RESEARCH ARTICLE

Useful Weed Plants in Solah Singi Dhar of Himachal Pradesh, North-Western Himalaya, India

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Abstract

Weeds are unwanted wild plants that grow along with crops. These cause harm to the crops and other valuable plants. First hand information on the traditional use of about nineteen weed plants namely *Abutilon indicum, Aerva lanata, Ageratum conyzoides, Alternanthera sessilis, Amaranthus spinosus, Argemone mexicana, Calotropis gigantean, Cannabis sativa, Celosia argentea, Cynodon dactylon, Cyperus rotundus, Dhatura stramonium, Euphobia hirta, Lantana camara, Opuntia dillenii, Parthenium hysterophorous, Solanum nigrum, Sonchus arvensis, Trianthema portulacastrum* from Solah Singi Dhar of Himachal Pradesh was recorded by conducting extensive field surveys during February to September 2020. The information was collected through personal interviews of local inhabitants of different age groups, sex, and profession. The collected plant specimens were identified with the help of available regional floras. The information is represented in a tabulated form mentioning botanical names, local names, family, scientific names, brief description, habitat, useful and harmful effects of plants—the study documents valuable information about the use of weed plants in traditional remedies.

Keywords: Agroecomy, Survey, Weed plants.

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Introduction

Weeds are a potential threat to the agro-ecosystem in the study area as these compete for habitat, nutrients, sunlight, water, and space (Ali & Islam, 1982). The encroachment of crop fields by the weeds reduces the yield and quality of crops. The existence of weed is as old as agriculture (Ali & Sabir, 2004). Initially, farmers tried to eradicate them out of crop fields manually. This eradication method was the major traditional agricultural operation for good crop yield (Chambers, 1963). Weeds are mainly of three types i.e., annual, biennial and perennial. The annual weed completes its life cycle from seed to seed in less than 12 months, including winter and summer types (Chisaka, 1977; Dayan *et al*., 2000). On the other hand, biennial weeds complete their life cycle in two years, germination and forming rosettes in their first year and producing flowers and seeds in the second year (Macias *et al*., 2001). The perennial weeds are most difficult to control as these re-occur every year and normally produce long tap roots in addition to seeds (Altieri & Liebman, 1988). In India, the impact of weeds on ecosystem was first reported in 1810, but it emerged as a serious problem after 1955 (Malik *et al*., 1995). A total of 55 different weed plant species belonging to 45 genera and 21 families were recorded in cotton fields (Noda, 1977; Padhyay, 1965). In Kharif crop, 23 weed species were recorded in Hamirpur, 68 species in Chamba, 51 species in Kangra, 53 species in Kinnaur, 66 species in Kullu, 64 species in Mandi, 41 species in Sirmour, 51 species in Solan, 37 species in Una (Navagana & Rao, 2017; Rao & Nagamani, 2013). A total of 137 species of weeds were recorded in Kharif crops (Tejinder & Sumam, 2015). A lot of research on floristics, argo-economics, bio-diversity, ethnobotanical, ethnomedicinal and ethnoveterenarian practices has been undertaken by earlier reaserchers in Himachal Pradesh and around Solah Singi dhar region (Prasher & Chander, 2005; Kumar & Chander, 2017a; Kumar & Chander, 2017b; Chander, Choudhary & Sharma, 2017; Chander, Thakur & Sharma, 2017; Chander, Devi & Dogra, 2017; Chander & Kumar, 2018; Pathania & Chander, 2018; Chander, Kumari & Sharma, 2018; Thakur & Chander, 2018a; Thakur & Chander, 2018b; Pathania & Chander, 2018; Thakur & Chander, 2018c; Thakur & Chander, 2018d; Kumar & Chander, 2018a; Kumar & Chander, 2018b; Kumar & Chander, 2018c; Kumar & Chander, 2018d; Chander & Pathania, 2018; Kumar & Chander, 2019; Chander, Sapna, Deepika & Sanjna, 2019; Chander & Chandel, 2019; Sharma & Chander, 2020a; Thakur & Chander, 2020; Poonam & Chander, 2020; Sharma & Chander, 2020b; Kumar & Chander, 2020a; Kumar & Chander, 2020b; Kumar & Chander, 2020c; Kumar & Chander, 2020d; Chander, Sharma, Priyanka & Katoch, 2020; Chander & Kumar, 2020; Kumar & Chander, 2020e; Chander, Kumari, Devi, & Sunaina, 2020; Sharma, Chander & Walia, 2020; Kumar & Chander, 2020f; Chander, & Sharma, 2020; Kumar & Chander, 2021). The present study comprises a survey of weed plants of the Solah Singi dhar of Himachal Pradesh, North-Western Himalaya.

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Study Area

The Solah Singi dhar of Hamirpur district lies in the lower foot-hill region of Himachal Pradesh. It is famous for the child saint shrine "Shri Baba Balak Nath Deothsidh", in the southwest part of the state. The annuals rainfall is 2000 to 3800 mm. The average temperature varies from 2°C to 15°C.

The weed plants were collected and preserved in the form of herbarium. The poisoned specimen was mounted on the herbarium sheets (40×28 cm), using animal resins as the mounting medium to serve as an insecticide/fungicide. The entire mounted specimen was treated with naphthalene powder before preservation. All the specimen have been deposited in CPUH (The herbarium, Department of Biosciences, Career Point University Hamirpur).

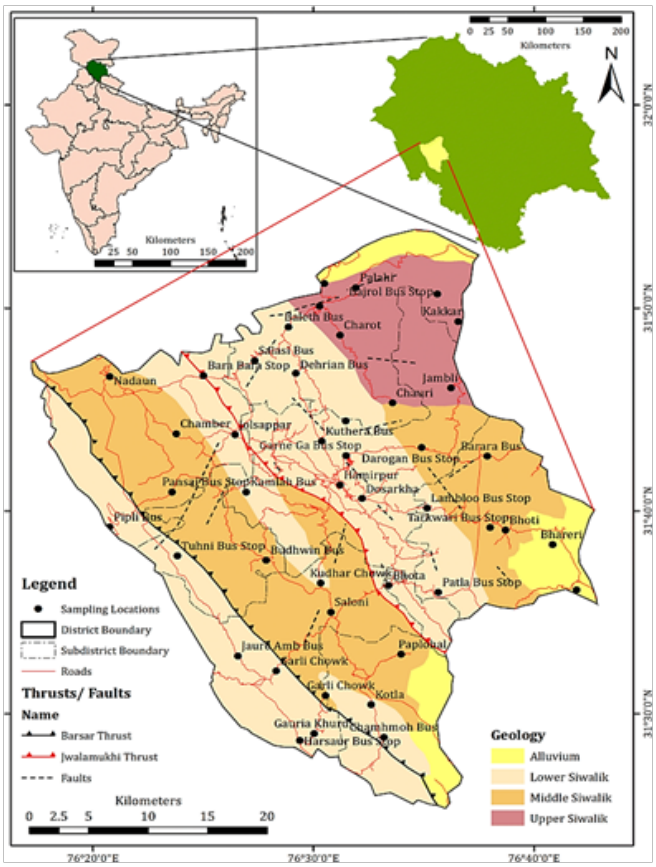

Fig. 1: Map of the study area (Source: www.mapsofindia.com)

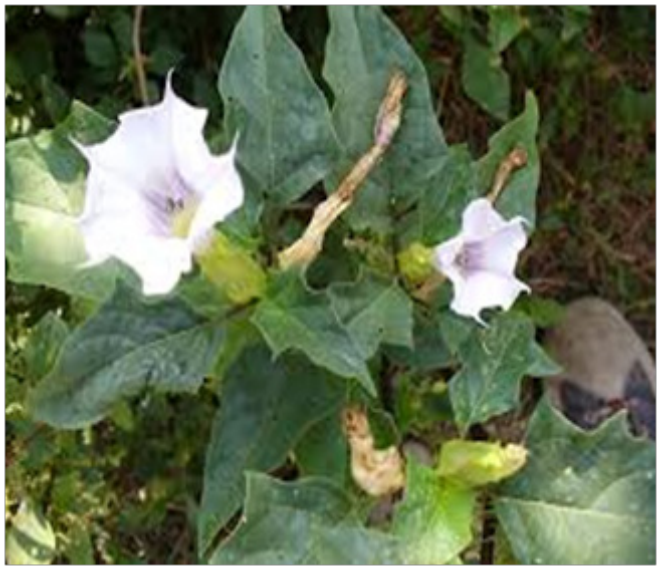

Fig. 2: Daturastramonium

Results

The information was collected from the local people through personal interviews of different age groups, basically from old age groups, different sex, and different professions. The collected plants were identified by consulting various regional floras. A total of nineteen weed plants were recorded from Solah Singi dhar of Himachal Pradesh (Table 1). The specimen was photographed in the field (Fig. 1-19).

Fig. 3: *Parthenium hysterophorous*

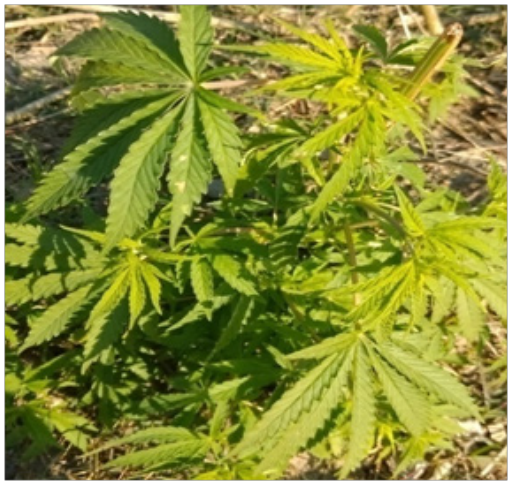

Fig. 4: *Cannabis sativa*

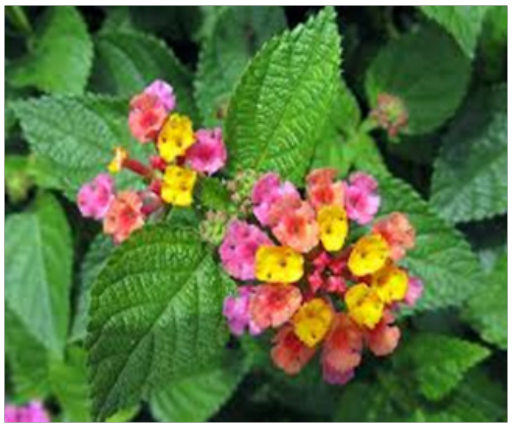

Fig. 5: *Lantana camera*

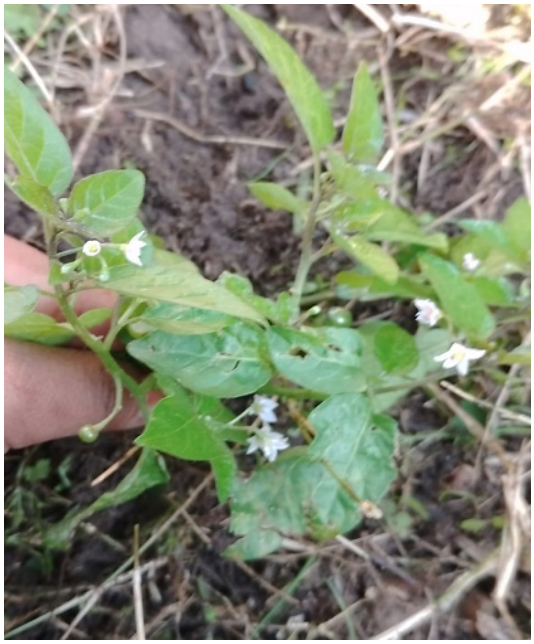

Fig. 6: *Solanum nigrum*

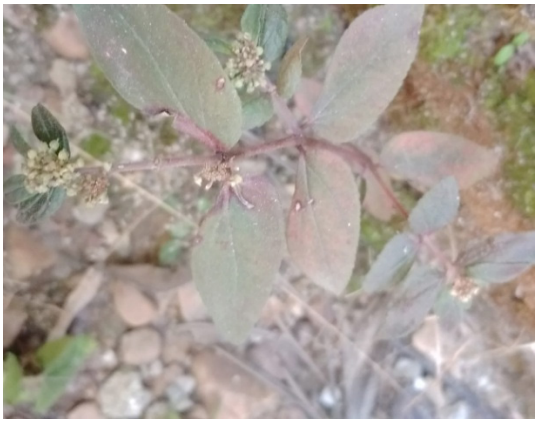

Fig. 7: *Euphorbia hirta*

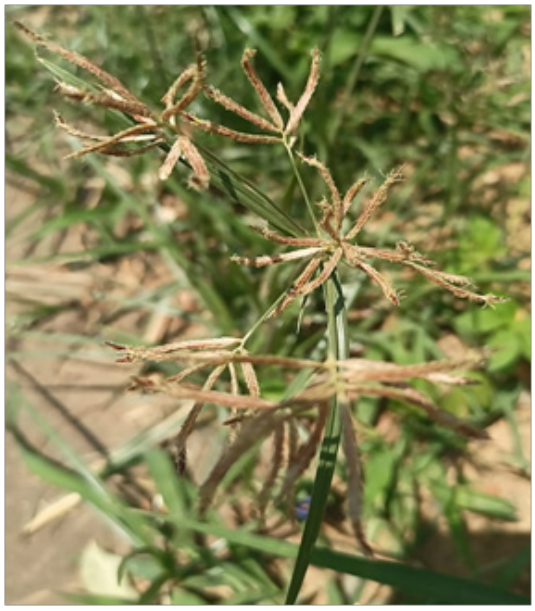

Fig. 8: *Cyperus rotundus*

Fig. 9: *Opuntia dillenii*

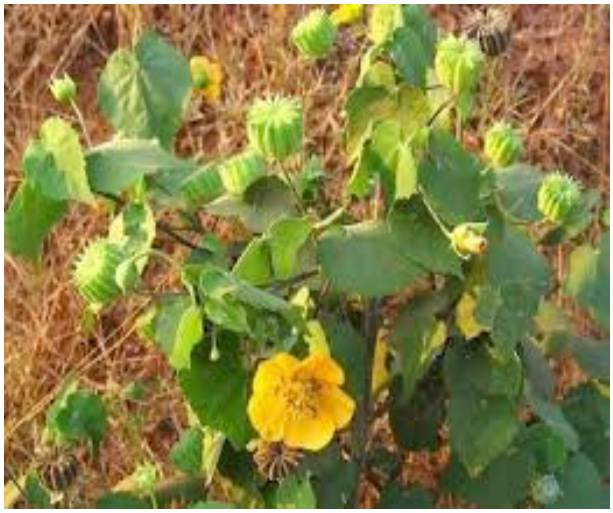

Fig. 10: *Abutilon indicum*

Fig.11: *Argemone mexicana*

Table 1: Brief description about collected plants with their contrasting effects

S. No.	*Botanical name/ Local name/ Family*	*Brief description*	*Distribution World/India/ Himachal Pradesh*	*Elevation*	*Useful effects*	*Harmful effects*
1.	*Dhatura stramonium* L./ Dhatura / Solanaceae	A foul-smelling, erect, annual herb, root is thick, fibrous, stem pale yellow. The flowers are erect, trumpet shaped and fruit is spiny capsule.	America, North Africa, India, North India, South India, Gujarat, Rajasthan, Madhya Pradesh, Bilaspur, Chamba, Hamirpur, Sirmaur	Up to 600 m	Powder of leaf and seed is used for the treatment of stomach and intestinal pain. Its fruit juice is applied to the scalp, to treat dandruff and other hair related problems.	Alkaloid content of the plant is poisonous and can cause various disorders such as dry mouth, eye pain, dizziness, nausea and vomiting and variation in heartbeat.
2	*Parthenium hysterophorous/* Gajarghas/ Asteraceae	It is a short lived, erect, herbaceous plant and bears numerous small white coloured flowers with tiny petals.	Mexico, Central America, Southern North America, West Indies, Central South America, North Western Himalaya, Himachal Pradesh	Up to 2200 m	Its leaf powder is used to treat fever, diarrhoea, neurologic disorder, urinary tract infections, dysentery, malaria.	Many chemicals like hymenin and ambrosin are found in the root that may cause various allergies like contact dermatitis, hay fever, asthma and bronchitis.
3	*Cannabis sativa* /Bhang/ Cannabinaceae	It is annual, dioecious, flowering herb. The leaves are palmately compound or digitate with serrate leaflets. Flowers are small, green, clustered. Fruits are small, dry, thin walled and contain only one seed.	Central Asia, Europe, China, North and Central Africa, Uttarakhand, Kashmir to Assam, Madhya Pradesh, Orissa, Rajasthan, Bihar, Tamil Nadu, Kerala, Malana, Kullu, Chamba, Shimla	Up to 3700 m	Hemp-seed oil is extyracted from the seeds which can be used for cookies or paints. Leaves are smoked and used as hallucinogenic, hypnotic, sedative and anti- inflammatory agent.	Smoking marijuana can damage the lungs, nad can cause anxiety and depression, vomiting, nausea, dehydration and increased heart rate.
4	*Lantana camara/* wild-sage/ Verbenaceae	Perennial shrub, flower tabular shaped, yellow, white, orange coloured, leaves ovate and with strong odour. Fruit is small, and fleshy purplish black berry.	Africa, Southern Europe, India, Tropical Asia, Australia, US as well as many Atlantic, Pacific and Indian ocean islands, Kangra, Bilaspur, Hamirpur, Solan, Chamba, Sirmaur and Mandi.	Up to 2000 m	Stems are used in furniture for making chair and tables. Leaf powder is used as antimicrobial, fungicidal and insecticidal.	It is known to be toxic to livestock such as cattle, sheep, dogs and goats. The active substance that cause toxicity in grazing animals include penta cyclic triterpenoids which result in damage to liver and photo-sensitiveness.
5	*Solanum nigrum/* Blackberry/ Black night shade / Solanaceae	Perennial shrub, erect, much branched, flower are white, short, small pedicellate. Leaves are juicy, ovate, dull dark green, berries are purple or dull black in colour.	America, Australia, South Africa, Brazil, Turkey, Nepal, Mexico, Tamil Nadu, Assam, Kerala, Maharashtra, Kullu, Chamba, Hamirpur, Shimla.	Up to 3500 m	Whole plant juice is used against asthma and whooping cough. Decoction of leaves is used to treat mouth ulcers. Boiled leaves and berries are used to alleviate liver ailments, including jaundice and disorder in gastric juices.	Unripe berries are toxic and can cause death after consumption. Consumption of ripe berries causes symptoms of mild abdominal pains, vomiting and diarrhoea.
6	*Euphobia hirta/* Dudhghas/ Euphorbiaceae	Annual herb, stem erect, woody tap root, leaves simple, opposite. Flowers small staminate, greenish, pistillate. Fruit capsule globose, dehiscent.	Tropical America, subtropical, southeast Asia, Australia, Bangalore, Madhya Pradesh, Shimla, Kullu, Hamirpur, Chamba	Up to 2000 m	Leaves are used for breathing disorder including asthma, bronchitis and chest congestion.	Tosuching the fresh herb can cause skin irritation or allergic reactions.
7	*Cyperus rotundus/* Nut grass/ Cyperaceae	Smooth, erect, perennial weed. Stem glabrose, long, thickened at the base. Leaves simple, parallel veins. Flowers bisexual, purple and yellow. Fruit achene, black, slightly beaked at tip.	Bhutan, Bangladesh, Myanmar, Pakistan, Srilanka, Indonesia, Tamil Nadu, Assam, Madhya Pradesh, Rajasthan, Punjab, Kangra, Hamirpur, Bharmaur, Bilaspur, Mandi, Sirmaur.	Up to 1500 m	Powder and decotion of roots is used to reduce the pain, redness, herb help in healing wounds and utrine contractions, ulcers. Root paste is used for treating skin related ailments like itching. Root powder is used to treat digestive system related disorders and purifies blood.	Consumtion of plant parts can cause constipation.

Table 1 continued.....

S. No.	Botanical name / Local name/ Family	Brief description	Distribution World/India/ Himachal Pradesh	Elevation	Useful effects	Harmful effects
8	*Opuntia dillenii*/ Indian Fig/ Prickly-pear/ Cactaceae	Evergreen perennial. Stems much branched, longer, hairless. Leaves small, slightly curved, cone-shaped. Flowers bright yellow, greenish or pink with numerous petals. Fruits are green turn reddish purple as they mature, fleshy, pear-shaped.	Australia, Mexico, Florida, Central America, South Africa, Andhra Pradesh, Gujrat, Kerala, Orissa, Punjab, Bilaspur, Hamirpur, Kullu, Lahaul, Mandi, Shimla, Solan, Una.	Up to 1500 m	The juice of edible parts is used to treat burns, diabetes, lipid disorders, inflammation, ulcers and chloestrol disorders. All the parts of the plant are high in fibre, antioxidants and carotenoids.	In some cases its consumption may cause mild diarrhea, nausea, increased stool volume, abdominal fullness, headache and bloating.
9	*Abutilon indicum* / Thuthi/ Kanghi/ Malvaceae	Erect, shrub, heart-shaped leaves, alternately arranged, pale hairs on them, orange-yellow flower, long stalk, fruit circular in shape, hairy carpel, seed blackish brown and kidney-shaped.	America, Africa, Asia, Australia, China, Japan, Tamil Nadu, Assam, Bihar, Nagaland, Punjab, Rajasthan, Hamirpur, Bilaspur, Chamba, Holly valley, Shimla, Mandi.	Up to 1600 m	Powder of roots is used in fiver and chest infections. Leaves are eaten to cure boils and ulcers. It is dalso used as digestive, laxative, astringent, anti-inflammatory.	Some chemicals present in this plant (Beta-sitosterol, hexoses and alkanols) can cause effects like dizziness, drowsiness, lowering blood pressure, hypotension or headache.
10	*Argemone mexicana* L./ Prickly poppy/ Papaveraceae	Annual herb. Stem branched, oblong. Leaves alternate, oblong elliptic, prickly. Flower terminal, golden yellow. Fruit oblong capsule, black, pitted.	Bangladesh, China, Nepal, Palistan, Mexico, America, Africa, Assam, Bihar, Gujrat, Uttar Pradesh, Madhya Pradesh, Hamirpur, Chamba, Shimla, Mandi, Una, Kangra, Sirmaur.	Up to 3000 m	Flowers, leaves and seeds are used in alcoholic and non-alcoholic drinks for psycho-active properties. Seed oil is used as purgative and as painkiller, diuretic, anti-inflammatory.	Seed oil may cause toxic effect like heart failure, erythema, poisoning, dehydration, increased dose cause diarrhoea, dysentery, loose motion, abdominal pain.
11	*Trianthema portulacastrum* /Pig weed/ Aizoaceae	Annual succulent. Leaves simple, opposite, stalked, glabrous. Flower bisexual, solitary, pinkish-white. Fruit capsule, white papillose.	Southeast Asia, Tropical America, Africa, Uttar Pradesh, Rajasthan, Madhya Pradesh, Delhi, Punjab, Haryana, Tamil Nadu, Hamirpur, kangra, Chamba, Bilaspur, Kullu, Mandi, Solan, Shimla.	Up to 3000 m	Decotion and powder of leaves and roots is used as analgesic, stomachic, laxative, treatment of blood disease, anemia, inflammation, night blindness, gonorrhoea, jaundice and asthma.	Plant contains alkaloid (trianthemine) and steroid (sterone). Seeds are harmful used as adulterant in food grains. Consumption of old leaves may cause diarrhea or paralysis.
12	*Aerva lanata* /Mountain knot grass/ Amaranthaceae	Perennial plant. Stem erect to prostrate, hairy. Leaves ovate, elliptic or ovate. Flowres alternate fsmall, whitish to green, sessile, bisexual. Fruit broadly ovoid, acute, silky-hairy.	Asia, Africa, Australia, US, Saudi Arabia, Kerala, Assam, Karnataka, Rajasthan, Tamil Nadu, Uttar Pradesh.	Up to 900 m	Decoction of roots is used in the treatment of headache, as anti-microbial, anti-diabetic, anti-parasitic. Decoction of leaves is used to treat kindey stone, lithiasis, cough, asthma, headache and as antidote for rat poisoning.	Plant contain alkaloid, amino acids, steroids whivh can cause headache, skin diseases, gall bladder stone, weight gain, diabetes, asthma, cough, fever.
13	*Celosia argentea*/ Garkha/ Amaranthaceae	Annual plant. Stem erect, much branched, ribbed. Leaves acute to obtuse, glabrous. Flowers dense, cylindrical, pink to white. Fruit capsule, globose. Seed black coloured.	Afganistan, Bangladesh, China, Hongkong, Bihar, Haryana, Uttar Pradesh, Kerala, Hamirpur, Bilaspur, Mandi, Kangra.	Up to 1600 m	Powder of lowers and seed is used as astringent, haemostatic, ophthalmic, treatment of bloody stool, uterine bleeding, dysentery, diarrhoea. Decoction of leaves used to treat infected sores, wounds. Decoction of roots is used to treat gonorrhoea.	The plant does not have any serious effect or marked toxicity.
14	*Amaranthus spinosus* / Kantachaulai / Amaranthaceae	Annual herb. Stem erect, branched, Ssmooth, cylindrical, often reddish. Leaves simple, alternate. Fruit capsule. Seed smooth, black, lens-shaped.	America, Europe, Asia, Kerala, Assam, Gujarat, Manipur, Hamirpur, Mandi, Shimla, Rodhu, Kangra.	Up to 820 m	Leaves contain calcium, iron, provide essential lysine and is a good source of protein. Powder and decoction is used to treat kidney problem. Decotion of stem is used as antidote for snake bites. Seed powder is used to treat stomach problems.	Leaves are toxic to cattle and can cause cardiac toxicity in human, body weight gain, sleep disorder, lowering of blood pressure.

Table 1 continued.....

S. No.	Botanical name / Local name/ Family	Brief description	Distribution World/India/ Himachal Pradesh	Elevation	Useful effects	Harmful effects
15	*Cynodon dactylon*/ Bermuda grass/ Poaceae	Perennial grass. Stem erect, flattened. Leaves are gray-green, ligule has ring of white hair. Flower occur in spikes. Deep root system.	Eastern Africa, North America, Mexico, Sri-Lanka, Australia, Maharastra, Punjab, Karnataka, Hamirpur, Bilaspur, Una, Kangra.	Up to 6000 feet	Decoction of leaves cure Diarrhoea, acidity, digestion, control sugar, boost immunity, vomiting, have anti-cancer property, high amount of chlorophyll help in regulating blood circulations.	Its overdose lead to problem like rash, skin burning, sensation, paraesthesia oral, high blood pressure, cold, urinary tract infection, headache, vomiting.
16	*Sonchus arvensis*/ Gutweed/ Asteraceae	Perennial herb. Stem erect, hollow, branched, hairless. Leaves alternate, sessile, lobed, oblong. Flower yellow colour, flat, bisexual. Fruit is smooth achene, oval, flattened, brown.	Europe, Asia, North Africa, Karnataka, Tamil Nadu, Kerala, Hamirpur, Dharmshala, Bilaspur, Mandi, Solan.	Up to 2000 m	Decoction of leaves is used as poultice, anti-inflammatory, antioxidant, antitumor, blood purifier activity. Tea prepared from root is used in treatment of asthma, cough, chest complaints.	Alkaloid content may cause liver diseases, stomach disorder, rashes, sores, asthma, cough, chest complaints.
17	*Alternanthera sessilis* / Garundi / Amaranthaceae	Perennial plant, much-branched. Stem cylindrical, longer, hollow. Leaves are simple, opposite, decussate. Flowers white in colour. Fruit utricle, dark brown with paler edge. Seed lens-shaped.	Nepal, Sri-Lanka, Australia, China, Africa, Goa, Gujarat, Delhi, Bihar, Assam, Hamirpur, Chamba, Mandi, Bilaspur, Shimla.	Up to 2000 m	Juice of root is used to treat fever, bloody dysentery, dysuria. Powder of leaves are used as a hair tonic, for treating bronchitis, asthma, also applied in the treatment of scabies, cuts, wounds, skin diseases.	Alkaloid extract of plant can effect kidney, liver.
18	*Calotropis gigantea*/ Aak/ Apocynaceae	Large shrub. Stem erect, branched, solid, contain milky latex. Leaves simple, opposite, fleshy, large. Flowers wide, pale blue. Fruit large green and pale-yellow, flattened, with hairy seeds.	Indonesia, Malaysia, Thailand, Sri-Lanka, Nepal, China, Assam, Bihar, Meghalaya, Tamil Nadu, Hamirpur, Kullu, Mandi, Chamba, Kangra, Solan.	Up to 900 m	Milky latex of root and barkis used as medicine for treatment of dysentery, cutaneous affection, leprosy and to treat ringworm. Powder of leaves is applied on paralysed parts, painful joints.	May interfere with heart function at high dose causing vomiting, diarrhoea, slow heartbeat and death in extreme cases. Its unsafe during pregnancy and breast-feeding.
19	*Ageratum conyzoides*/ Goat weed/ Asteraceae	Annual herbaceous weed. Stem and leaves are covered with fine white hairs. Leaves are oval shaped with broad end. Fowers are purple, blue, pinkish or white. Fruit are small brown one seeded achene.	Asia, Arica, Europe, North America, South America, Andhra Pradesh, Assam, Bihar, Gujarat, Manipur, Kerala, Madhya Pradesh, Hamirpur, Mandi, Bilaspur, Kangra, Una, Chandigarh.	Up to 2500 m	Juice of whole plant is anti-inflammatory and anti-allergic. The juice and decoction of fresh plant and extract of dried plant is used to treat allergic rhinitis and sinusitis, cuts, wounds. Root juice is anti-lithic. Flower juice used to treat scabies.	Plant contain pyrrolizidine alkaloids that may cause bad breath, diarrhoea, mouth ulcer, throat ulcer, nausea and can also cause liver lesion and tumor.

Fig. 12: *Trianthema portulacastrum*

Fig. 13: *Aerva lanata*

Fig. 14: *Celosia argentea*

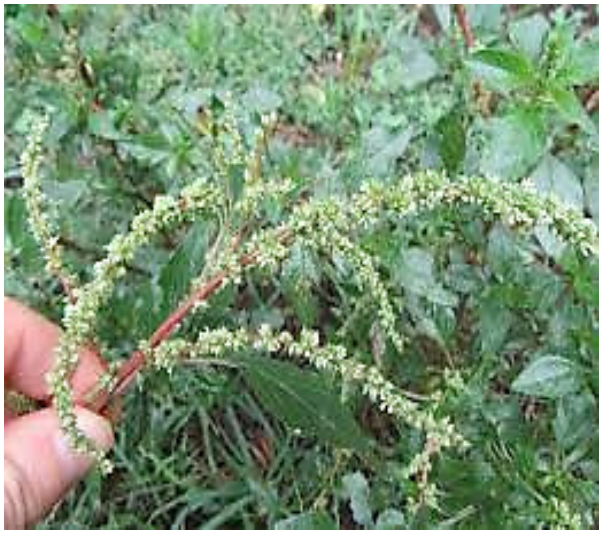

Fig. 15: *Amaranthus spinosus*

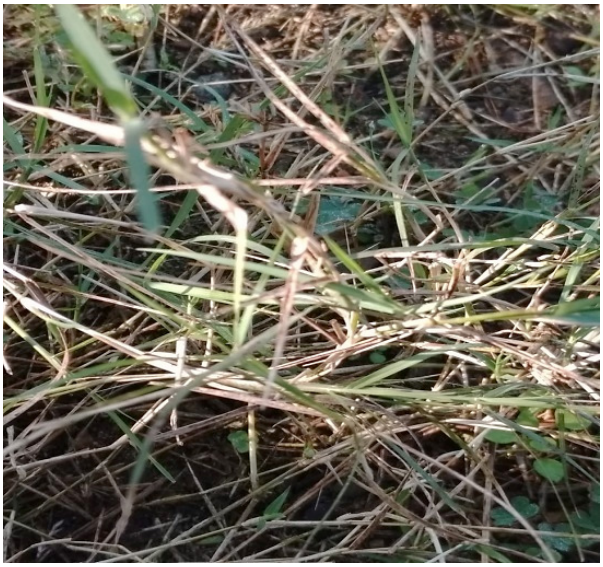

Fig.16: *Cynodon dactylon*

Fig.17: *Sonchus arvensis*

Fig. 18: *Alternanthera sessilis*

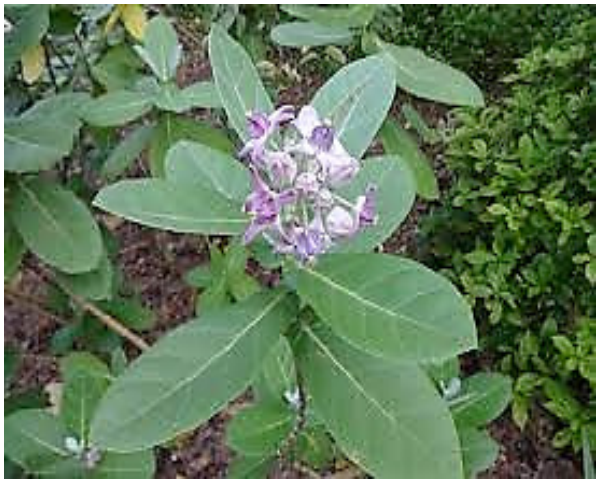

Fig. 19: *Calotorpis gigantea*

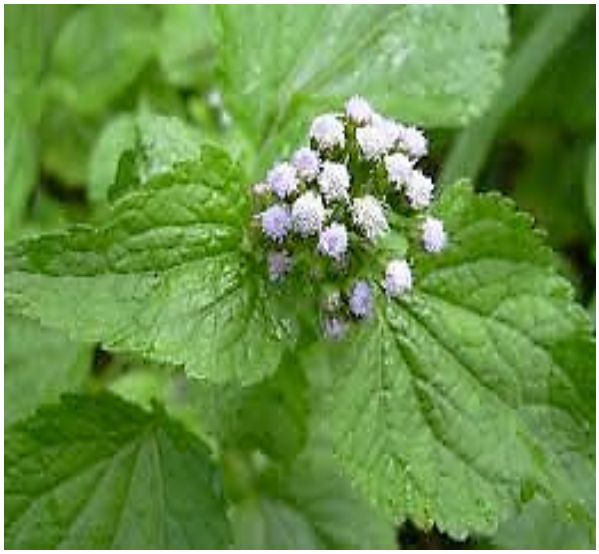

Fig. 20: *Ageratum conyzoides*

Conclusion

The modern medical treatment system has become a costly affair beyond the reach of low economy class people living in tribal areas. The natives of Solah Singi Dhar are closer to nature and more accustomed to the power of nature. Studies revealed that these people use herbal-based powders, pastes, aqueous extracts, decoctions etc., for the treatment of different diseases of humans and animals. Similarly, 19 plant species have been reported to be used by local inhabitants to treat various ailments. In contrast, the traditional system of medicine has played a pivotal role in providing healthcare to the people living in remote areas where modern facilities have failed to flourish. Hence, it becomes necessary to explore the alterative to provide healthcare for all.

Acknowledgments

The help of forest officials, local panchayat representatives, and inhabitants of Solah Singi dhar is duly acknowledged. Authors and thankful to Er. Pramod Maheshwari, Chancellor, Career Point University, Hamirpur, Himachal Pradesh, India, for providing all the logistics for the study.

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