3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

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Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
						Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
Tagetus patula L,A fungicidal ,ornamental species of Asteraceae family	Kadlag S.D., Varpe S.N. Suroshe V.M	Botany	Wesleyan journal of Research	2021	ISSN-0975-1386	www. wesleyanjournal.in	www.wesleyanjournal.in	yes
Plants species used by Tribes of murbad tahasil in treatment of various human disease such as tuberculosis,leprosy,herpes, diabetes and ulcers	Kadlag S.D., Varpe S.N. Suroshe V.M Bharitkar D.V.	Botany	Journal of the Maharaja sayajirao University	2022	ISSN : 0025-0422			yes
Plants species used by Tribes of Murbad tahasil in treatment of some Common Human Ailments Like Stomachache And Stomach Disorders	Varpe S.N, Suroshe V.M. Kadlag S.D Gadakh V.D Bharitkar D.V. Gaykar B.M.	Botany	Journal of the Maharaja sayajirao University ,	2022	ISSN: 0025-0422			yes
Plants species used by Tribes of Murbad tahasil in treatment of human diarrhoea and dysentery	Kadlag S.D Varpe S.N. Gadakh V.D. Bharitar D.V. Suroshe V.M.	Botany	Journal of the Maharaja sayajirao University	2022	ISSN: 0025-0422			yes
Impact of PEG-6000 induced water stress on seed germination parameters of wheat cultivars.	Ravindra Deshmukh , Tukaram Thopate, Kalpana Sawant, Anil Bhalerao, Kadlag S.D.	Botany	Wesleyan journal of Research	2021	ISSN-0975-1386	www.wesleyanjournal.in	www.wesleyanjournal.in	yes
Plant speciesused by tribes of Murbad tahsil in dying and taning	Kadlag S.D Varpe S.N.Gadakh V.D.Bharitar D.V. Suroshe V.M.	Botany	Journal of the Maharaja sayajirao University	2022	ISSN: 0025-0422			yes

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PLANTS SPECIES USED BY TRIBES OF MURBAD TAHASIL IN TREATMENT OF VARIOUS HUMAN DISEASES SUCH AS TUBERCULOSIS, LEPROSY, HERPES, DIABETES AND ULCERS.

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ABSTRACT
Murbad tahasil is rich in floristic as well as ethnic diversity. Murbad is mountainous and tribal populated Tahasil of Thane District lying approximately at 19^0 31^1 N and 73^0 35^1 E (Collectorate of Thane District, 2014). It includes about 906.36 sq. km area, 207 villages and 159 'padas'. 'Ethnobotanical exploration of Murbad Tahasil, Dist.Thane was done. Various medicinal plants employed by tribes of Murbad Tahasil in curing of human diseases such as Tuberculosis, leprosy, Herpes, Diabetes and ulcers were recorded.
Key words: Ethno botany, medicinal plants, human diseases.

INTRODUCTION
There are many sub-disciplines of Ethnobotany. These are viz. ethno agriculture, ethno ecology, ethno medico botany, ethno pharmacology, ethnopteridlogy, ethnobryology, ethno-phytotaxonomy and ethno-veterinary (Jain 2001). Early origin of traditional medicine viz. Ayurveda, Unani and Siddha must have had their foundation in Ethno botanical folklore. The people in tribal areas and remote villages mostly depend upon the folk medicines and household remedies. The practice of herbal medicines to cure different ailments has descended down ancestrally. Medicine men do not easily disclose their knowledge to others. Therefore, the valuable information may be vanished with them. The tahasil Murbad of Thane district comprises three major tribes viz. Thakur, Mahadev Koli, Katkari and several ethnic groups that have been engaged in conservation practices. The medicine men generally are experts in one or other diseases and inhabit in remote areas. Their knowledge needs to be assembled and recorded. In many cases like scorpion sting, snakebite and rabid dog bites the practitioner administrates drugs accompanied with 'jantras' and 'mantras'. They believe that both of these things act supplementary and complementary to each other. Many times, this practice causes death of the person.

REVIEW OF LITERATURE
Ethnobotanical knowledge is helpful in treatment and prevention of diseases and provide a wide scope and opportunities for bioprospecting in drugs/chemicals and gene prospecting. For example, medicines viz. NICOSAN^{TM} (HEMOXIN^{TM}) and 'Ajawaron HF' used in treating sickle cell anaemia were developed through ethnobotanical investigations in Nigeria (Idu, 2009).
Scientific approach must be followed in Ethnobotanical studies. It must provide proper information, statistical analysis to support the data and field observations. Related socio-economic aspects, effects on environment and conservation of biodiversity must be taken into consideration. Ethics demand protecting the knowledge base. Benefits should be shared resulting from commercial use of the tribal knowledge (Idu, 2009).
Local people of Deogarh (Orissa) use plant species for treating skin diseases. These are: Argemone Mexicana L., Azadirachta indica A. Juts. and Helicetres isora L. to treat 'Scabies'; Hemidesmus indicus (L.) R.Br., Streblus asper Lour. to cure 'Eczema'; Boerhaavia diffusa L., Combretum decandrum Roxb., Tinospora cordifolia (Willd.) Miers. ex Hook. F. and This. to treat 'Acne and Pimples' (Sahu et al., 2009).

Many ethnomedicinal plants are critically endangered / threatened or near threatened categories as per IUCN categorization norms. Chenchu tribe of Nallamalai (Andhra Pradesh) use species viz. Christella dentata (Forssk.) Brownsey & Jermy., Careya arborea Roxb. for curing cough and cold; Piper attenuatum Buch.Ham. ex Miq., Piper nigrum L. for curing skin diseases; Ipomoea mauritiana Jacq., Curculigo orchioides Gaertn. to treat male impotency; Glycosmis cochinensis Pierre., Entada pursaetha DC. as contraceptives and Trichosanthes cucumerina L. for cardiac problems. (Yasodamma et al., 2009).

People of Hmar tribe of Cachar (Assam) use plant species against various diseases of animals. Juice of Onion bulb, paste of Annona muricata L.,Blechnum orientale Lill., Butea monosperma (Lamk.)Taub. and bulb extract of Crinum amoenum Roxb. to cure tongue infections, to remove off lice, to keep insects off hens, as wound healer and to cure inflated stomach respectively (Nath and Choudhary, 2009).

Mishing community of Gohpur (Assam) has developed an anti-rheumatic plaster by mixing plants viz. Tinospora cordifolia (Willd.) Miers. ex Hook. f. and Thom., Amphineuron extensus (Blume.) Moore., Hibiscus rosa-sinensis L., Gossypium arboretum L., Litsea salicifolia Roxb., Machilus bombycina King., Moringa oleifera Lam. in appropriate quantities and the fresh earth mound of white ants with a little salt thoroughly. Plaster is applied and then covered by leaf of Musa sapientum L. (Borah et al., 2009).

Tribals and rurals in East Godavari district (Andhra Pradesh) traditionally use plant species for the treating bites and scorpion stings. Mantra and tantra are used to invoke the Gods and mesmerize the patient.They use Cassia auriculata L., Abrus precatorius L., Tiliacora acuminate (Lam.) Miers., Plumeria alba L.,Cymbopogon flexuosus (Nees ex Steud.) Wats. for snake bite; root paste or leaf juice of Acalypha indica L., Allium cepa L., Vigna trilobata (L.) Verdc. Selaginella repanda (Desv. ex Polr.) Spr. Ruellia tuberosa L., Ocimum basilicum L. Diplocyclos palmatus (L.) Jeffrey. for the Scorpion stings and Crotolaria laburnifolia L., Colocasia esculenta (L.) Schott & Endl. , Cleome monophylla L. in insect bites (Suneetha et al., 2009).

Tribal and rural folklore of Mayurbhanj (Orissa) treat asthma with Terminalia arjuna (Roxb. ex DC.) W. & A., Syzygium cumini (L.) Skeels.; bark decoction of Anogeissus latifolia (Roxb. ex DC.) Wall. ex Bad. is used to regularize menstrual cycle and bark of Gastonia scholaris L. is used in malaria (Rout et al., 2009).

Bhil tribe of Ratlam (Madhya Pradesh) use leaves of plant species for the treatment of different ailments. To suppress boils and swellings, leaves of Barleria prionitis L., Butea monosperma (Lamk.) Taub., Citrus limon (l.) Burm. f., Datura stramonium L., Euphorbia neriifolia L., Ipomoea carnea Jacq. Subsp. Fistulosa (Mart. ex Choicy.) Austin. Jasminum sambac (L.) Ait., Jatropha curcas L., Kalanchoe pinnata (Lam.) Pers., Papavar somniferum L., Physalis minima L., Quisqualis indica L.are used ; to get relief in toothache leaves of Calatropis procera (Ait.) R.Br., Mangifera indica L., Psidium guajava L.Tridex procumbens L. are used (Jadhav, 2009).

Tangkhul-Naga tribe of Ukhrul (Manipur) use Ageratum conyzoides L., Allium hookerii Thw., and Auricularia delicate (Fr.) Henn. in stomach disorders; Emillia sonchifolia (L.) DC., Eupatorium adenophorum Spreng., Lantana camara L., and Musa paradisiaca L. in diarrhea and dysentery; Ocimum americanum L., Tinospora cordifolia (Willd.) Miers. ex Hook. f. and Thoms in diabetes treatment (Salam et al.,2011).

In Bihar exotic species Vernonia amygdalina Del. is used against diabetes, cough, fever, malaria and as a blood purifier (Kumar and Varma ,2011).

Andrographis paniculata (Burm.f.) Wall. ex Nees., Celastrus paniculata Willd., Flacourtia indica (Burm. f.) Merr. Mucuna puriens (L.) DC., Pongamia piñnata (L.) Pierre. and Xanthium strumarium L. are the promising plant species of Adilabad district (Andhra Pradesh) used for curing leucorrhoea (Swamy and Reddi,2011). Bombax ceiba D.C. has anti-HIV, anti-inflammatory, hepatoprotective, anticancerous, anti-helicobacter, analgesic and antioxidant, hypotensive, hypoglycemic and antimicrobial properties (Verma, 2011).

People of Salem district of Tamilnadu use plants in treatment of diseases. Andrographis alata Nees., Gymnema sylvestre R.Br. and Cyanodon dactylon Pers. to cure diabetes; Abutilon indicum (L.) Sweet., Aristolochia indica L., Argemone mexicana L., Asparagus racemosus Willd. and Azadirachta indica A. Juss. to cure leprosy; jaundice is treated with Argemone Mexicana L., Eclipta prostrate L., Phyllanthus amarus L., Boerhavia diffusa L. and Cleome viscosa L. (Alagesaboopathi , 2011).

METHODOLOGY

Extensive field work was done in the forest area with the help of local tribe people. The information about uses of plants in dying and tanning was confirmed from the discussion with the tribal. The ethnobotanical methodology of previous workers was followed (Jain, S. K. and Mugdal, V. 1999; Malhotra *et al* 2001.). The data of plants was entered in a field notebook

RESULTS AND DISCUSSION

We consulted many medicine men in Murbad tahasil. Different tribes of Murbad Tahasil use medicinal plants in curing of human diseases such as Tuberculosis, leprosy, Herpes, Diabetes and ulcers. These are given below.

Plant species used in the treatment of major diseases viz. TB, diabetes, Harpies, Leprosy and Ulcer by tribes of Murbad Tahasil, Thane district (India)

Tuberculosis:

Thakur and Katkari people prepare decoctions/powder of roots 'Vilayati' (Argemone Mexicana L. Hook, f. and Thoms., family: Papaveraceae); 'Tetar' [Oroxylum indicum (L.) Vent) Family: Bignoniaceae] and 'Kuda' (Wrightia tinctoria R. Br.; Apocynaceae) and give orally to the patients. They and other tribe people also use roots and flowers of 'Bhuiringani' (Solanum virginianum L.) family Solanaceae.

Diabetes:

Thakurs and Katkari people use powder of wood of 'Bibla' (Pterocarpous marsupium Roxb. Family Fabaceae); they and other tribes use leaves of 'Adulsa' [(Justicia adhatoda L.) FamilyAcanthaceae] ; 'Bedki' [Gymnema sylvestre (Retz.). R. Br., family Asclepiadaceae]; 'Medshingi' [Dolichandrone falcate (Wall. ex. DC.) Seem.family Bignoniaceae] while Tangkhul-Naga tribe of Ukhrul (Manipur) use Ocimum americanum L., Tinospora cordifolia (Willd.) Miers. ex Hook. f. and Thoms in diabetes treatment

All tribes employ pods of 'Bahawa' [Cassia fistula L. family Caesalpiniaceae];stem branches of 'Gulvel' [Tinospora cordifolia (Willd.) Miers. Family Menispermaceae];seeds of 'Jambhul'[Syzigium cumini (L.) Skeels family Myrtaceae] and rhizomes of 'Koshta' [Costus speciosus (Koen.) J. E. Smith] family Zingiberacae] in treating diabetes.

Herpes:

Medicine men of Thakur and Koli tribes employ 'Bandhala' (Viscum angulatum Heyne ex DC.family Viscaceae) . Extracts or powder are applied externally.

Leprosy :

Thakur, Katkari and medicine men of other tribes use pods of Bahawa Cassia fistula L.Caesalpiniaceae and bark of 'Gulvel' [Tinospora cordifolia (Willd.) Miers. Family Menispermaceae].while tribal people of Salem district of Tamilnadu Abutilon indicum (L.) Sweet., Aristolochia indica L., Argemone mexicana L., Asparagus racemosus Willd. and Azadirachta indica A. Juss. to cure leprosy

Ulcer

Thakurs give orally bark powder of 'Athrun' [Flacourtia indica (Burm. F.) Merrill.family Flacourtiaceae] in the treatment of ulcers.

ACKNOWLEDGMENT

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PLANTS SPECIES USED BY TRIBES OF MURBAD TAHASIL IN TREATMENT OF HUMAN DIARRHOEA AND DYSENTERY.

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ABSTRACT
'Ethno botany' word was coined for the study of plant species used by aboriginal people (Hershberger, 1895). Ethnic's knowledge of plant resources is documented in 'Ethno botany'. Ethno botany is a promising field of research. Ethno botanical exploration of Murbad Tahasil, Dist.Thane was done. Various medicinal plants employed by tribes of Murbad Tahasil in curing of human diseases were recorded. Out of total medicinal plants, Thakur and Katkari tribes use about 20 species in the treatment of diarrhoea and dysentery.
Key words: Ethno botany, diarrhoea and dysentery, medicinal plants.

INTRODUCTION
The tribes living in remote hilly forest areas and villages of Tahasil Murbad mostly have to depend upon home remedies. Main medicine man of the village has enough knowledge of uses of medicinal plants. 'Medicine men' do not disclose their knowledge to other people. The practice of employing folk medicines to cure human diseases descends down ancestrally. It is possible that such knowledge of medicinal plant remedies may get vanished with 'medicine man'. We tried to collect data of medicinal plants from these medicine men. Thakur, Warali, Katkari, Koli are the tribes in Thane district (Jagtap and Singh, 2002).
Murbad Tahasil is mountainous which lies approximately at 19^0 31^1 N and 73^0 35^1 E (Collectorate of Thane District, 2014.The forests are of tropical mixed deciduous and semi-evergreen types. These forests are reserved, protected and cover an aggregate area of 36256.122 ha. The tribal people collect different materials viz. flowers, fruits, nuts, bark, shoots, tubers, roots, leafy vegetables, gum and honey from the forests. Katkari is a nomadic tribal group and are socially and economically backward.

REVIEW OF LITERATURE
Huyin et al., (2000) recorded Blumea balsamifera (family Compositae) which is used in Thailand in case of skin itching. Chinese have been using it in indigestion problems. Saxena et al., (2000) recorded use of Cleome viscosa L. (Family Cleomaceae) in curing diarrhoea. Smoke of its leaves can be used to repel mosquitoes. Reddy and Vatsavaya, (2000) recorded that the tribal people of Nalgonda (Andhra Pradesh state, India), use Adhatoda vasica Nees., Cissus quandricularis L., Withania somnifera (L.) Dunal., Wrightia tinctoria R.Br. and Dolichondrone falcata (DC.) Seem. in treating Anthrax disease of cattle. Cassia italica (Mill) Andr. , Calotropis gigantea (L.) R. Br. And Terminalia chebula Retz. are used in curing constipation. Sharma and Singh, (2001) recorded that the tribal people of Dadra, Nagar Haveli and Daman (India) consume varieties of plant species in their regular diet. They use Aegle marmelos (L.) Corr. in treating dysentery and Syzygium cuminii (L.) Skeels. in digestive disorders.

METHODOLOGY
Extensive field work was done into the forest. The medicine men or tribal people were requested to accompany us in the field work. The information about medicinal uses of plants was confirmed. The methodology of previous workers was adopted (Jain, S. K. and Mugdal, V. (1999) and Malhotra *et al* (2001.).We entered the data in a field notebook.

RESULTS AND DISCUSSION

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L.Myrtaceae), root powder of Padvel (Cissampelos pareira L. var hirsuta Buch.-Ham. ex DC.) Forman.Menispermaceae) and Thinjira (Triumfeta rhomboidea Jacq.Tiliaceae).They tie stems of Vasanvel (Cocculus hirsutus (L.) Theob.Menispermaceae) and Murud- sheng (Helictres isora L.Sterculiaceae); flowers of Jaswand (Hibiscus rosa-sinensis L.Malvaceae) ;fruits of Bhendi (Abelmoschus esculentus (L.) Moench.Malvaceae) and seeds of Kuda (Holarrhena pubescens (Buch.-Ham) Wall. Ex G. Don.Apocynaceae).

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PLANTS SPECIES USED BY TRIBES OF MURBAD TAHASIL IN TREATMENT OF SOME COMMON HUMAN AILMENTS LIKE STOMACHACHE AND STOMACH DISORDERS.

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ABSTRACT
Present work is the result of intensive, systematic, Ethnobotanical exploration of Murbad Tahasil, Dist.Thane. Genera and species of medicinal plants used by tribes of Murbad Tahasil in treatment of human ailments were recorded.Out of total medicinal plants Thakur and Katkari tribes employ 20 genera and species in the treatment of stomachache and 17 genera in gastric disorders. Various plant parts viz. Leaves, flowers, fruits, seeds and barks ofmedicinal plants are used for curing ailments like stomach ache and gastric disorder.
Key words: Ethno botany, human ailments, stomachache, stomach disorders, plant resources.

INTRODUCTION:
Ethnic's knowledge related to plant resources is documented in 'Ethno botany'. Hershberger (1895) coined the term 'Ethno botany' for the study of plant species used by aboriginal people. It is a promising field of research. It has created enthusiasm among the researchers how to save the traditional knowledge of tribes. Early origin of Ayurvedamust have had its foundation in Ethno botanical folklore. The tribes living in remoteareas and villages mostly depend upon the folk medicines and household remedies. The practice of folk medicines to cure human ailments descends down ancestrally. 'Medicine men'do not easily disclose their knowledge to others. The valuable information of medicinal remedies may get vanished with 'medicine man'. Tribes in Thane district are:viz. Thakur, Warali , Katkari , Koli (Jagtap and Singh, 2002).. The present Ethnobotanical work in Murbad tahasil was undertaken.

The plants are keenly associated with the social customs and rituals of tribes. The tribes have been protecting the natural vegetation in the form of sacred groves. Conservation of plant resources is one of the national needs.Traditional knowledge of tribes and their participation has importance in conservation of biological resources.

Location of Murbad Tahasil: It is mountainous and tribal Tahasil of Thane District which lies approximately at 19^0 31^1 N and 73^0 35^1 E (Collectorate of Thane District, 2014).The climateof Murbad comprises the south-west monsoon, post-monsoon season, cold and summer seasons. The average relative humidity is 77%. Summer has day temperature (33°C to 41°C). The rainy season starts from June first week and continues till September. The average annual rainfall in the district is 2,293mm. July is the rainiest month of the year. The forests are of tropical mixed deciduous and semi-evergreen types dominated by Madhuca-Terminalia community. The area under forest cover is categorized under reserved, protected and unclassed forests of aggregatearea 36256.122 ha (362.56 sq kms). Some of the dominant plant species are viz. Terminalia alata, Madhuca longifolia var. latifolia and Anogeissus latifolia. Teak occurs along with dominant Bridelia retusa, Lannea coromandelica, Mallotus philippensis, Mangifera indica, Mitragyna parviflora, Pongamia pinnata.Thakurs form the major part of tribal population followed by Mahadeo koli and then Katkari/Kathodi tribe. 'Medicine men' of Thakur and Katkari tribes possess good knowledge of medicinal plants. The tribals spend maximum time in the forests in collecting different materials viz. flowers, fruits, nuts, bark, shoots, tubers, roots, leafy vegetables, gum, honey and leaves of Gunj and Bel trees. Drinking liquor prepared from flowers of Madhuca longifolia var. latifolia. (Moha) is a part of their lifestyle.Katkari (Kathodi) is a nomadic tribal group.

REVIEW OF LITERATURE

Once the forests hadluxuriant vegetation but with passage of time deforestationtook place. Forestremnants may be called the sacred groves.(Gadgil and Vartak (1975).

Deities in the sacred groove of area of 'Panshet' dam, Maharashtra state, (India) are ferocious in nature and cause serious illness or death to offenders. People are allowed to use dead wood and leaf litter. There are 233 sacred groves (Devrais) of the districts of Maharashtra State (India). These grooves in forests have been playing a vital role in preservation of plant species diversity (Gadgil and Vartak (1981).

People in Thailand use Blumea balsamifera in cold and skin itching while Chinese use it as carminative and indigestion problems(Huyin et al., 2000).

Tribes of Coorg of Karnataka (India) use Aegle marmelos (L.) Corr., Bridelia scandens (Roxb) Willd.,Cyclea peltata (Lam.) HK.f.&Th.,Coriandrum sativum L, Sida rhombifolia L. subsp.retusa, Terminalia chebula (Gaertn.)Retz. as pain relivers.Jenukurba tribe of Mysore (India) Basella rubra (L.) to cure mouth ulcer; Boehaervia diffusa (L.) in diabetes; Cocculus hirsutus (L.) in sprain; Meyna laxiflora in mumps; Pavetta indica (L.) in toothache andSida spinosa (L.) to stop early grayingof hairs (Kshirsagar and Singh, 2000).

Gujjar tribe of Uttar Pradesh use Dalbergia sissoo Roxb. Abutilon indicum L. to cure leucorrhoea; Ficus racemosa L. and leaf extract of Achyranthus aspera L. with seeds of Piper nigrum to cure piles; decoction of flowers of Butea monopserma (Lam.) Taub. to remove blockage during urination; Celastrus paniculatus Willd., (Khanna and Kumar,2000).

Cleome viscosa L. is antihelmintic and also given in diarrhoea. Smoke of its leaves repel mosquitoes. Its leaf extract has larvicidal effect on Anopheles stephensi, a vector of malaria (Saxena et al., 2000). Gaddi tribes (migratory shepherds) use veterinary medicinal plants like Alnus nepalensis (D. Don.) to cure sprains, Mentha longifolia (l.) as wound healer, Vanda tessellate (Roxb.) for general weakness and Zingiber roseum (Rosc.) in the treatment of cough in cattle (Singh and Kaushal Kumar,2000).

Tribal and non-tribal communities of West Bengal use roots of Aegle marmelos (L.) Corr. Aristolochia indica L.,Euphorbia neriifolia L., and Ocimum sanctum L. for their anti- venom properties (Maiti and Mishra, 2000).Tribal people of Nalgonda (Andhra Pradesh), India use crude veterinary plant drugs obtained from Adhatoda vasika Nees., Cissus quandricularis L.,Whithania somnifera (L.) Dunal., Wrightia tinctoria R.Br. and Dolichondrone falcata (DC.) Seem. in treating Anthrax disease; Cassia italica (Mill) Andr. , Calotropis gigantea (L.) R. Br., Ipomoea turbinate Lag. Terminalia chebula Retz. in constipation (Reddy and Vatsavaya, 2000).

People of Almora (Uttaranchal) use Pteridophytic plant species viz. Adiantum edgeworthii (Hook.) Bedd. to cure mouth blisters; Asplenium dalhousiae (Hook.) C. Chr. in typhoid; Lygodium flexuosum (L.) Sw. in skin diseases and Tectaria polymorpha (Wall. ex Hook.) Copel. to cure fever (Pande et al., 2000).

Herbal practioners of Assam use Kyllinga brevifolia Rottb. to treat yellow type of jaundice and Hydrocotyle rotundifolia Roxb.,Musa sapientum to treat red type jaundice (Das and Saikia, 2001). Tribals of Dadra, Nagar Haveli and Daman consume plant species regularly in their everyday diet. Some of them have medicinal values.These are: Aegle marmelos (L.) Corr. in treating dysentery, Citrus medica L.in sunstroke, leaf extract of Spinacia oleracea L.is given for cooling purpose, 'Kavalu'(Smithia conferta J.E. Sm.) as pain reliever and Syzygium cuminii (L.) Skeels. in digestive disorders (Sharma and Singh, 2001). The tribes of Melghat forest (Amaravati) Abrus precatorius L. in cough, cold and throat infections; Clitoria ternatea L. in chronic cough; Chlorophytum borivilianum Sant. & Fern. as health tonic and Plumbago zeylanica L. in rheumatism and swelling (Chaudhari and Hutke, 2002). Ethnobotanical knowledge and practices continuously undergo some modification, improvement or change. It is dynamic. For example, Ageratum conyzoides L., Amaranthus spinosus L., Asclepias *curassvica* L. *Cleome gynandra* L. are some exotic plants

introduced and naturalized in India. The local folk people have discovered some uses in them (Jain, 2005).

Curcuma longa L. is a valuable resource for spice, food, medicine as well as for its symbolic, ceremonial, ritualistic and religious purposes from ancient times in India. In order to overturn the patent given to USA in August 1997, researchers in India carried out a huge survey of literature dealing with the ancient uses of turmeric. This case is an example of how careful ethnobotanical research can help safeguard intellectual property rights (Merlin and Kinsela, 2005).

Ethnomedicinal study offers scope and opportunities for the development of new drugs (Mehrotra and Mehrotra, 2005).

Lichen Cladonia rengiferina (L.) Wigg. of alpine regions of West Kameng (Eastern Himalaya) is useful for removing of kidney stones (Rout et al.,2005).

Tribes of Maharashtra use Canscora decussata (Roxb.) Roem. & Schult. in treatment of fever, skin diseases and diabetes (Khanna et al., 2005).

Tree worship has been the most simple and convincing method of nature conservation.. There are several trees that are worshiped by Hindus according to 27 natal constellations. For example, Krutika, Chitra,and Sravan constellations are associated with Ficus recemosa L., Aegle marmelos (L.) Cor., Calotropis gigantea (L.) Ait. respectively. There are 28 Buddhas that are worshiped in the form of trees known as 'Wisdom trees'. For example, Buddhasviz.Medhankara,Paduma and Gautama are associated with Butea monosperma (Lam) Taub., Oroxyllum indicum (L.) Vent., Ficus religiosa L. respectively (Sane and Ghate, 2006).

People of Bundi (Rajasthan) use household remedies against animal and insect bites. Datura metel L. mixed with cows urine are very effective against dog bite (Shekhawat and Batra, 2006).

People of rural area of Uttarkashi (Uttaranchal) India, use plant species in ethnoveterinary medicines. Some useful plants which increase lactation are: Amaranthus caudatus L., Echinocloa crusgalli (L.) P. Beauv. Ficus palmata Forssk., Glycine max (L.) Merr., Grewia optiva J.R. Dumm. ex Burrett., Quercus floribunda Rehder. (Tiwari and Pande, 2006).

Traditional healers of Wayanand (Kerala state) India, use plant species to cure skin diseases viz. ring worm is treated with Vernonia cinerea (L.) Less., Thespesia populnea (L.) Sol. ex Correa., Sida rhombifolia L., Ocimum basilicum L., Jatropha curcus L., Jasminum angustifolium Vahl. and Elephantaphus scaber L. ; leprosy with Acacia catechu Willd., Cassia fistula L. and Tinospora cordifolia (Willd.) Miers. ex Hook. f. and Thoms. Athletes foot disease is treated with Anacardium occidentale L., Camellia sinensis (L.) Kuntze., Colocasia esculenta (L.) Schott., and Solanum anguivi Lam. (Nisha and Sivadasan, 2007).

While treating jaundice, tribes from Nagarjunasagar(Andhra Pradesh) use Phyllanthus amarus Schum & Thonn., Andrographis paniculata (Burm. f.) Wall. ex Nees., Argemone Mexicana L., Leucas aspera (Willd.) Link. in different formulations. (Rao et al., 2007).

Bhil tribes of Madhya Pradesh use Bombax ceiba L. to cure different diseases. Decoction of root is taken to promote conception and to prevent miscarriages as well as to cure menorrhea; the extract of its stem bark and flowers is taken in diarrhoea and dysentery, menorrhea and leucorrhoea and stomach pain during menses. The paste is tied over anus to cure piles. Extract of inner bark is taken to increase sexual potentiality (Jadhav, 2007).

METHODOLOGY

During field work, the local tribe people were requested to accompany into forest. The information about medicinal uses of plants was confirmed by different groups. The methodology of previous workers was adopted (Jain, S. K. and Mugdal, V. 1999; Malhotra et al 2001.) The data was entered in a field notebook

RESULTS AND DISCUSSION

Present work is the result of intensive, systematic, Ethnobotanical exploration of Murbad Tahasil, Dist.Thane. Genera and species of medicinal plants used by tribes of Murbad Tahasil in treatment of human ailments are recorded.Out of total medicinal plants tribe use about 20 genera and species in

stomachache and 17 genera in gastric disorder. Leaves, flowers, fruits, seeds and barksoffollowing plants are employed in curing these two ailments.

(A) : Ethnobotanical plant species used in the treatment of stomach ache by tribes of Murbad Tahasil, Thane district (India):

(A1): Thakurs and Katkari people of Murbad Tahasiluse roots(powder/decoction) orally in case of stomachache. These plants are:

1. Kurdu : Celosia argentea L. (Fam.Amaranthaceae)
2. Kuda :Wrightia tinctoria R. Br.(Fam. Apocynaceae)
3. Hadang: Eriolaena candollei Wall.(Fam Sterculiaceae).
4. Hastipada: Elephantopus scaber L.(Fam. Asteraceae) Katkari
5. Wagoti:Capparis zeylanica L. (Fam.Capparaceae)Katkari
6. Ran-ghewda: Paracalyx scariosus (Roxb.) Ali. (Fam. Fabaceae)
7. Vasanvel: Cocculus hirsutus (L.) Theob.(Fam. Menispermaceae)

A2) Thakurs and Katkari people of Murbad Tahasil use flowers orally in case of stomachache: These are:

1. Owa: Trachyspermum ammi (L.) Sprague (Fam. Apiaceae)
2. Dhayti: Woodfordia fruiticosa (Linn.) Kurz.(Fam. Lythraceae)

A3)Thakurs of Murbad Tahasil use fruits orally in case of stomachache: These are:

1. Bahawa: Cassia fistula L. (Fam. Caesalpiniaceae)
2. Bartondi: Morinda pubescens J. E. Sm. (fam.Rubiaceae)
3. Murudsheng: Helictres isora L.(Fam. Sterculiaceae)

A4)Thakurs of Murbad Tahasil use seeds orally in case of stomachache: These are:

1. Kuda : Holarrhena pubescens (Buch.-Ham) Wall. Ex G. Don.(Fam. Apocynaceae)
2. Sagargota: Caesalpinia bonduc (L.) Roxb.(Fam.Caesalpiniaceae)
3. Dhawada: Anogeissus latifolia (Roxb. ex Dc.) Guill. & Perr. (Fam.Combretaceae)

A5) Thakurs of Murbad Tahasil use bark orally in case of stomachache: These are:

1. Rohan: Soymida febrifuga (Roxb.) Juss.(FamMeliaceae)
2. Hedu:Haldina cordifolia (Roxb.) Ridsd.(FamRubiaceae)

A6) Thakurs of Murbad Tahasil use leaves orally in case of stomachache: These are:

1. Pandhar: Murayya paniculata (L.) Jack.Fam.Rutaceae)
2. Harbhara: Cicer arietinum L. (Fam Fabaceae)
3. Chirmut- fanglu: Hyptis suaveolens (L.) Poit.(Fam. Lamiaceae)

(B) Ethnobotanical plant species used in the treatment of gastric disorder by tribes of Murbad Tahasil. Thane district (India).

B1)Thakurs of Murbad Tahasil use leaves orally in case of gastric disorder: These are:

1. Ramphal: Annona reticulata L.(fam. Annonaceae)
2. Medshingi:Dolichandrone falcate (Wall. ex. DC.) Seem.(Fam. Bignoniaceae)
3. Harbhara: Cicer arietinum L.(Fam Fabaceae)

B2)Thakurs of Murbad Tahasil use fruits orally in case of gastric disorder: These are:

1. Dhane:Coriandrum sativum L.(Fam.Apiaceae)
2. Jire Cuminum cyminum L.(Fam Apiaceae)
3. OwaTrachyspermum ammi (L.) Sprague(fam.Apiaceae)Thakur and katkari
4. Tambada Bhopala: Cucurbita maxima Duch. ex Lam.(Fam. Cucurbitaceae)
5. Limbu: Citrus aurantifolia (Christm and Panz.) Swing.(Fam. Rutaceae)
6. Ghotvel: Smilax zeylanica L.(Fam Smilacaceae)

B3) Thakurs of Murbad Tahasil use flowers orally in case of Gastric disorder: These are:

1. Bahawa:Cassia fistula L(Fam. Caesalpiniaceae)
2. Palas: Butea monosperma (Lam.) Taub(Fam.Fabaceae)
3. PalashiButea superba Roxb. ex Willd.(Fam. Fabaceae)
4. Dhayti: Woodfordia fruiticosa (Linn.) Kurz.(Fam Lythraceae)

B4) Thakurs of Murbad Tahasil use seeds orally in case of Gastric disorder: These are:

1. Dhawada:Anogeissus latifolia (Roxb. ex Dc.) Guill. & Perr.(Fam.Combretaceae)

Katkari also use it.
2.Bhovari:Ipomoea nil (L.) Roth.(Fam.Convolvulaceae)
3.ErandRicinus communis L.(Fam.Euphorbiaceae)seed-oil
1.KharmatFicus hispida L.(fam.Moraceae)Thakurs useroots in gastric disorder.

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IMPACT OF PEG-6000 INDUCED WATER STRESS ON SEED GERMINATION PARAMETERS OF WHEAT CULTIVARS.

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Abstract: Amongst all the natural climatic hazards, drought is the single most important disaster affecting food production throughout the world. In the present investigation seven wheat cultivars B-288-18; NI-5434; Vijay; Motiya; Gulab; NI-59 and Kenphad of wheat were preliminary screened thoroughly under PEG-6000 induced drought stress during seed germination parameters. The results on seed germination percentage, root and shoot length as well as FWt. and DWt. were correlated. In all the cultivars of wheat percentage and seed germination was reduced and the degree of reduction was intensified with increasing stress level. At extreme water stress (-8bar) the cultivar Kenphad and B-288-18 showed seed germination. All the promising cultivars were highly sensitive towards all the levels of water stress as observed from percentage inhibition in root and shoot length. The cultivar Kenphad and B-288-18 showed better performance for in root length as well as shoot length. The cultivar Vijay and NI-5434 showed moderate performance regarding seed germination parameters. The wheat cultivars NI-59, Motiya and Gulab showed very poor performance to seed germination parameters.

On the basis of all above parameters the cultivar Kenphad and B-288-18 was ranked at number one position for showing comparatively better survival at different levels of PEG induced water stress so they may be called as drought tolerant, next to it at second position wheat cultivar was Vijay and NI-5434 so may be called as moderately drought tolerant and at last position NI-59, Motiya and Gulab may be called as drought susceptible wheat cultivars.

Key Words: PEG- 6000, Wheat, Seed germination, FWt, Dwt.

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1. Introduction

Wheat is mainly a rabi seasonal crop in India. Wheat is grown in a various soils of India. Soils with a clay loam, good structure and moderate water holding capacity are suitable for wheat cultivation. Care should be taken to avoid very porous soils. Wheat is belonging from Family Gramineae. Its botanical name is Triticum aestivum. The Soft Wheat (Bread wheat) is originated at Hindukush mountainous regions adjoining to India and Afganistan. Wheat species distinct to three groups diploid, tetraploid and hexaploid in according to chromosome number in their reproductive cells 7, 14 and 21 respectively. India has largest area under wheat in the world and wheat is grown under diverse environment.

Wheat is sown in September or October after the summer monsoon rains are over. Wheat requires a well ushed but compact soil for good and uniform seed germination. Wheat responds well to the commercial fertilizers.

2. Materials and Methods

In the present investigation, the seed germination experiments were conducted at the Department of Botany and Research Centre, New Arts, Commerce and Science College, Parner. The authentic seeds of seven cultivars of wheat (B-288-18; NI-5434; Vijay; Motiya; Gulab; NI-59 and Kenphad) were procured from the Agricultural Research Station, Niphad, Dist. Nashik , (MS) for preliminary screening. The seven cultivars of wheat were screened for their drought tolerant abilities by applying PEG-6000 induced water stress at seed germination level (-2 to -8 bar).

The healthy and uniform seeds of selected cultivars of wheat were washed thoroughly in water, surface sterilized with 0.1% HgCl2, and washed with distilled water for 3-4 times. These seeds were kept for germination on germination paper in sterilized petri plates, containing different concentrations of PEG-6000 solutions such as 0 bar (distilled water), -2 bar, -4 bar, - 6 bar and –8 bar. The method described by [9] was followed to prepare the different solutions of PEG –6000 (Table 1).

Five ml of PEG-6000 solution of respective concentration was added in each petri plate. The control was maintained with distilled water. All the sets were arranged in triplicate under uniform conditions in seed germination chamber. Observations on following different parameters were recorded on seventh day.

Germination percentage:-

Germination percentage was determined on seventh DAS [7]

Length of plumule and radicle:-

On 7th day of sowing, 10 seedlings from each replication and treatment were randomly selected for measuring the root and plumule length.

Fresh and dry weight:-

On 7th day ten seedlings were randomly selected for recording fresh weight. These seedlings were kept in an oven at 60 0C, till constant dry weight was obtained. The total dry weight of seedlings from control and each treatment was recorded

3. Results and Discussion

Effect of PEG-6000 induced water stress on seed germination parameters

a) Seed germination:

The effect of PEG 6000 induced water stress on seed germination in different cultivars of wheat recorded in Table 2 and shown in photo plate 1 and 2 revealed that in all the cultivars with increase in PEG induced water stress seed germination was drastically reduced from -2 to -8 bar. In all the cultivars of wheat at control and -2 bar solution 100% seed germination was recorded. At -4 bar NI-5434 and Kenphad 100% seed germination was noted which was followed by B-288-18 (90%), Motiya and NI-59 (80%) and Gulab (70%). At -6 wheat variety Kenphad showed 100% seed germination which was followed by Vijay (90%), NI- 5434 (80%), B-288-18,Motiya and NI-59 (70%) and Gulab (60%). At higher water stress (-8 bar) B-288-18 and NI-59 showed 70% seed germination which was followed by Kenphad (50%) and NI- 5434 (30%). Wheat variety Vijay, Motiya and Gulab showed very poor performance (00%) regarding seed germination it indicate that these cultivars may be drought susceptible. The cultivar Kenphad showed better performance regarding seed germination as compared to others.

b) Root length:-

The root length in all the cultivars decreased from -2 to -8 bar PEG induced water stress. The maximum root length was recorded in wheat cultivar B-288-18 (11.69 cm), Kenphad (11.39 cm), Vijay (11.13 cm), NI-5434 (11.01 cm), NI-59 (9.91 cm), Motiya (6.8 cm) and Gulab (6.38 cm) at control condition. With increase in water stress in all the cultivars root length were decreased. At -4 bar water stress wheat cultivar NI-5434 shoed better performance regarding root length, in this cultivar root length 4.68 cm which was followed by Kenphad (4.55 cm), Vijay (2.86 cm), B-288-18 (2.18 cm), NI-59 (1.19 cm), Gulab (086 cm) and Motiya (0.78 cm). At -6 bar water stress wheat cultivar Kenphad shoed better performance regarding root length in this cultivar root length 1.52 cm which was followed by NI-5434 (0.72 cm), Vijay (0.45 cm), B-288-18 (0.18 cm), Motiya and Gulab (0.15 cm) (Table 2 and shown in photo plate 1 and 2).

c) Shoot length:-

The shoot length was also decreased with increase in water stress. The maximum plumule length at -2 bar PEG induced water stress was recorded in NI-5434 (3.75 cm) and it decrease to 0.03cm in -8 bar which was followed by cultivar B-288-18 3.35cm at -2 bar and it decrease to 0.06cm at -8 bar, NI-59 2.64cm at -2 bar and it decreases to 0.04cm at -8 bar, Cultivar Gulab 1.38cm at -2 bar and it decreases to 0.06 cm at -6 bar and in this cultivar there is no plumule formation is noted at -8 bar. Very poor performance regarding shoot length was recorded in wheat cultivar Vijay followed by Motiya it means that these two cultivars are may be susceptible the water stress.

d) Fresh Weight:-

The seedling FWt in all the cultivars of wheat was decreased with increase in PEG-6000 induced water stress. In all the cultivars of wheat from -2 bar to -8 bar fresh weight was decreased. The best results were noted in wheat cultivar B-288-18 {-2 bar (2.06gm) and at -8 bar (1.29 gm)} which was followed by NI-59 {-2 bar (2.0gm) and at -8 bar (1.21 gm)}, Vijay {-2 bar (1.97gm) and at -8 bar (1.63 gm)}, Motiya {-2 bar (1.63gm) and at -8 bar

(1.14 gm)}, Kenphad {-2 bar (1.76gm) and at -8 bar (1.18 gm)}, NI-5434 {-2 bar (1.51 gm) and at -8 bar (1.11 gm)} and Gulab {-2 bar (1.44 gm) and at -8 bar (1.1 gm)} .

e) Dry Weight:- The seedling dry weight in four cultivars of wheat was increased with increase in PEG-6000 induced water stress and only in three cultivars with increasing water stress slight decrease in dry weight was noted. The four cultivars of wheat showed increase in weight is Vijay {-2 bar (1.27gm) and at -8 bar (1.28 gm)}, B-288-18 {-2 bar (0.96 gm) and at -8 bar (1.01 gm)}, Gulab {-2 bar (0.86 gm) and at -8 bar (0.98 gm)} and NI-5434 {-2 bar (0.80 gm) and at -8 bar (0.92 gm)}. The three cultivars of wheat showed slight decrease in weight is NI-59 {-2 bar (1.12 gm) and at -8 bar (1.04 gm)}, Motiya {-2 bar (1.07 gm) and at -8 bar (0.95 gm)} and Kenphad {-2 bar (0.99 gm) and at -8 bar (0.97 gm)}.

Our results were confirmed with the many workers, the two different levels of PEG-6000: 0% and 10%. PEG stress significantly reduced percent germination, shoot length and root length. PEG stress significantly increased dry weight in twenty two wheat cultivars (11). Seed germination and vigor index of twenty wheat genotypes were reduced with the increment of water stress induced by PEG. Shoot and root lengths and seedling dry weight of 10 days old seedlings were found to be reduced due to the increment of water stress [8]. Seed germination percentage, root and shoot length and root shoot ration decrease with increases in PEG 6000 induced water stress in ten barley cultivars [2]. The linear correlation between water stress and slight increase in dry matter accumulation in Triticum sps. [4].

In sorghum and wheat seedlings under PEG-6000 induced water stress the root and shoot length, root: shoot ratio was reduced with increased level of water stress [6]. In four genotypes of sorghum namely M35-1, SPV-86, CSH-1 and CSH-8R under manitol induced water stress germination percentage was decreased with increasing water stress from 2.5 to 10 atmospheres. The plumule and radicle lengths were progressively decreased with increase in osmotic tension. The radicle length was affected more than plumule length [1].The germination percentage was decreased with increasing concentration of PEG, in eleven different sorghum cultivars [10].

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Table 1: The quantity of Polyethylene glycol (PEG)-6000 (g L^{-1}) for different water stress treatment(s) at different room temperature range.

Stress	Temperature ^{0}C				
(- bars)	15	20	25	30	35
2	105	112	119	128	137
4	161	169	178	188	199
6	204	214	224	235	247
8	241	251	262	278	287

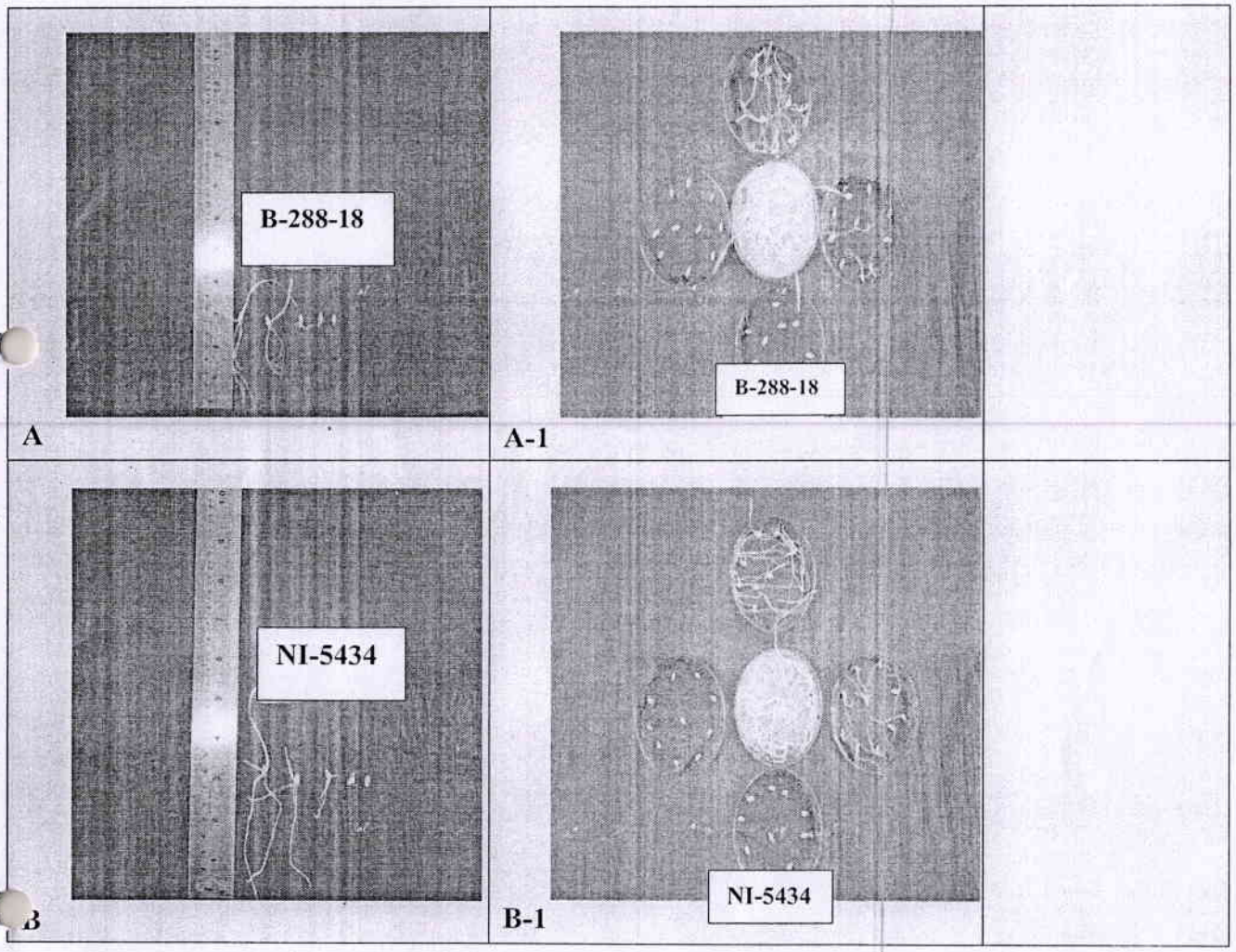
Table 2:- Effect of PEG-6000 induced water stress on seed germination parameters on wheat cultivar.

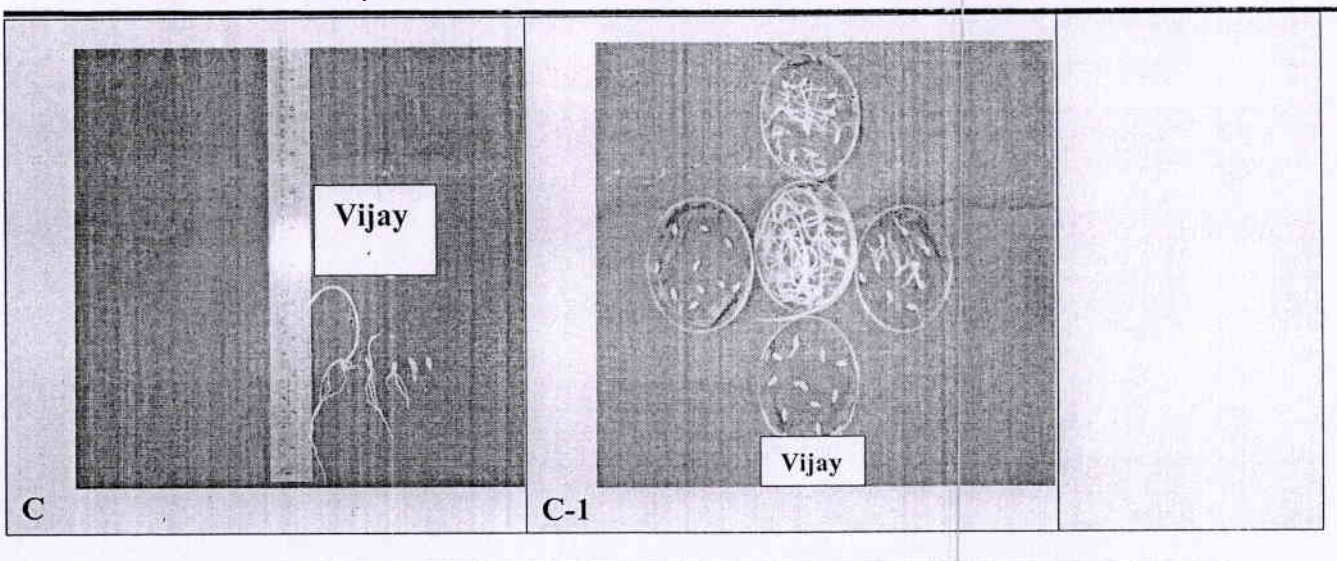
Wheat Cultivars	PEG-6000 Water Stress	Seed Germination Parameters				
		Root Length (cm)	Shoot Length (cm)	Fresh weight (gm)	Dry weight (gm)	Seed Germination (%)
B-288-18	Control	11.69 (SD± 3.205).	9.91(SD± 2.903)	3.55(SD± 0.29)	0.853(SD± 0.05)	100 (SD± 0.026)
	-2 Bar	7.18(SD± 1.075)	3.53(SD± 1.679)	2.06(SD± 0.032)	0.96(SD± 0.086)	100 (SD± 0.026)
	-4 Bar	2.18(SD± 0.848)	0.22(SD± 0.301)	1. 963(SD± 0.20)	1.05(SD± 0.01)	80 (SD± 0.015)
	-6 Bar	0.18(SD± 0.078)	0.08(SD± 0.037)	1.24(SD± 0.120)	1.021(SD± 0.012)	70 (SD± 0.026)
	-8Bar	0.1(SD± 0.081)	0.06 (SD± 0.021)	1.29(SD± 0.41)	1.009 SD±(0.002)	60 (SD± 0.026)
NI - 5434	Control	11.01(SD± 2.252)	9.71(SD± 1.91)	2.59(SD± 0.1)	0.688(SD± 0.044)	100 (SD± 0.0264)
	-2 Bar	8.11(SD± 1.875)	3.75(SD± 2.157)	1.51(SD± 0.060)	0.806(SD± 0.024)	100 (SD± 0.0264)
	-4 Bar	4.68(SD± 15.00)	0.26(SD± 0.126)	1.22(SD± 0.11)	0.899(SD± 0.044)	100 (SD± 0.0264)
	-6 Bar	0.72(SD± 0.250)	0.11(SD± 0.051)	1.44(SD± 0.072)	0.898(SD± 0.044)	80 (SD± 0.015)
	-8Bar	0.04(SD± 0.057)	0.03(SD± 1.69)	1.11(SD± 0.060)	0.920(SD± 0.01)	30 (SD± 0.021)
Vijay	Control	11.13(SD± 1.48)	10.77(SD± 1.97)	4.48(SD± 0.224)	1.036(SD± 0.018)	100 (SD± 0.026)
	-2 Bar	4.68(SD± 2.14)	1.7(SD± 2.15)	1.97(SD± 0.116)	1.274(SD± 0.087)	100 (SD± 0.026)
	-4 Bar	2.86(SD± 1.248)	0.19(SD± 0.126)	2.02(SD± 0.052)	1.251(SD± 0.025)	90 (SD± 0.025)
	-6 Bar	0.45(SD± 0.452)	0.12(SD± 0.051)	1.94(SD± 0.100)	1.333(SD± 0.11)	90 (SD± 0.025)
	-8Bar	0(SD± 0.00)	0(SD± 1.6)	1.63(SD± 0.106)	1.284(SD± 0.142)	0 (SD± 0.0)

Motiya	Control	6.8(SD± 2.305)	6.69(SD± 2.29)	3.52(SD± 0.219)	0.854(SD± 0.068)	100 (SD± 0.0264
	-2 Bar	3.08(SD± 1.711)	0.39(SD± 0.409)	1.63(SD± 0.005)	1.007(SD± 0.058)	100 (SD± 0.0264)
	-4 Bar	0.78(SD± 0.629)	0.13(SD± 0.047)	1.93(SD± 0.105)	0.981(SD± 0.21)	80 (SD± 0.015)
	-6 Bar	0.15(SD± 0.121)	0.08(SD± 0.037)	1.19(SD± 0.106)	0.951(SD± 0.115)	70 (SD± 0.026)
	-8Bar	0(SD± 0.00)	0(SD± 0.00)	1.14(SD± 0.075)	0.952(SD± 0.026)	00 (SD± 0.0)
Gulab	Control	6.23(SD± 1.246)	6.84(SD± 1.142)	3.38(SD± 0.14)	0.942(SD± 0.120)	100 (SD± 0.0264)
	-2 Bar	3.56(SD± 1.460)	1.38(SD± 1.032)	1.44(SD± 0.120)	0.859(SD± 0.280)	100 (SD± 0.0264)
	-4 Bar	0.86(SD± 0.340)	0.13(SD± 0.106)	1.34(SD± 0.170)	1.015(SD± 0.008)	70 (SD± 0.026)
	-6 Bar	0.15(SD± 0.197)	0.06(SD± 1.52)	1.16(SD± 0.083)	0.982(SD± 0.142)	60 (SD± 0.026)
	-8Bar	0(SD± 0.00)	0(SD± 0.00)	1.1(SD± 0.057)	0.981(SD± 0.132)	00 (SD± 0.0)
NI-59	Control	9.91(SD± 1.023)	11.51(SD± 2.133)	4.19(SD± 0.080)	1.068(SD± 0.039)	100 (SD± 0.0264)
	-2 Bar	6.97(SD± 1.154)	2.64(SD± 1.623)	2(SD± 0.060)	1.125(SD± 0.071)	100 (SD± 0.0264)
	-4 Bar	1.19(SD± 0.859)	0.1(SD± 0.0462)	1.51(SD± 0.105)	1.142(SD± 0.072)	80 (SD± 0.015)
	-6 Bar	0.44(SD± 0.292)	0.1(SD± 0.053)	1.34(SD± 0.121)	1.13(SD± 0.068)	70 (SD± 0.026)
	-8Bar	0.07(SD± 0.095)	0.04(SD± 0.00)	1.21(SD± 0.1050)	1.04(SD± 0.0120)	60 (SD± 0.026)
Kenphad	Control	11.39(SD± 1.726)	9.32(SD± 1.112)	3.95(SD± 0.125)	0.849(SD± 0.174)	100 (SD± 0.0264)
	-2 Bar	6.3(SD± 2.206)	1.18(SD± 0.436)	1.76(SD± 0.125)	0.996(SD± 0.11)	100 (SD± 0.0264)
	-4 Bar	4.55(SD± 1.151)	0.19(SD± 0.110)	1.602(SD± 0.101)	1.073(SD± 0.037)	100 (SD± 0.0264)
	-6 Bar	1.52(SD± 0.922)	0.12(SD± 0.0421)	1.38(SD± 0.141)	0.99(SD± 0.135)	100 (SD± 0.0264)

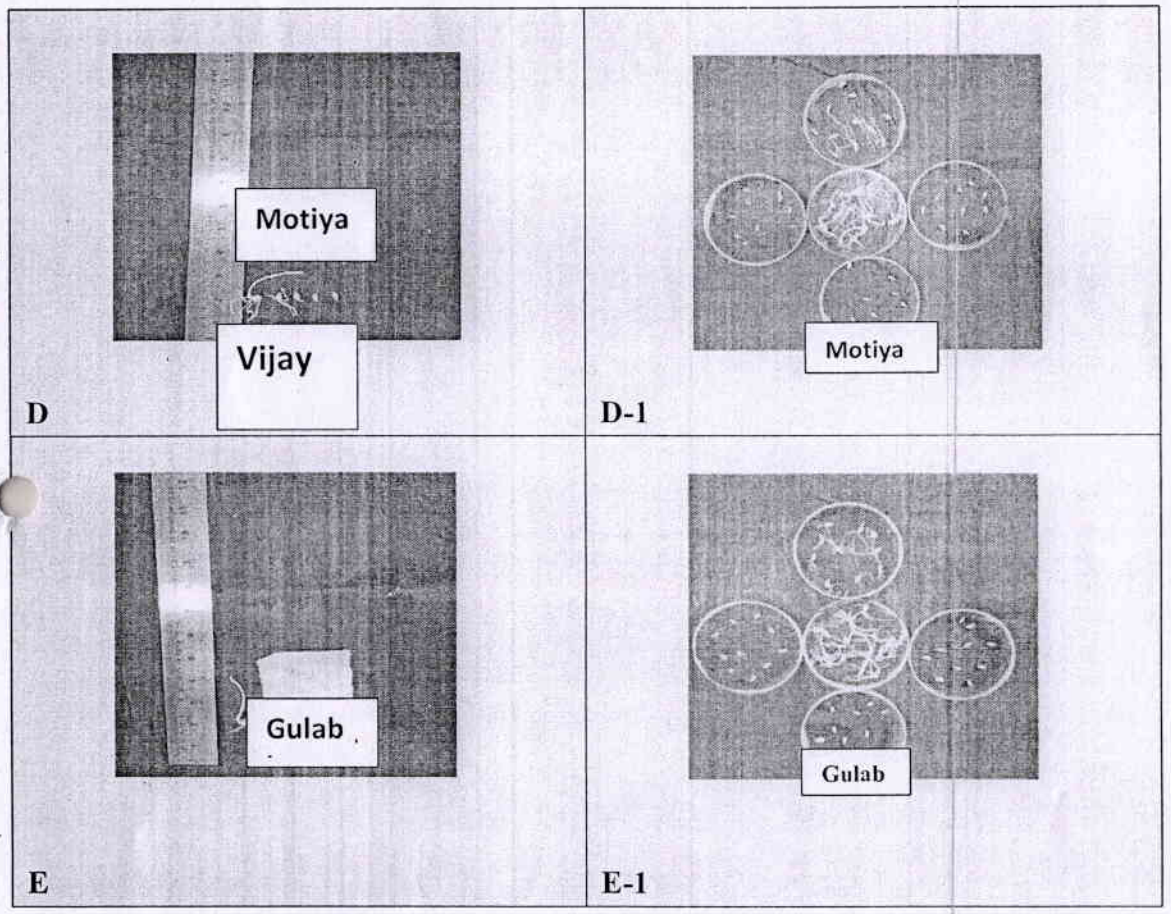
	-8Bar	0.05(SD± 0.00)	0.05(SD± 0.00)	1.18(SD± 0.098)	0.979(SD± 0.125)	50 (SD± 0.01)

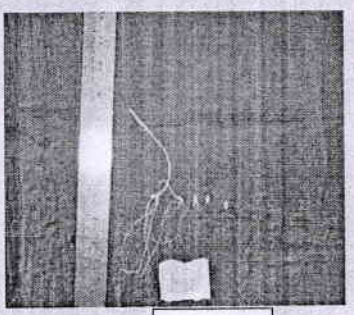
Photoplate-1:- Effect of PEG-6000 induced water stress on seed germination parameters on *B-288-18; NI-5434 and Vijay* wheat cultivar





Photoplate-2:- Effect of PEG-6000 induced water stress on seed germination parameters on *Motiya; Gulab; NI-59 and Kenphad* wheat cultivar





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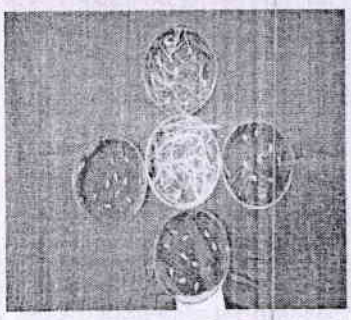

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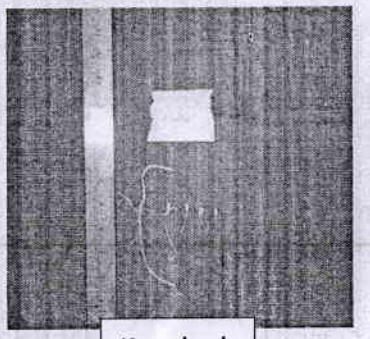

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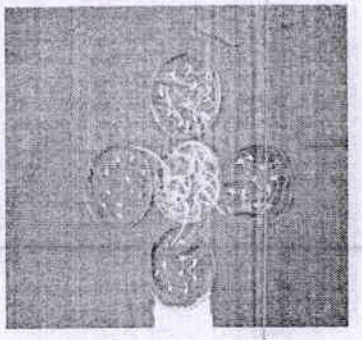

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VQEDC- 2024

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Research article: (Botany)

TAGETES PATULA LINN., A FUNGICIDAL, ORNAMENTAL SPECIES OF ASTERACEAE FAMILY.

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Abstract

Plants produce varieties of chemicals as secondary metabolites. These natural chemicals produced by the plants when secreted in the environment either promote or inhibit growth of other plants and even microbes. They are called allelochemicals which are eco-friendly i.e. biodegradable and are abundantly available. Inhibitory allelochemicals could be used as biocides in controlling fungal diseases of crops. Laboratory bioassay work was done for finding out allelopathic potentials of a common ornamental herb *Tagetes patula* Linn.of Asteraceae family. In the present work it was found out that the fresh leaf extracts of *Tagetes patula* Linn. of various concentrations inhibited mycelial growth of *Fusarium oxysporum* f. sp. *lentis* Schl. .

Key words: *Tagetes patula* Linn. , antifungal, *Fusarium oxysporum* f. sp. *lentis* Schl.

Article History

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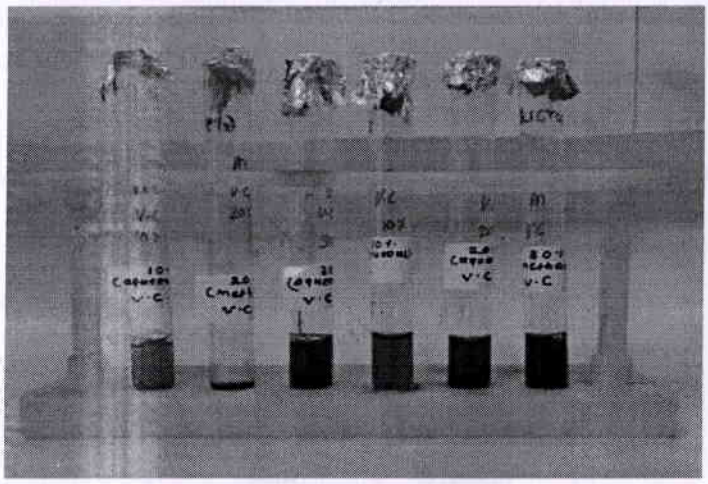
Introduction

Allelopathy, a current area of research, may be useful in agriculture to controlling diseases of crops. Plant- produced chemicals are good botanical source of biocides are eco-friendly i.e. biodegradable, renewable and abundantly available. Therefore, there is a vast scope for research in Allelopathy and crop diseases. Molisch (1937), father of Allelopathy introduced the word "Allelopathy" for beneficial as well as harmful (detrimental)



2) Leaf Extracts.

Table No 1: Effect of aqueous and methanolic leaf extract of *Tagetes patula* Linn.on growth of *Fusarium oxysporum*

Sr No	Extract	conc	Inhibition zone (in mm)	P-value	CD at 0.05%
1	Aqueous	control (DW)	0.00a ±0.00	1.67E-12	0.026
		10%	0.044b ±0.007		
		20%	0.14c ±0.019		
		30%	0.144d ±0.020		
2	Methanolic	control (DW)	0.00a ±0.00	3.7E-12	0.029
		10%	0.077b ±0.01		
		20%	0.108c ±0.013		
		30%	0.190c ±0.026		

Data presented are means of six replicates; values within the same column with different letters a(a,b,c,d)are significantly different at 0.05% P-level by Single factor ANOVA test followed by CD & Tukeys test.,

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PLANTS SPECIES USED BY TRIBES OF MURBAD TAHASIL IN DYING AND TANNING.

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ABSTRACT
Present work is the outcome of Ethnobotanical exploration of Murbad Tahasil, Dist.Thane. Recording of plant species used by tribes to obtain dyes in Murbad Tahasil was done. Tribal people obtain dyes from plant sources and use them for coloring bamboo crafts/articles, draw pictures on walls, colour horns of cattle, and prepare colored masks.
Key words: Ethno botany, plant species, dying and tanning

INTRODUCTION
Hershberger (1895) coined the term 'Ethno botany' for the study of plant species used by aboriginal people. Ethnic's knowledge of tribes related to plant resources is documented in 'Ethno botany'. Researchers record and try to save the traditional knowledge of tribes. Tribes in Thane district are: viz. Thakur, Warali, Katkari and Koli. The present Ethnobotanical work in Murbad tahasil was undertaken. The plants are keenly associated with the social customs and rituals of tribes.
Location of Murbad Tahasil: It is mountainous and tribal Tahasil of Thane District which lies approximately at $19^0\ 31^1$ N and $73^0\ 35^1$ E (Collectorate of Thane District, 2014). The forests are of tropical mixed deciduous and semi-evergreen types dominated by Madhuca-Terminalia community. The area under forest cover is categorized under reserved, protected and unclassed forests of aggregate area 362.56 sq kms.
The tribal people spend maximum time in the forests and collect different materials viz. flowers, fruits, nuts, bark, shoots, tubers, roots, leafy vegetables, gum, honey and leaves of Gunj and Bel trees. Katkari (Kathodi) is a nomadic tribal group. They are socially as well as economically backward.

REVIEW OF LITERATURE
Tribals of Chhattisgarh obtain dyes from plant sources viz. flowers of Butea monosperma (Lamk.) Taub., Woodfordia fruiticosa (L.) Kruz., fruits of Mallotus philippensis Muell.Arg., and whole plants of Indigoflora tinctoria L. and tannin from Emblica officinalis Gaertn., Cleistanthus collinus (Roxb.) Benth. & Hk.f., Acacia catechu (L.f.) Willd., Carea arborea Roxb. and Terminalia alata Roxb. (Tirkey et al., 2006).
Patan city of North Gujrat region of Western India is famous for weaving 'Patola' hand woven textiles. People use dye yielding plants such as: Acacia chundra (Roxb. ex Rottl.) Wild. (Brown), Allium cepa L.(yellow), Bixa orellana L. (Orange-Red), Cosmos bipinnatus Cav. (Yellow), Indigofera tinctoria L. (Indigo-blue), Rubia cordifolia L. (Red), Terminalia chebula Retz. (Dark blue) are used along with different mordents to obtain various colour shades (Punjani and Goel, 2007).
The Bagh printing and dyeing, a traditional art of Dhar (MP) is well known globally for its brightness and glow. They use dye yielding plant species. Azadirachta indica A. Juss., Curcuma longa L., Cinnamomum tamala T. Nees., Lawsonia inermis L., Tagetes eracta L.and Terminalia chebula Retz. yield yellow dye; while Woodfordia fruticosa (L.) Kurz., Musa paradisiaca L., Morinda tinctoria Roxb., Anogeissus latifolia (DC.) Wall. ex Bedd. and Acacia nilotica (L.) Willd. ex Bedd. yield red-brown dye. For green colour Mangifera indica L. and Punica grantum L. are used (Satya, 2012).

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METHODOLOGY -Extensive field work was done in the forest area with the help of local tribe people. The information about uses of plants in dying and tanning was confirmed from the discussion with the tribal. The ethnobotanical methodology of previous workers was followed (Jain, S. K. and Mugdal, V. 1999; Malhotra et al 2001.). The data of plants was entered in a field notebook

RESULTS AND DISCUSSION

Tribal people obtain dyes from plant sources and use them for coloring bamboo crafts/articles, draw pictures on walls, colour horns of cattle, and prepare colored masks. Enumerations are given below.

ENUMERATIONS

1. Erinocarpus nimmonii Grah. Bombay Pl. 21. 1839; Mast. in Hook, f. Fl. Brit, India 1: 394. 1874(as 'nimmoanus'); Cooke, Fl. Pres. Bombay 1:155.1958 (Repr. Ed); Pradhan **in** Singh et al. Fl. Maharashtra St. Dicot.1:383. 2000. Chera, Chira. Family Tiliaceae.

Trees, 7 m tall; leaves orbicular lobed, base cordate; flowers yellow, mild fragrance; fruits 1-4 celled; seeds one in each cell, oblong.

Fls & Frts : August- October.
Distrib : Common in deciduous, semi evergreen forest. Endemic Western Ghats. Malshej Ghats (NACSA) 107.
Uses : Flowers yield yellow dye and is used to decorate 'Bamboo-crafts'.
Literature : Jain (1991) -(bk) cordage.

2. Schleichera oleosa (Lour.) Oken. in Allg. Naturf. 3 (2): 1341. 1841; Hiern. **In** Hook, f. Fl. Brit, India 1: 681. 1875; Cooke, Fl. Pres. Bombay 1:283.1958 (Repr. Ed); Kulkarni **in** Singh et al. Fl. Maharashtra St. Dicot.1:577. 2000. Koshimb. Family Sapindaceae

Trees; 5to13m in height; leaves paripinnate, leaflets elliptic-oblong, coriaceous, reddish; flowers greenish- white in panicle cymes, polygamo- dioecious; drupes ovoid, small blunt prickles; seeds 1-2.Fls & Frts : February- June

Disturb : Occasional on denuded hill slopes. Gorakhgad (NACSA) 282. Siddhagad (NACSA) 099..
Uses : Timber wood. Agricultural tools viz. plough (Dat) , 'Petari' Flowers yield dye.
Literature : Rout, (2007) -(fr) edible. Pawar et al. (2004) -(bk) fish poison. Upadhye and Kumbhojkar (1998) -(bk) dye.

3.Butea monosperma (Lam.) Taub in Eng. & Prantl, Pfam. 3(3): 365. 1894.; Baker in Hook, f. Fl. Brit, India 2: 194. 1876; Cooke, Fl. Pres. Bombay 1:395.1958 (Repr. Ed); Kothari **in** Singh et al. Fl. Maharashtra St. Dicot.1:610. 2000. Palas.Family Fabaceae.

Tree; bark- ash coloured, fissured; leaves trifoliate, leaflets ovate- oblong or rhomboid; flowers scarlet red, in compact racemes; pods stalked, one- seeded, silvery tomentose.

Fls & Frts : January- June.
Distrib : Common in dry deciduous forest. Veherewadi (NACSA), 256.
Uses : Flowers yield natural dye. preparation- dry powder of flowers boiled in water and lime is added. Used for coloring Bamboo- crafts
Literature : Khanna and Kumar (2000) -(fl) urinary blockages. Patel, et al., (2003) -(lf) hut. Ishtiaq et al. (2013) - (wd) timber, fuel.

4.Butea superba Roxb. ex Willd. Var. Sp. Pl. 3: 917. 1802; Baker in Hook, f. Fl. Brit, India 2: 195. 1876; Cooke, Fl. Pres. Bombay 1: 396. 1958 (Repr. Ed); Kothari **in** Singh et al. Fl. Maharashtra St. Dicot. 1: 611. 2000. Palashi.Family Fabaceae.

Liana, leaves trifoliate, leaflets, ovate-rhomboid or elliptic-oblong; flowers bright-orange or scarlet in terminal and axillary racemes; pods brown, hairy, oblong, narrowed at base.

Fls & Frts : January- June.
Distrib : Common in deciduous forest. Sonawale (NACSA), 167.

Uses : Flowers- Natural dye preparation- dry powder of flowers boiled in water and lime is added. Used for coloring Bamboo- crafts- 'Toplis'
Literature : Jain (1991) -(fl) dysuria.

5.Acacia catechu (L.f.) Wild.(= A. catechuoides) Sp. Pl. 4: 1079. 1806; Baker in Hook. Fl. Brit. Ind. 2: 295. 1878; Cooke Fl. Pres. Bombay1: 476. 1958 (Repr. Ed.); Londhe **in** Singh et al. Fl. Maharashtra St. Dicot. 1: 808. 2000. Khair.Family Mimosaceae.

Tree; 10-12 m in height; 30 to 50 pairs of leaflets; flowers in axillary spikes, Calyx, petals and rachis pubescent; ; stalked, brown, shining pods, Seeds 3-10.

Fls.& Frts. : June-October.
Distrib. : Common in deciduous forest. Zapwadi (NACSA), 268.
Uses : wood pieces are boiled in water and filtrate settle as 'Kattha' (black dye)

6. Haldina cordifolia (Roxb.) Ridsd.in Blumea 24: 361. 1978; Kothari & Moorthy, Fl. of Raigad Dist. 182, 1993; Almeida, Fl. Sawantwadi, 205, 1990; Cooke, Fl. Pres. Bombay 1:626, 1903. Mudaliar & Prasad **in** Singh et al. Fl. Maharashtra St. Dicot.2:127. 2001 Hedu, Haldu, Family Rubiaceae.

Trees; leaves crowded at ends of branchlets, orbicular, shortly acuminate, cordate at base, lower surface densely pubescent; flowers in peduncle heads, globose, yellow, capsules 4-5mm, seeds six in each cell.

Fls & Frts : May- August.
Distrib : deciduous forest. Mhadas (NACSA), 227.
Uses : Bark yields yellow colour; Timber wood; Agri. Tools: Plough.
Literature : Sharma and Singh, (1999) -(bk) stomachache. Jain, (1991) -(lf) headache, (wd) tools, (bk) yellow dye.

7.Morinda pubescens J. E. Sm in Rees, cyclop. 24, n. 3. 1813; Hook, f. Fl. Brit, India 3: 156. 1880; Cooke, Fl. Pres. Bombay 2:43.1958 (Repr. Ed); Mudaliyar and Prasad **in** Singh et al. Fl. Maharashtra St. Dicot.2:146. 2001. Bartondi, Asu.Family Rubiaceae.

Medium sized trees; leaves obovate, tomentose, elliptic-oblong; flowers white in globose heads; fruits irregularly globose, fleshy.

Fls & Frts : March- October.
Distrib : Common in dry deciduous forest. Sonawale (NACSA), 166.
Uses : Bark yielded dye. Timber wood.
Literature : Jain, (1991) -(rt) dye, (wd) timber.

8.Mallotus philippensis (Lam.) Muell.-Arg. in Linnaea 34: 196. 1865 (as Philippensis); Hook. f. Fl. Brit. India 5: 442. 1887; Cooke, Fl. Pres. Bombay 3: 113. 1958 (Repr.); Londhe **in** Singh et al. Fl. Maharashtra st. Dicot. 2: 894. 2001. Shendar.Family Euphorbiaceae.

Trees; many branches; Leaves ovate or ovate lanceolate; Flowers greenish-yellow; Capsules, 3-lobed covered with red powder; Seeds black.

Fls & Frts : November-February.
Distrib : Common on hill slopes. Malshej Ghats (NACSA), 104.
Distrib : Fruits yield red dye.
Literature : Jain, (1991) -(fr) dye, anthelmintic.

9.Emblica officinalis Gaertn. Fruct. 2: 122. 1791; Hook, f. Fl. Brit, India 5: 289. 1887; Cooke, Fl. Pres. Bombay 3: 81. 1958 (Repr. Ed); Londhe in Singh et al. Fl. Maharashtra St. Dicot.2: 873. 2001. Awala. Awalkanthi.Family Euphorbiaceae.

Deciduous trees; leaves bipinnate, leaflets linear, oblong, glabrous; flowers minute, greenish-yellow, numerous; fruits greenish-yellow, globose, smooth.

Fls & Frts : February- October.
Distrib : Common, wild as well as cultivated. Walhivare (NACSA), 053.
Uses : Fruits are dried, powdered and is used in preparation of hair dyes. .
Literature : Jain (1991) -(sd) asthma, bronchitis. Singh and Chauhan (2004) - (wp) religious; Sharma and Singh (2001) - (fr) cough.

10.Acacia chundra (Roxb. ex Rottl.) Willd.Sp. Pl. 4: 1078. 1806; Londhe **in** Singh et al. Fl. Maharashtra St. Dicot. 1: 808. 2000. Yadav and Sardesai, Fl. Kolhapur Dist. 178. 2002. Khair Lal.Family Mimosaceae.

Tree; moderate 3 to 5 m tall; 20 to 40 pairs of leaflets; flowers in axillary spikes, Calyx, petals and rachis pubescent; Pods brown, shining.

Fls.& Frts. : August-February.
Distrib : Common in deciduous forest. Khandape (NACS), 201.
Uses : Kattha(brown black dye) is prepared from wood.
Literature : Punjani and Goel, (2000) -(wd) dye.

11. Acacia nilotica (L.) Willd. Ex Del.Baker in Hook, f. Fl. Brit, India 2: 293. 1878; Cooke, Fl. Pres. Bombay 1: 472. 1958 (Repr. Ed); Londhe in Singh et al. Fl. Maharashtra St. Dicot. 1: 813. 2000;Babhul.Family Mimosaceae

Tree; tall; bark fissured, blackish-brown; leaves pinnate, leaflets 10-20 pairs; flowers in axillary, pedunculate heads, yellowish; pods stalked, linear-oblong; seeds blackish- brown, polished.

Fls.& Frts : May- February
Distrib. : Uncommon on the bunds of fields. Khandape (NACS), 205.
Uses : Bark is used in dyeing and tanning.
Literature : Khyade et al. (2010) -(tw) toothache.

12.Anogeissus latifolia (Roxb. ex Dc.) Guill. & Perr.Fl. Seneg. Teent. 1: 280. 1832; in Hook, f. Fl. Brit, India 2: 450. 1878; Cooke, Fl. Pres. Bombay 1:512. 1958 (Repr. ed.) Santapau, Fl. Khandala ed. 3. 91. 1967; Diwakar in Singh et al. Fl. Maharashtra St. Dicot.2: 1. 2001; Dhawada.Family Combretaceae.

Deciduous tree; leaves opposite or sub opposite, elliptic-oblong; flowers sessile in dense heads; fruits clustered, with persistent calyx, wings entire, beaked; seeds ovoid solitary.

Fls & Frts : September- March.
Distrib : Common in dry deciduous forest. Mal (NACSA), 242.
Uses : leaves yield brown dye.
Literature : Satya, (2012) -(lf) dye. Sonawane et al., (2012) -(st) timber, gum.

13.Terminalia chebula Retz.Obs. Bot. 5: 31. 1788; Cl. in Hook, f. Fl. Brit, India 2: 446. 1878; Cooke, Fl. Pres. Bombay 1:509. 1958 (Repr. ed.); Diwakar **in** Singh et al. Fl. Maharashtra St. Dicot.2: 4. 2001.Hirda.Family Combretaceae.

Tree; leaves elliptic oblong, base rounded, apex obtuse; petioles with 2 glands near the tip; flowers white-pale yellow; drupes pendulous, ellipsoid, yellowish-green, faintly ribbed; stone oblong.

Fls.& Frts. : March- November.
Distrib : Uncommon on hill slopes in forests. Siddhagad (NACSA), 094.
Uses : Fruits yielded yellow dye.
Literature : Satya, (2012) -(fr) cold & cough; Jain, (1991) -(fr) dye.

14.Woodfordia fruiticosa (Linn.) Kurz. in J. Asiat. Soc. Beng. 40 (2): 56, 1871; Diwakar in Singh et al. Fl. Maharashtra St. Dicot.2: 39. 2001; Santapau, Fl. Khandala ed. 3, 313,1967; Almeida, Fl. Sawantwadi 182, 1990. Dhayti, Dhauri.Family Lythraceae.

Shrub; leaves oblong lanceolate, glabrous, glandular punctuate beneath; flowers deep red or scarlet in axillary or extra axillary fascicled cymes; capsules oblong, brown.

Fls & Frts : January- May.
Distrib : Common on slopes and along roadsides. Mhadas (NACSA), 233.
Uses : Red dye is obtained from flowers.
Literature : Sharma and Singh (2000) -(rt) snakebite. Satya, (2012) (fl) dye;

15.Curcuma longa L.Sp. Pl. 2. 1753, pro. max. parte.; Baker in Hook, f. Fl. Brit, India 6: 214. 1890; Cooke, Fl. Pres. Bombay 3: 328. 1958 (Repr. Ed); Yadav and Sardesai, Fl. Kolhapur Dist. 476. 2002. Halad.Family Zingiberaceae.

Herbs; rootstock ovoid; sessile cylindrical tubers, tubers orange inside; leaves oblong-lanceolate; flowers white.

Fls & Frts : Not seen
Distrib : Cultivated in backyards. Kheware (NACSA), 024
Uses : Rhizomes yield natural yellow dye.
Literature : Satya, (2012) -(rh) dye. Sharma and Singh, (2001) -(rh) antiseptic.

16. Oroxylum indicum (L.) Vent.Dec. Gen. Nov. 8. 1808; Cl. In Hook, f. Fl. Brit, India 4:378. 1884; Cooke, Fl. Pres. Bombay 2:401.1958 (Repr. Ed); Londhe **in** Singh et al. Fl. Maharashtra St. Dicot.2:575. 2001. Tetar.

Trees; leaves opposite pinnate, leaflets elliptic-oblong, acuminate; flowers yellowish purple; capsules flattened , huge, bent ; woody; seeds many, winged. Family Bignoniaceae

Fls & Frts : May- December
Distrib : Common in deciduous forest. Kheware (NACSA), 135.
Uses : Bark,flowers and fruits are used for tanning and dyeing.
Literature : Jain (1991) - (fr) vegetable, (bk, Fr) dye.

Present work is the result of intensive, systematic, Ethnobotanical exploration of Murbad Tahasil, Dist. Thane. Genera and species of medicinal plants used by tribes of Murbad Tahasil in treatment of human ailments are recorded. Total 16 plants were recorded belonging to 10 families.

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