oct)

Table 2 — Examples of pesticidal features in some species of Euphorbiaceae and their active components.

	Pesticidal feature	Species	Chemical compound(s)
1	Anti-bacterial	*E. hirta*	Tannins, Alkaloids, Flavonoids[15]
2		*E. antiquorum*	Triterpenoids, Flavonoids[16]
3		*E. neriifolia*	Phenols,Flavonoids,Thiocyannate[17]
4		*P. nirurii*	Flavonoids, Lignans[18]
5		*P. amarus*	Alkaloids, Tannins , Saponins[19]
6		*R. communis*	Alkaloids, Flavonoids, Saponins[20]
7		*E. officinalis*	Flavonoids, Alkaloids,Saponins[21]
8		*J. gossypifolia*	Alkaloids, Aaponins, Tannins[22]
9		*E. antiquorum*	Triterpenod[16]
10		*E. neriifolia*	Flavonoids, Thiocyanate[17]
11		*E. Thymifolia*	Triterpenes and Alkaloids[23]
12	Anti-viral	*P. amarus*	Alkaloids and Flavonoids[24]
13		*P. niruri*	Flavonoids, Terpenes, Tannins[25]
14		*E. hirta*	Diterpenes and triterpenes[26]
15		*P. nirurii*	Terpenens and Flavonoids[27]
16	Anti-fungal	*J. gossipifolia*	Alkaloids, Saponins, Tannins[22]
17		*R. communis*	Fatty acids[28]
18		*P. amarus*	Flavonoids, Lignans[29]
19	Moluscicidal	*R. communis*	Steroids, Saponins[30]
20	Anti-malarial	*E. hirta*	Flavonol glycosides[31]
21	Insecticidal	*R. communis*	Flavonoids[31] Ricinine[28]

are prescribed for treating rheumatism (Table 1). The above mentioned plants have anti-bacterial, anti-fungal, anti-viral and insecticidal properties (Table 2).

Discussion

The results show that most of the plants of Euphorbiaceae are being used by the tribe against multiple diseases. Mostly roots and leaves are used in traditional medicines[8], however in case of Santhals the whole plant including seeds is also used. A number of plants reported by Santhals of Santhal Pargana region are also used by Santhals of other regions, but for different ailments. Plants like *Jatropha gossypifolia* in Santhal Pargana is used against rheumatism and dental problem while it is used in treating dysentery by Santhals of Bangladesh[9]. *Embilica officinalis* has been used as anti-venom[10]. *E. antiquorum* and *E. neriifolia* have been used as wound healing stimulant, against skin infection, filariasis[11], however it has been used against whooping cough also by Gurus of Santhal Pargana. *Tragia involucarata* roots are used for treating nervous disorders by Santhals and in a study it has been shown that *Tragia involucrata* L. possesses dose dependent antiepileptic activity[12].

Plants of Euphorbiaceae family are being used as phytomedicine for human as well as veterinary because of their pesticidal nature. Varied habitat condition influences the physiological processes hence there is accumulation of different chemical substances in response to a stimuli in different habitat conditions[13,14]. Majority of the plants belonging to Euphorbiaceae family contain terpenoids, flavonoids, alkaloids, saponins and tannins (Table 2) as their major secondary metabolites. The complex habitat with varying stress factors like high temperature, salinity, drought and genetic factors are responsible for synthesis of wide assemblage of secondary substances that are responsible for the family's medicinal nature[1]. The survey signifies that the Santhal Gurus really are the primary healthcare providers in the rural India and conservers of the naturally available vast resources. Due to the high costs, lack of efficacy of synthetic drugs and the side effects that may follow long-term use of these agents, there is a need to discover natural products with minimal side effects and lower cost which can be used as adjuvant treatment besides the conventional treatment modalities. These plant resources can be used as complementary alternative medicine (CAM) for the betterment of human health due to their fewer side effects. Emphasis should also be given on the *in situ* and *ex situ* conservation of these medicinal plants.

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