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DIVERSIFICATION OF MYCORRHIZAL FUNGI ASSOCIATED WITH SOME SELECTED MEDICINALLY IMPORTANT PLANTS IN THE CONTEXT OF MEERUT DISTRICT

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ABSTRACT:
The Indian subcontinent has an enormous abundance of restorative plants and a decent extent of the therapeutic plant species happen all through the nation. The central Himaliyan region, peninsular forests the Western Ghats (Parrota, 2001), the north east region have been highly documented for their significant diversity of these plants. But many regions though quite rich in this type of flora have been neglected. Medicinal plants are important as they have been used for their properties since times immemorial. The excavations of many of the past civilizations have unearthed some remains of these plants. The recorded history constitutes ayurvedic texts and various other religious tomes which provide a detailed and in depth usage of the extracts of the medicinal plants. In modern times too the medicinal systems use more than 70,000 plant based products, in their medication either as such or as minimum compounds. This knowledge and products are used in pharmacological research and drug development, not only as plant constituents used directly as therapeutic agents, but also as starting materials for the synthesis of drugs or as models for pharmacologically active compounds. The commonly found medicinal plants in the Meerut district are mentioned in the list attached.
Key Words: Pharmacological, World Health Organization, Arbuscular Mycorrhizal.

INTRODUCTION:

With the growing recognition of natural products, as being non-toxic, without side effects and their ease of availability at affordable prices demand for medicinal plants is increasing in both developing and developed countries due to an increasing demand for medicinal plants and due to this reason loss and fragmentation of natural habitats has been recorded. About 300 species of Indian medicinal plants have been assessed as under threat in the wild (based on International Union for Conservation for Nature (IUCN) (Red List Criteria). Around 1,000 species are estimated to be facing various degrees of threat across different bio-geographic regions in the country (Seth and Sharma, 2004).

Plants are one of the most important sources of medicines. The relevance of plants as medicines dates back to prehistoric period. The medicinal plants are extensively utilized throughout the world basically by two means of health care system management which are traditional and modern. The World Health Organization (WHO) reported that as many as 80% of the world population depend upon traditional medicines for their primary health care (Singh et al., 2010; Dubey, 2004, Gautam R P, 2015)

Therapeutic plants are still broadly utilized for medical care by ancestral. As the new age is redirected towards the allopathic medications, ethnobotanical information on significant restorative plants stayed confined to the elderly individuals just (Amjad et al., 2014). The United Nations through WHO projects looked to advance and create customary medication in the medical care frameworks to coordinate conventional medication and present day medication and to advance labor improvement and exploration in conventional medication (Adachukwu and Yusuf, 2014).

India has 10 of the world's biodiversity wealth which is scattered across 16 agro climatic zones (Raut et al., 2010). Plants have been used by familial and close by people for fix of various ailments. As most

of the ailments of present day society are style disorders and the use of helpful plants can destruction such issues. Likewise a couple of irksome diseases have issues related with centrality, diabetes; psychological decrease could be reestablished reasonably by the use of characteristic drug which generally is absurd by the allopathic prescriptions (Agarwal et al., 2013). Essentialness of remedial plants in regular clinical administrations practices which offer clues to new domains of assessment and in biodiversity protection is as of now striking. In any case, information on the businesses of plants for medicine is absent from various lopsided and hereditary zones of Kashmir Himalayas (Jeelani et al., 2013). The use of plants for remedial purposes and human food has been eventually in India since Vedic events. The soonest notice of the therapeutic usage of the plants is found in Rig-Veda (1500-400 B.C) and Atharveda (1500 BC). In India, around 17000 plant species out of which 7500 are known for remedial jobs. In India, Ammal began the work on ethno home grown science while working in BSI (Kumar Mahesh et al., 2009; Zishan et al., 2016) In view of the innate Indian strengths, which include diverse ecosystems for growth of meditional plants, farming capacity, strong manufacturing sector, the medicinal plants sector can provide a huge export opportunity after fulfilling domestic needs (Kumar et al., 2013). Nature has bestowed our country with an enormous wealth of medicinal plants, therefore, India has often been refered to as the "medicinal garden of the world" .Medicinal plants are being looked upon not only as a soruce of health care but also as a source of income (Sachan et al.,2015 and Om Prakash et al.,2017)

Meerut is having lofty space in the history of India. The principal upset for opportunity of India was begun here itself in 1857 by extraordinary child of this dirt Mangal Pandey. Capital of Kauravs and Pandavas was at Hastinapur. Meerut is 65 km away from the National Capital Territory. Rich place where there is Meerut for developing numerous types of tree. The absolute woodland zone in the Meerut region is 21,314 hectare. Trees are a significant piece of life. Since the start, trees have outfitted us with two of life's fundamentals, food and oxygen. Trees add to their current circumstance by purifier's air quality, atmosphere improvement, Water purifiers, saving water, protecting soil, and supporting natural life and appropriation of many associated uncommon species with trees, and the genuine figure is probably going to be a lot higher.

Mycorrhiza is a symbiotic mutualistic relationship between soil fungi and roots. This association is mutualistic, so both the organisms benefit from the association. The fungus receives food and growth factors from the plant, and in return provides many benefits to the plant, primary being that of increased absorption. Here the fungus acts as the plant's root hairs and basically behaves as an extension of its root system (Kaushik, 2011).

Arbuscular Mycorrhizal (AM) symbiosis is formed by approximately 80% of the vascular plant species in all terrestrial biomes (Smith et al., 2010). Arbuscular mycorrhizal fungi (AMF) are of great ecological importance, since arbuscular mycorrhizae is the most widespread plant symbiosis that often improves plant productivity (Fedderman et al., 2010). The main advantage of mycorrhizae to the host plants is the extension of the penetration zone of the root fungus system. The interconnected networks of external hyphae act as an additional catchment and absorbing surface in the soil (Sharma, 2004). The increased efficiency of mycorrhizal roots versus non mycorrhizal roots is caused by the active uptake and transport of nutrients especially immobile minerals like P, Zn and Cu (Phiri et al., 2003; Jamal et al., 2002)

MYCORRHIZA:

The term mycorrhiza is coined by Albert Bernard Frank in 1885 who was a German Forest Plant Pathologist. Mycorrhiza is the combination of two words, one Greek Mykes (Mushroom/Fungus) and other Latin Rhiza (roots), it literally implies parasite root. It is characterized as an association or symbiosis among plants and non-pathogenic organisms that colonize the cortical tissue of roots during

times of dynamic plant growth (Sharma et al., 2014). It is described by bidirectional development of supplements where carbon flows to organism and inorganic supplements move to the plant. About 95% plant species harbor mycorrhizal association.

MEDICINAL PLANTS AND MYCORRHIZAL FUNGI:

A restorative plant is any plant which, in at least one of its organ, contains substance that can be utilized for helpful reason or which is an antecedent for amalgamation of valuable medications (Sofowora, 1982). Plants owe their temperances as clinical operators to optional metabolites that they integrate and have offered in excess of 7000 distinct aggravates that are being used today as heart drugs, diuretics, against malignant growth specialists, hormones, anti-toxins, analgesics, sedatives, ulcer mixes and antiparasitic mixes (Biradar and Reddy, 2007).

Immunization of Mentha piperita L. with Glomus fasciculatum in unsterilized soils created better root colonization with fundamentally higher complete root length, shoot dry weight, P take-up, natural and inorganic P portions in leaf tissues and oil yields when contrasted with the un-vaccinated control, both at insufficient and elevated levels of soil P (Sirohi and Singh, 1983). Rao et al. (1988) recorded AM fungal association in root tests of 25 restorative plants developing in red sandy topsoil soils of Bangalore and no connection was seen between percent root colonization and the chlamydospore number in the rhizosphere soil. Bass (1990) detailed physiological impacts of AM colonization comparable to interior P focus in Plantago major and Pletosperma species.

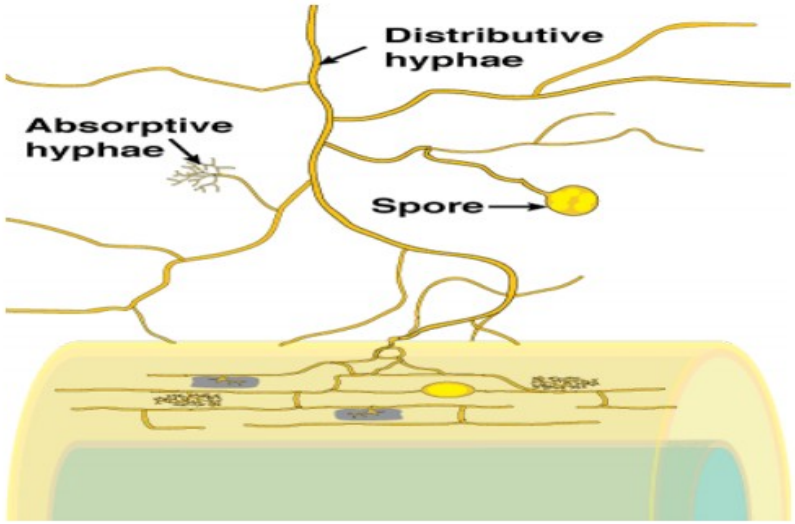


Figure 1.1: Types of extraradical mycelium

DEFENSE ENHANCEMENT IN MYCORRHIZA COLONIZED PLANTS:

AMF has a place with request Glomales of Zygomycetes family. Since AMF are absolutely subject to their host plant to duplicate and endure they are most popular as 'commit biotrophs'. The endeavor accordingly creates among plant and growth is of the common benefits accomplished by both. AMF colonizes the plant root cortex and structures bramble or little tree like structures known as arbuscules implied for nutrient trade between the partners. Extraradical hyphae framed by AMF in soil expand the retention effectiveness of plant roots by intersection nutrient consumption zones and along these lines broadening the compass for inorganic nutrients like phosphate and nitrate. Plants respond this assistance by providing photosynthates to fungal partner. The association guarantees tight bidirectional guideline of mutualism. This deal practice is overseen by plants through specific modifications in its primary just as auxiliary digestion and furthermore altering its safeguard mechanisms.These corrections develop the plants potential to wade through anxieties.

REVIEW OF LITERATURE:

It is currently accepted, that this old gathering of growths has been instrumental during the time spent land colonization by plants (Pirozynski and Malloch, 1975; Schubler 2002; Simon et al. 1993). MF may have assumed a key function in the capacity of the primary land plants to gain water, since hereditary plants needed roots. Another speculation proposes that an expanded admittance to restricting assets, for example, phosphorus, may have been the most inept advantage for plants that should have advanced in clammy natural surroundings (Heigason and Fitter, 2005). Today, most of land plant mycorrhiza. A section from vascular plants, two of the crude surviving gatherings of land plants, hornworts (Anthocerotae) and liverworts (Hepaticeae), much of the time structure advantageous interaction with glomeromycota organisms in their rhizoids. The utilitarian noteworthiness of this 'mycorrhiza'- like affiliation isn't yet completely comprehended (Selosse et al., 2005).

The principle advantage for vascular plants having mycorrhiza has customarily been viewed as expanded admittance to soil supplements, specifically phosphenes. Phosphenes may be received up legitimately by the fundamentals however that make a consumption zone around the root, which is hard to eliminate because of low paces of dispersion. Phosphines were exceptionally stable particles since they will in general form edifices together high muds. Hyphae are more slender than roots and hence 'Less expensive' to create and more compelling at misusing Microsystems which are genuinely distant to enormous roots. A section from phosphorus, MF have demonstrated to be conceivably ready to take up both natural (Hodge, Campbell and Fitter, 2001) and inorganic nitrogen from the dirt (Govindrajulu et al., 2005) some examinations additionally recommend that this old beneficial interaction may likewise have other significant capacities. Exploratory examinations have indicated that decrease of microorganism contaminations (Borowicz, 2001; Newshm, Fitter and Watkinson, 1995), improvement of water relations (Auge, 2001; Porcel et al., 2006) and restricting their take-up of hefty metals (Leyval, Turnau and Haselwandter, 1997) can be likely advantages as long as mycorrhiza vegetation.

AIMS AND OBJECTIVES:

1. To study the anatomical relationship of the Mycorrhizal fungi with selected plants.
2. To assess the edaphic condition variation on mycorrhizal root colonization and sporulation of V AM fungi in Plants ie.,Aegele maramelos,Azadirecta indica,Cassia fistula and Saraca asoka

MATERIALS AND METHODS:

STUDY SITE:

Meerut is having prestigious space in the Indian history. The primary change for chance of India was started here itself in 1857 by staggering offspring of this soil Mangal Pandey. Capital of Kauravs and Pandavas was at Hastinapur. Meerut is 65 km away from the National Capital Territory. Ready spot that is known for Meerut for building up various kinds of tree The hard and fast forest zone in the Meerut district is 21,314 hectare. Trees grouped assortment is a noteworthy bit of life. Since the beginning, trees have equipped us with two of life's basics, food and oxygen. Trees add to their condition by purifier's air quality, climate improvement, Water purifiers, checking water, protecting soil, and supporting untamed life. They furthermore cut down the air temperature and diminish the glow intensity of the nursery sway by keeping up low degrees of carbon dioxide. Trees are of particularly high organic, budgetary and social significance.

Within the current examinations, area Meerut of Uttar Pradesh, was partitioned in Four locales i.e Block: - Saroorpur, Hastinapur, Macchra, Mawanakalan block areas, were chosen for the investigation of therapeutic plants of this district in various natural surroundings, for example, woods land, rural land, crop lands, plantation lands, close to the street side, close to the houses or structures, anyplace, the restorative plants were found and recognized remembering entire the site

METHODOLOGY:

The study was directed in Meerut District during, March 2017 to September 2019. The review was done months March, May and September 2017, 2018, 2019 on the all chosen region of Meerut. Study zone, Meerut region is situated between 77º. 00' and 78º 00' longitude East and 28º 54' and 29º 15' scope North (Fig 4.1.1.1) the temperature of the region is shifts from 4º C in winter to 48º C in summer. The blustery meeting regularly begins toward the finish of June month. The normal precipitation is around 686 mm. The study included field work and multipurpose utilization of climber's data gathered from neighborhood people groups and different exploration papers. Tree species were photograph recorded by Sony Digital camera modular no. DSC HX1, during the investigation time frame. Species character, were affirmed with the assistance of the books by R.K. Chakraverty and S. K. Jain (1984), and Y. Rai (2015).

RESULTS:

IDENTIFICATION AND ENUMERATION MEDICINAL TREE PLANTS OF THE DISTT. MEERUT:

In the current examination, area Meerut of Uttar Pradesh, was separated in four square districts for example Hastinapur, Mawana and Machra and Saroorpur khurd locales, were chosen for the investigation of therapeutic plants of this area in various natural surroundings, for example, woodland land, agrarian land, crop lands, plantation lands, close to the street side, close to the houses or structures, anyplace, the restorative plants were found and distinguished remembering all the geological conditions, for example, soil type, accessibility of water, wellsprings of water, temperature conditions, geology. The current examination depends on the broad study work during July 2017-August 2019. ID of the gathered (non-recognized plant species) little therapeutic plants was done at the lab by watching their morphological characters with specialists, and on the off chance that any enormous plant isn't distinguished during the hour of review, at that point an unmistakable photo was taken and talked with the specialists and distinguished. During the study work, nearby just as local names of the therapeutic plants were likewise recorded one next to the other, talking about with the neighborhood people groups, particularly having a place with rustic region (Chakraverti and Jain, 1984, Krishen, et al., 2006, Prasanna, et al., 2012.Rai P,2015)

During the study work, a complete 37 Family therapeutic plant species were recognized and recorded in the area Meerut of Uttar Pradesh, in which subtleties of around 32 sub species are been given in detail with their worth and dissemination and the all out of 95 restorative plant assets are plainly portrayed inThe findings agree with Chakraverti and Jain, 1984; Krishen, et al. 2006; Prasanna, et al.. 2012, Rai, Y. 2015; Sachan et al.,2015; Patel DK,2015 and Rai.P, 2016. Om Prakash et al., 2017 also reported sum of the plant species used against different ailments. They discussed some of the plants used by the different tribes against different ailments.

The maximum available nitrogen 411. And 212. kg ha-1 was found in Hastinapur site and minimum 260.00 and 166.00 kg ha-1 Jani location at surface and subsurface.

However, available nitrogen content was found to be maximum in Hastinpur location. Similarly in subsurface, minimum pH 6.35 and maximum pH 8.44 was observed at both the same locations.

This may be due to the influence by parent material, rainfall and topography (Thangaswamy et al., 2005, and Kumar et .al,. 2016)

On the basis of suggested by muhr et al., (1968) 40% samples were rated low (<20 P2O5 kg ha-1), and 60% samples were medium (20– 50 P2O5 kg ha-1).

Similar results were reported by Thangaswamy et al., (2005). Kumar et al., 2016)

TABLE 1.1
MUD AND GREENERY QUALITIES AT EVERY PLAN OVERVIEWED

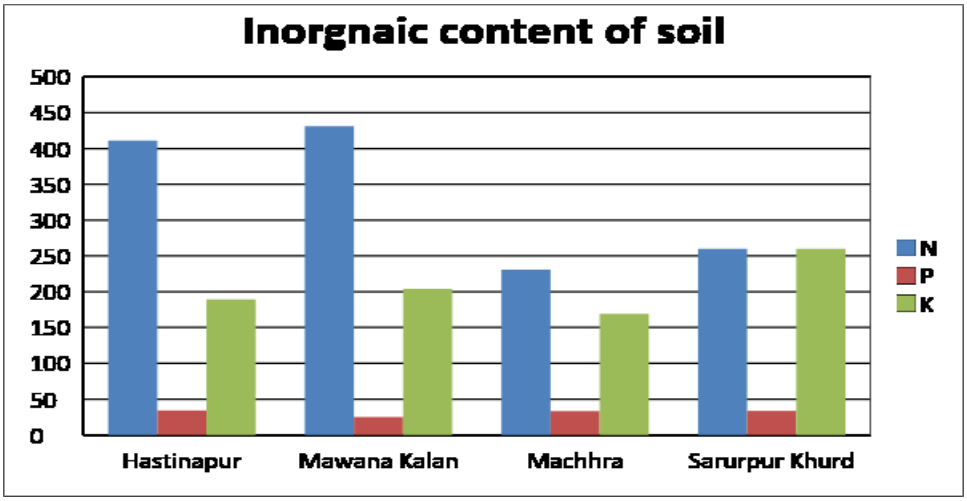
Plot characteristics	Site –Block Hastina pur	Site – Mawana kalan	Site- Machhra	Site- Sarur pur khurd
Vegetation				
Tree number (individuals ha−1)	434	419	340	403
Stem basal area (m^2 ha^{-1})	23.9	25.1	21.3	26.2
Leaf area index (m^2 m^{-2})	5.1 ± 0.6	5.5 ± 0.8	5.4 ± 0.7	5.3 ± 0.5
Soil				
pH	7.5 ± 0.3	6.8 ± 0.2	6.5 ± 0.4	5.5 ± 0.3
Water content (%)	16.5 ± 1.3	25.8 ± 3.1	16.3 ± 1.3	16.5 ± 1.2
Cation exchange (mol dm^{-3})	0.7 ± 0.2	1.2 ± 0.3	0.7 ± 0.2	0.7 ± 0.2
Clay content (%)	14.2 ± 3.9	44.3 ± 1.8	43.5 ± 1.8	44.5 ± 1.8
Carbon content (g kg^{-1})	9.5 ± 0.3	17.3 ± 0.9	9.5 ± 0.3	19.3 ± 0.8

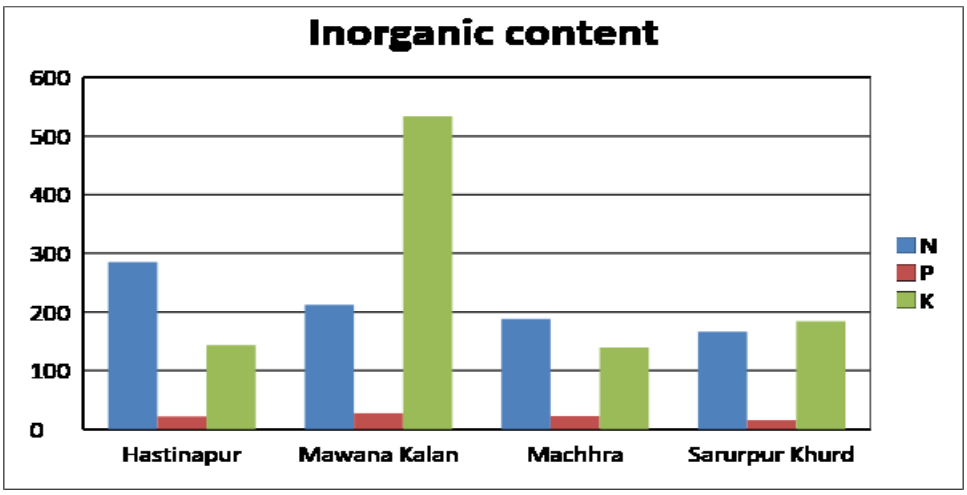
TABLE 1.2
CHEMICAL PROPERTIES IN SOILS OF OF MEERUT DISTRICT OF UTTAR PRADESH

Site	Depth (cm)	Avaiable Micronutrient Kg /h1				
		Ph	EC(dS m^{-1})	N	P	K
Block: Mawana Kalan	0–15 15–30	6.31 7.35	1.07 0.43	431 285	25.0 21.5	204 143
Block: Hastinapur	0–15 15–30	7.85 7.95	1.59 0.67	411 212	34.1 27.0	189 534
Block:Machra	0–15 15–30	7.61 8.44	0.46 0.47	231 188	33.2 22.1	169 139
Block:Sarurpur Khurd	0–15 15–30	7.12 7.80	0.28 0.21	260 166	33.5 15.2	260 184

FIG: 1.1

SHOWING THE DIFFERENT INORGANIC CONTENT AT FOUR SURVEY SITES RANDOMLY





Seasonal Survey (Two year) of Aegle marmelosa, Azadirachta indica, Cassia fistula, Saraca asoca mycorrhiza:

Based on the growth forms of selected four tree specsie ie Aegle marmelos, Azadirachta indica, Cassia fistula, Saraca asoca Mycorrhiza sampling for soil spore population and quantification of mycorrhizzal tree root colonisation was done during growth stages of the host. The samples were collected for two years from different sites of Meerut District UP, i.e., Block-Hastinpur (Site 1), Block-Mawana kalan(Site 2), and Block- Machraa (Site 3) and Sarurpur khurd (Site 4)Rural forest range. The indigenous fluorescent pseudomonads populations were isolated simultaneously.

Spore Population (no./ml of soil):

5.43.2 1.The data in Table (**Table 1.2**) and the depictions in Fig. (**Table 1.2**) A showed that irrespective of time of sampling, Hastinapur range had selected tree species Aegel marmelosa highest average spores (10.5/ml of soil, range 5.0–16.0) followed by Mawana kalan (9.3/ml of soil, range 5.8–13.2) Machhra(8.6/ml of soil,range 5.2-11.1)and Saurpur khurd (8.8/ml of soil, range 5.3-11.2).

All the sites responded to the seasons - clear higher peaks during the months of April and October with dips during the active monsoon month of July. It was noticed that over the years there was a marginal decrease in spore population in all the sites. Hastinapur 10.5-9.8,Mawana kalan 9.1 to 8.8; Saurpur khurd 9.2- to 8.4 ; Block Machhra 9.1 to 8.3).

Table (1.5.): Aegle marmelos **Spore population (no./ml of soil) of indigenous mycorrhizae in the root zone of different growth forms**

Site	Statistical parameter	Year I				Year II				Grand mean
		April	July	Oct	Mean	April	July	Oct	Mean	
Block: Mawana Kalan	Mean Range	11.3 8.2-13.8	6.2 4.8-8.4	11.2 8.2-13.8	9.5	10.1 7.8-11.2	5.7 4.9-7.1	10.8 7.7-13.3	8.8	9.1
Block: Hastinapur	Mean Range	13.2 10.6-16.1	6.5 5.4-7.8	12.1 9.5-14.5	10.3	12.2 10.5-13.5	5.8 50-67	11.6 97-11.5	9.8	10.05
Block:Machra	Mean Range	11.1 10.0-12.7	6.1 4.7 - 6.3	10.2 8.7-12.0	9.1	10.1 87-110	5.2 37-70	9.5 80-103	8.2	8.6
Block:Sarurpur Khurd	Mean Range	11.2 8.2-13.8	6.5. 5.4-7.8	10.0 7.8-11.2	9.2	10.5 7.9-11.1	5.3 37.5-70.5	9.5 7.8-12.8	8.4	8.8
	Mean	11.7	6.3	10.87	9.5	10.7	5.5	10.17	8.8	9.13

Above table shows that of sampling, Hastinapur range had selected tree species Azadirecta indica highest average spores (10.2/ml of soil, range 5.8–13.2) followed by Mawana kalan (9.3/ml of soil, range 5.8–11.2) and Saurpur khurd (9.3/ml of soil, range 6.7–11.6).and Machhra(8.7/ml of soil ,range 5.2-11.2.)
All the sites responded to the seasons - clear higher peaks during the months of April and October with dips during the active monsoon month of July. It was noticed that over the years there was a marginal decrease in spore population in all the sites are as follows Hastinapur 10.6-9.8 and Mawana kalan 9.5 to 9.0; Saurpur khurd 10.6 to 9.8; And Machhra 9.1 to 8.3.

All the sites responded to the seasons- clear higher peaks during the months of April and October with dips during the active monsoon month of July. It was noticed that over the years there was a marginal decrease in spore population in all the sites; (Mawana kalan 9.5 to 8.9; Saurpur khurd 9.4- to 9.3; Block Machhra 9.3 to 8.2).

DISCUSSION:
VAM research is popular but difficult and methodological developments are therefore still a challenge. The Field trials and methodology in particular was an inefficient start-up. A fundamental critical analysis of its limitations is urgently needed. Although the mycorrhiza field trials no longer seem to be appropriate, the evaluation of mycorrhizal propagules in soils remains a fundamental methodological

problem. There is a general propensity in applied science such as crop science to focus on results, rather than paying attention to the problems that arise in the process, which may lead to the application of insufficient methods (Aug RM 2004 ; Smith and Read,2008;Begum N **et al.,** 2019).

The tree specsie Azadirecta indica,Cassia fistula ,Aegel marmelosa and saraca asoka is perceived as very important tree species for local populations, forestry, Reported The Morphological Diversity The above finding is supported by the work (Rai Yashwant ,2014;2015 Dutta, 1689; Rai Yashwant & Kumar Deepak, 2016 ;Malik and Verma 2019)

The AM fungi are the most intensively studied types of mycorrhizae because they arepresent in most agricultural and natural ecosystems and play an important role in plant growth, health and productivity was reported Harley and Smith, 1983; Gianinazzi et al., 2011.

Arbuscular mycorrhizal growths work by infiltrating feeder roots through cortical cells framing structures of enormous vesicles and arbuscules as assessed by Tate, 2000 and smith and Read, 2008.

Arbuscular mycorrhizal growths emerge from three wellsprings of inoculum: spores, hyphae, and contaminated root a piece were accounted for (Smith and Read, 2008). Spores are the most obviously characterized wellspring of inoculum and the main aspect of the organism utilized for species distinguishing proof. Thickness and decent variety of spores can fluctuate by ecological conditions. (Smith and Read, 2008) Root pieces fill in as a significant wellspring of inoculum in many soil types. It is conceivable that hyphae can regrow from recently tainted root parts which can be utilized to start colonization regardless of whether the host root is dead that dictated by Smith and Read, 2008;. Bárzana G et al., 2015.

These branches consider the ascent of arbuscules in the cells. Arbuscules are tree like structures that happen inside the cortical cells of the host root. The existences of arbuscules are the primary marker for AMF colonization. In the later phases of colonization, arbuscules breakdown starting with the best branches was accounted for Brundrett et al.,1996;Husband, R et al.,2002; Lakshmipathy A, et al.2003.

Phosphate impediment in soils is a deep rooted issue which seriously impacts present day horticulture's proficiency. Phosphorus is artificially added to horticultural soils which unravel the supplement lack issues, yet unintentionally makes natural issues was assessed by (Sawers et al. 2008; Smith and Read, 2008). Arbuscular mycorrhiza phosphate accomplishment starts with the expansion of extra-extremist contagious hyphae. These hyphae reach out past the colonized root to take into consideration introduction to more prominent soil volume these hyphae take-up Pi (inorganic phosphate). Phosphate is then moved to the parasitic vacuole where polyphosphate is shaped. From that point, hydrolization of the polyphosphate happens and the substance is delivered to the apoplast was accounted for Sawers et al. 2008; Smith &Read, 2008. Bagheri, V. et al., 2012; Begum N et al.,2019 ;Chandrasekaran, M.et al.,2019.

AMF colonization in the underlying foundations of plants vulnerable to plant parasitic nematodes, contagious plant microbes, and other plant microorganisms can really deflect malady or help to mend quicker was accounted for Akhtar et al. 2008; Chen, S et al 2017;Chandrasekaran, M.et al .,2019.

Colonization of AMF in the root framework changes the roots morphologically through an expansion in root surface region. The plants reaction to communications with different life forms changes when the morphology of the root framework is modified. Past exploration has demonstrated that plants colonized by AMF display solid vascular wellbeing and upgraded lignin creation was accounted for Fitter AH .,2006 Akhtar et al. 2008; Feddermann N, et al.,2010;Begum N et al.,2019.

Mycorrhizal presence in soils has a solid beneficial outcome on development of AMF viable plants. In light of these advantageous qualities, ranchers of horticultural yields have gotten more mindful of the significance of gainful parasitic networks and practices that upgrade propagation and security of AMF in the dirt was reported Husband R et al.,2002;Brundrett M. 2004; Hartmann M.et al.,2015;Freidenreich Ariel., 2016).

Smith and Read 2008; Aug,2011;Wehner J. et al., 2011.was reported that the results indicate that interactions between assemblages of beneficial and pathogenic microorganisms can influence the growth of host plants.

Biodiversity study of AM fungi in complex habitat based on integration of molecular, morphological and biochemical approach and that The AMF form beneficial symbioses in most terrestrial ecosystems and crop production systems Similar report by Fitter, A. H.,1989; Helgason,T. &Fitter A.H.2005; K sanjeev et al 2014.Singh Amandeep.,et al.,2019.

Fungus protects plants by supplying a protective health to supply both water & Phosphorus to the plant roots during droughts was reported by (Fitter, A. H. 1985; Magdoff and VanEs, 2009; Jadhav Shilpa Y and Shinde Pratiksha P., 2017.

VAM high functional diversity and huge variation detected across time points, sites and hosts, implies that the AM fungal types are ecologically distinct and thus may have the potential to influence recruitment and host composition in tropical forests was reported Husband,R,2002; Fedderman, N.R., T. Finally, F. Boller and Elfstr 2010; Chatterjee S, Chatterjee Sabyasachi and Dutta S,2010; Fedderman, et al., 2010 the Mycorrhizae are the root-symbionts which obtain their nutrients from the plant and provide mineral elements like N, P, K, Ca, S and Zn to the host plant Mycorrhizae isolated were identified to the genus level and to the species when possible on the basis of macro morphological The similar finding is reported by Jayachandran, K., Schwab, A. P. and Daniels Hetrick, B. A. 1989; Hodge, A., Campbell, C.D. & Fitter, A.H. 2001; Abbasi et al.,2015 ; Jadhav Shilpa Y and Shinde Pratiksha P.,2017

Systems of microorganism insurance by AM parasites and present proof, where suitable, for utilitarian variety among AM contagious taxa concerning these instruments follow similarly with Wehner J et al., 2009 Lapeyrie, F. (1988) Leake, J. R et al.,1989; Leyval, C., et al ,1997; Miller, R. M., et al ,1995; Newsham, K et al.,1995; Phiri, S.,et al , 2003; Sharma, M.P. and A. Adholey. 2004; Fedderman, N.R., T. et al . 2010; Smith, E. et al 2010.

Cooperations between plants which are interceded by over the ground measures incorporate rivalry for light and space and varieties in direct reactions to the physical condition determind by (Grime, 1979; Tilman, 1988), Many mycorrhizal environment themes are inadequately perceived, on the grounds that plant scientists seldom consider mycorrhizas and mycorrhizal examinations normally are not led in biological systems The comparable finding was accounted for by St John and Coleman, 1983; Fitter, 1985; 1989; Harley and Harley, 1987.

The cozy relationship of roots of mycorrhiza with leaf litter has brought about the speculation which growths of mycorrhiza could be legitimately engaged with leaf litter disintegration some ECM parasites can use natural (protein) wellsprings of nitrogen The above finding is upheld by the work Harley and Smith, 1983; Abuzinadah et al., 1986.

In soils where ECM trees happen half of the phosphorus can be in regular structures that could be isolated by rhizosphere phosphatases made by ECM parasites and Soil minerals are suffered by microbial development similarly as physical cycles comparative finding as Cromack et al., 1979 ;

Read, 1983; Bajwa and Read, 1986; Coleman et al., 1983; Bolan et al., 1987; Lapeyrie, 1988.; Lapeyrie, 1988;; Jayachandran et al., 1989 ;Cairney and Ashford, 1989; Haussling and Marschner, 1989; Robert and Berthelin, 1986;Straker and Mitchell, 1986 and Haselwandter et al., 1987;

The AM parasitic spores were confined from the rootzone soil by wet sieving and tapping procedure (Gerdemann and Nicolson, 1963. For analyzing root colonization, underlying foundations of seedlings accepting distinctive AMF medicines were isolated by muds tests also prepared to explore the method of colonization by AMF.The similar findingwas reported by Banerjee K, et al., 2013)

Distinguishing proof of the most appropriate types of arbuscular mycorrhizal parasites (AMF), explicit for a given tree animal types, is plainly an important errand. Percentage of Arbuscular mycorrhizal (AM) infection, number of resting spores and AM fungi the above finding is supported by the work.

Pindi PK,2011;Banerjee K, et al., 2013; Ovum investigation from the rhizosphere soil test displayed a lot of variety in their morphological highlights and they generally have a place with the animal categories gathering of Glomus,Vesicular-arbuscular mycorrhizal (VAM) was observed in almost all plants. The similar finding is reported by Gerdmann JW and Nicolson TH.1963 ;Chatterjee S et al., 2017;Ghosh P,2015; Tirpathi and Khare, 2012., Ishaq F and Khan A.2011.

Statistical analysis showed that the expected number of species of endophytes in all plants similarly finding D 'souza and Bhat.2007; Weiner J et al.,2011. Therefore, the present study was conducted with defined methodology so that could be applied to obtain such data and infer a comprehensive view about composition of fungal endophyte communities associated with selected tree specisie.ie Aegel marmelosa,Azadirecta indica,Cassia fistula,and sraca asoka.

CONCLUSIONS:

The present work entails about the use of different medicinal trees in Meerut region. The need of the hour is to go for their conservation and its cultivation in the area, as we are progressing toward modernization; the knowledge of traditional uses of plants may not be lost in due course. In all the blocks cumulatively, Azaracthica indica is abundant and most frequent followed by Aegle marmelos and Cassia fistula. The soil type, climate and pH favors the growth of Azadirecta indica.,in the region. Study of soil content revealed that nitrogen is higher in all the four blocks. A plant needs a very large amount of nitrogen for photosynthesis. Plants can absorb nitrogen in the form of inorganic nitrogenous compounds. Nitrogen conversion is largely mediated by fungal decomposer in the soil. AM fungi are now seen as an integral part of agricultural practices and support soil fertility.

The role of trees in maintaining a considerable higher number of spore populations is regarded beneficial for agroforestry model. Spore population is higher in neem in first year and the same trend was observed for second year though the total population declined. Also, root colonization was higher in first year as compared to second year. Thus percent root colonization and spore population seem to have a correlation. From the present investigations, it can be concluded that mycorrhizae seems to play an important role in the seedling growth and perhaps in the establishment of saplings in new habitats after transplantation. Thus, the results showed that trees acted as AMF inoculum reservoir for intercrops in agroforestry systems, intercropping increased mycorrhization in the tree rhizosphere, AM fungi is a beneficial microorganism as a bio fertilizer and is involved in breakdown of complex organic matter to simpler ones. Thus they improve soil health, soil structure and prevent certain diseases. Owing to this property various formulations of this AM fungi are being utilized. The study in the present case highlights about the importance of AM fungi in relation to soil vis-à-vis tree species. Further work can be done to evaluate the fungal characteristics and their relationship with the ecological niche.

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