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Germination and survival of seeds of multipurpose tree species under nurseries condition in pothwar

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ABSTRACT

The study was conducted at National Agricultural Research Centre (NARC), Islamabad. The present study was undertaken to find out germination percentage of multipurpose tree species which are of fodder, fuel wood and of timber importance under different growth media and nursery condition. Maximum germination percentage in farmyard manure was found. *Bauhinia variegata* which was statistically higher (23.00%) from all other species except *Parkinsonia aculeata.Parkinsonia aculeata* had higher seed germination of (22.33%) followed by *Leucacena leucocephala* (20.67%), *Albizzia lebbek* (14.00%), *Acacia modesta* (11.33%), *Acacia nilotica* (11.00%), *Cassia fistula* (9.67%), *Pongamia glabra* (9.00%), *Acacia albida* (7.33%), and *Acacia tortilis* (7.00%). In compost, *Bauhinia variegata* had highest germination (23.33%) followed by *Leucacena leucocephala* (22.00%), *Parkinsonia aculeata* (19.67%), *Acacia modesta* (11.00%), *Albizzia lebbek* (10.00%), *Cassia fistula* (9.67%), *Acacia nilotica* (9.00%), *Acacia albida* (7.00%), *Pongamia glabra* (6.00), *Acaciatortilis* (4.66). In soil media maximum seed germination was observed *Bauhinia variegata* (14.00%) which had higher germination followed by *Parkinsonia aculeata* (10.00%), *Leucacena leucocephala* (9.33%), *Acacia modesta* (8.22%), *Acacia albida* (6.33%), *Acacia nilotica* (5.6%), *Acacia tortilis* (5.6%), *Cassia fistula* (5.33%), *Albizzia lebbek* (2.00%), and least in *Pongamia glabra* (0.67%). It is concluded from the study that maximum germination percentage in farmyard manure was found. Highest growth of roots and shoots was observed in compost medium. Soil medium had the lowest seed germination and growth as it had the lowest nutrients so there is need to increase forest cover of the country on farm land. The fertility of the soil is decreasing due to intensive cropping so there is need to increase to grow leguminous trees there is need to improve the germination of seeds so that more and more useful trees are grown on the farms in agro-forestry practices.

Keywords: *Bauhinia variegate, Parkinsonia aculeate*, *Leucacena leucocephala*

INTRODUCTION

Pakistan is one of the low forests cover countries with only 4.8% part is covered by trees which has deforestation rate of 3% and vanished 24.7% of its trees during the last fifteen years. The several materials obtained from plants, are of big advantage for industries such as paper, pulp rayon, plywood, newsprints and sports goods. It is even a source of beneficial food as several kinds also produce fruits. As a result giving

benefits to all walks of natural life and not just restricted to some species. Although they play such a vast role in the environments, we still allow perishing. http://wwf.org.pk/blog/2015/08/13/the-importance-of-forestry. Deforestation has led to a number of adverse natural and environmental significances, apart from the clear ecological and economic ones due to the damage of biomass. More or less of these is top-soil erosion, reduction of water table, lack of rainfall, adverse climatic effects, formation of wasteland. Deforestation has also caused extinction and migration of certain animal species (at least locally). At an alarming rate, the reduction of forestry biomass is a great basis in both developed and developing countries. In developing countries, key causes of decrease is due to human behavior, industrial development, rise of agricultural land, clearing of land for settlement, wood cutting for fuel, forage and paper created industries, etc. All of these lead to the biomass degradation, also due to direct harvesting or by a letdown of carrying capacity by contamination (Munn and Fedorov, 1986).

Germination of a seed is a critical phase in the life series of trees mainly in arid and semi-arid land, which lay open to several harmful conditions, beside, this has critical impact on the following stand of plants life. Natural propagation success depends essentially on the comeback of the seeds to the interfering of many external factors. Hence, germination of seed success may reveal about population size, abundance and distribution (Flores *et al.,* 2001; Ramírez *et al.,* 2005; Rojas-Aréchiga *et al.,* 1998). Definitely, the environmental circumstances of the region of species existence are important to determine the seed features and its germination reactions. Essentially, the temperature effect the seed germination process and supports or inhibits the process of germination (Cota *et al.,* 2007; Flores *et al.,* 2006; Ramírez-padilla *et al.,* 2005; Simão *et al.,* 2007; Valverde *et al.,* 2004), soil or substrate variety, water availability and the degree of gas exchange. All these factors affect the seed germination. Understanding germination is so significant ecological relevance (Bewley *et al.,* 1994; Fenner *et al.,* 2005).

Seed germination is known to be affected by both internal and external factors of the environment. Hormones effect and various growing phases of the seed and enzymes are nearly some of the internal factors which in single way or another can affect the germination of seed. The main external factors which are considered to affect germination of seed involve temperature, air, oxygen, moisture or water and at times light even though most of literature in many studies do depict that there is no effect of light on germination of seed instead most plant life begin germination successfully in dark places as related to the light places but dark places has no effect in any published scientific study as a factor affecting germination. An additional external substance like gibberellic acid and other synthetic hormones which can affect germination considerably are also not described to be factors affecting seed germination. Many scientists also agree that dormancy period, thickness of the seed coat and seed viability may affect germination of seed and therefore, are factors for germination of seed. All plant life has definite germination requirements based on environmental cues and the ecological adaptations that trigger germination for that species (Washa *et al.,* 2015). The present study was undertaken to achieve the following objectives:

1. To study germination of seeds of multipurpose tree species.
2. To study germination and survival percentage of different tree species under different potting medium.
3. To study growth and root shoot ratio of tree species under different growth media.

MATERIALS AND METHODS

Study area

The study was conducted at the National Agricultural Research Centre (NARC), Islamabad. Islamabad is situated at 33.43^0 N 73.04^0 E at the edge of the Pothwar plateau at the end of the Margalla Hills in the Federal Islamabad Capital Territory and its altitude is 507 meters. Islamabad lies in the moist subtropical climate, with hot, humid summers, a monsoon season followed by cool winters. The soil of the region are local outwash or loessic, alluvial in source. These are temperately calcareous and their lime contents equally distributed all over the soil profile. The soils of the region are non-sodic and non-saline, have a little alkaline pH and have little inorganic substance. The soils are also low in organic material and ensuring pH of 7.5 to 8.5 (Ahmad *et al*., 1990). Rainfall is irregular and differs significantly from 250 mm in south-west to 1000 mm in the north-east portion of the area. In the summer months more than 70% of annual rain falls.

Growth media

Seed germination was studied in three growth media. First medium was prepared by mixing Farmyard manure and silt farmyard manure which was obtained from livestock research station, National Agricultural Research Centre (NARC). It was ensured that farmyard manure was properly decayed for at least six months so that weeds could not emerge out of this medium. Silt was obtained from the riverbed of the Korang River. Farmyard manure and silt were mixed with the ratio of 1:1 to make the ideal bed culture. This mixture was passed through mesh to obtain even sized grain particles. Second

Table 1. Average germination of different multipurpose tree seeds under different growth media.

	Species	Farmyard	Compost	Soil	Average
1	*Pongamia glabra*	9.00 DEFG	6.00 H	0.67 K	5.00 F
2	*Acacia modesta*	11.33 CD	11.00 D	3.00 IJ	8.22 CD
3	*Leucacena leucocephala*	20.67 AB	22.00 AB	9.33 DEF	17.33 B
4	*Albizzia lebbek*	14.00 C	10.00 DE	2.00 DEF	8.67 C
5	*Acacia albida*	7.33 EFGH	7.00 FGH	6.33 GH	8.56 C
6	*Acacia nilotica*	11.00 D	9.00 DEFG	5.66 HI	8.56 C
7	*Acacia tortilis*	7. 00 FGH	4.67 HIJ	5.66 HI	5.77 EF
8	*Cassia fistula*	9.68 DEF	9.67 DEF	5.33 HI	8.22 CD
9	*Parkinsonia aculeate*	22.33 AB	19.67 B	10.00 DE	17.33 B
10	*Bauhinia variegata*	23.00 A	23.33 A	14.00 C	20.11A

Numbers sharing different letters are statistically different at P<0.5

medium consisted of compost + sand+ soil. Compost was obtained from the recently installed compost plant which prepares compost of decomposed plant material mixed with essential nutrients. Sand was obtained from the construction site at NARC. Soil was obtained from the field area of Rangeland Research Institute in which no fertilizer had been added. Compost, sand and soil were mixed in the ratio of 1:1:1 to make the medium. This medium was also passed through mesh to get uniform sized particles. Third medium consisted of soil only in which no fertilizer had been added. The soil was grained and also passed through mesh.

Sowing

Polythene tubes of seven inch long and four inch wide sized were filled with the respective medium. Fifty polythenes were assigned for each species. The tubes were arranged and packed in the nursery bed. Seeds of 10 multipurpose tree species viz. Sukh chain (Pongamia*glabra),* Phulai *(Acacia modesta),* Iplelple *(Leucacenaleucocephala),* Kala Shirin*(Albizzialebbek),* White kikar *(Acacia albida),* Kikar *(Acacia nilotica),* African kikar *(Acacia tortilis),* Amaltas *(Cassia fistula),* Parkinsonia *(Parkinsoniaaculeata),* and Kachnar *(Bauhinia variegata)* were put under germination trial.

Ten multipurpose tree species obtained from plus trees obtained from different areas of Islamabad during 2013 – 2014 were used for the present study. Seeds were sown on 10 August 2016 during the monsoon seasons in the polythene tubes. Seeds were sown in the polythene tubes and covered with half inch deep potting medium and were watered. After that the tubes were watered daily and germination was recorded daily for two week.

Data collection

Emergence of first and third leave was also recorded. After two weeks five plants at random of each species were uprooted and measured for root length and shoot length. Roots and shoot were separated and fresh weight of root and shoot was weight separately. Fresh roots and shoots were placed in an oven maintained at 80C for 24hrs and dry weight was also recorded. Data were collected every day for 2 weeks for germination of seeds, days to seed germination, days to appearance of first leave, days to appearance of 3 leaves, plant height, root length, root/shoot ratio, fresh and dry matter.

Statistical design

The experiment was conducted in a Randomized complete block design and analyzed for comparison by means of method describe by Steel and Torrie (1997).

RESULTS

Seed germination

An average seed germination of different tree seeds grown under different growth media is given in Table 1. Maximum germination percentage in farmyard manure was found. *Bauhinia variegate* which was statistically higher (23.00%) from all other species except *Parkinsoniaaculeata*. *Parkinsoniaaculeata* had higher seed germination of (22.33%) followed by *Leucacenaleucocephala* (20.67%), *Albizzialebbek* (14.00%), *Acacia modesta* (11.33%), *Acacia nilotica* (11.00%), *Cassia fistula* (9.67%), *Pongamiaglabra* (9.00%), *Acacia albida* (7.33%), and *Acacia tortilis* (7.00%). In compost, *Bauhinia variegata* had highest germination (23.33%) followed by *Leucacenaleucocephala* (22.00%), *Parkinsoniaaculeata* (19.67%), *Acacia modesta* (11.00%), *Albizzialebbek* (10.00%), *Cassia fistula* (9.67%), *Acacia nilotica* (9.00%), *Acacia albida* (7.00%), *Pongamiaglabra* (6.00), *Acaciatortilis* (4.66). In soil media maximum seed germination was observed *Bauhinia variegata* (14.00%)

Table 2. Percentage germination of different multipurpose tree seeds under different growth media.

	Species	Farmyard	Compost	Soil	Percentage
1	*Pongamia glabra*	18	12	1	10
2	*Acacia modesta*	26	22	6	18
3	*Leucacena leucocephala*	44	44	20	36
4	*Albizzia lebbek*	28	20	4	17.33
5	*Acacia albida*	18	18	14	16.66
6	*Acacia nilotica*	22	18	14	18
7	*Acacia tortilis*	14	10	14	12.66
8	*Cassia fistula*	26	26	12	21.33
9	*Parkinsonia aculeata*	48	40	20	36
10	*Bauhinia variegata*	46	48	28	40.66

Table 3. Difference of Shoot length, Root length and their ratio among different species

S. No	Species	Shoot length, cm	Root length, cm	Root/Shoot Ratio
1	*Pongamia glabra*	42.8 A	13.36 C	0.56 B
2	*Acacia modesta*	24.46 AB	11.98 C	0.50 B
3	*Leucacena leucocephala*	22.1 B	14.3 C	0.68 B
4	*Albizzia lebbek*	21.2 B	13.45 C	0.62 B
5	*Acacia albida*	21.8 B	13.8 C	0.68 B
6	*Acacia nilotica*	20.4 B	16.9 C	0.85 B
7	*Acacia tortilis*	23.5 AB	42.7 A	1.55 AB
8	*Cassia fistula*	20.4 B	12.6 C	0.61 B
9	*Parkinsonia aculeata*	20.63 B	15.2 C	0.75 B
10	*Bauhinia variegata*	19.9 B	38.5 B	2.19 A

Numbers sharing different letters are statistically different at P<0.5

which had higher germination followed by *Parkinsoniaaculeata* (10.00%), *Leucacenaleucocephala* (9.33%), *Acacia modesta* (8.22%), *Acacia albida* (6.33%), *Acacia nilotica* (5.6%), *Acacia tortilis* (5.6%), *Cassia fistula* (5.33%), *Albizzialebbek* (2.00%), and least in *Pongamiaglabra* (0.67%).

An average comparison of seed germination for species revealed that *Bauhinia variegata* had statistically higher germination (20.11%) followed by *Leucacena leucocephala* (17.33%), *Parkinsonia aculeata* (17.33%), *Albizzia lebbek* (8.6%), *Acacia nilotica* (8.55%), *Acacia albida* (8.55%), *Cassia fistula* (8.22%), *and Acacia modesta* (8.22%) *Acacia tortilis* (5.7%) and *Pongamia glabra* (5.00%).

Percentage of seed germination of different multipurpose tree species under different growth media is given in Table 2. Highest seed germination percentage was observed in the medium of farmyard. As regards differences among species, it is clear from Table 2 that the highest percentage seed germination was observed in *Parkinsoniaaculeata* (48%) followed by *Bauhinia variegata* (46%), *Leucacenaleucocephala* (44%), *Albizzialebbek* (28%), *Acacia modesta* (26%), *Cassia fistula* (26%), *Acacia nilotica* (22%), *Acacia albida* (18%), and *Pongamiaglabra* (18%) and least in *Acacia tortilis* (14%).

In the compost medium, it is clear from Table 2 that the highest percentage of seed germination was observed in *Bauhinia variegata* (48%), followed *Parkinsonia aculeata* (40%) *Leucacena leucocephala* (44%), *Cassia fistula* (26%), *Acacia modesta* (22%), *Albizzia lebbek* (20%), *Acacia nilotica* (18%), *Acacia albida* (18%), *Pongamia glabra* (12%) and *Acacia tortilis* (10%). In field of soil medium, it is clear from Table 2 that the highest percentage seed germination was observed in *Bauhinia variegata* (28%), followed by *Parkinsonia aculeata* (20%) *Leucacena leucocephala* (20%), *Acacia nilotica* (14%), *Acacia albida* (14%), *Acacia tortilis* (14%), *Cassia fistula* (12%), *Acacia modesta* (6%), *Albizzia lebbek* (4%), and *Pongamia glabra* (10%)

Average percentage of seed germination of different multipurpose tree species under different growth media was obtained higher in *Bauhinia variegata* (40.66%), followed *Parkinsonia aculeata* (36%) *Leucacena leucocephala* (36%), *Cassia fistula* (21.33%), *Acacia nilotica* (18%), *Acacia modesta* (18%), *Albizzia lebbek* (17.33%), *Acacia albida* (16.66), *Acacia tortilis* (12.66) and *Pongamiaglabra* (10%).

Root and shoot length

It is clear from the Table 3 that the highest shoot length was recorded for *Pongamiaglabra* (42.8A) which was not significantly higher than *Acacia modesta (24.46AB)* followed by *Acacia tortilis* (23.5AB),

Table 4. Effect of growth medium on root, shoot ant root shoot ratio

Medium	Root length, cm	Shoot length, cm	Root shoot ratio
Farmyard	14.3	20.4	0.73
Compost	15.1	27.1	0.75
Soil	28.4	20.5	1.2

Table 5. Effects of root shoot fresh and dry weight of species

Species	Root fresh wt.gm	Root dry wt. gm	Shoot fresh wt.gm	Shoot dry wt. gm
Pongamia glabra	0.7182 D	0.1666 D	1.7038 D	0.6096 B
Acacia modesta	0.5782 F	0.1457 E	1.0282 G	0.3235 D
Leucacena leucocephala	0.4071 G	0.1037 F	1.4360 F	0.4821 C
Albizzia lebbek	1.0471 B	0.2587 B	1.8427 B	0.6195 B
Acacia albida	0.6049 EF	0.1506 E	1.8238 BC	0.6049 B
Acacia nilotica	1.3238 A	0.3306 A	0.9838 G	0.3235 D
Acacia tortilis	0.6871 D	0.1665 D	1.8382 B	0.5986 B
Cassia fistula	0.6271 E	0.1548 DE	1.5604 E	0.5214 C
Parkinsonia aculeata	0.6382 E	0.1569 DE	1.7615 CD	0.5894 B
Boehinia variegata	0.7993 C	0.1970 C	2.6393 A	0.8759 A

Numbers sharing different letters are statistically different at P<0.5

Table 6. Effect of different growth media on fresh and dry matter of roots and shoots

Growth medium	Root fresh wt.	Root dry wt.	Shoot fresh wt.	Shoot dry wt.
Farmyard manure	0.6790 B	0.1699 B	1.6287 B	0.5492 B
Compost	1.2447 A	0.3038 A	2.6870 A	0.8934 A
Soil	0.0756 C	0.0758 C	0.6696 C	0.2249 C

Numbers sharing different letters are statistically different at P<0.5

Leucacenaleucocephala (22.1B), *Acacia albida* (21.8B) *Albizzialebbek*, (21.2B), *Parkinsoniaaculeata*, (20.63B) *Cassiafistula (20.4B)* and least in *Acacia nilotica (20.4B)* and *Bauhinia variegate (19.9B)* All other species had non-significant differences with the descending order.

It is clear from Table 3 that the highest root length was recorded for *Acacia tortilis* (42.7A) which was significantly higher than the *Bauhinia variegata* (38.5B) followed by *Acacia nilotica* (16.9C), *Parkinsonia aculeata* (15.2C), *Leucacena leucocephala* (14.3C), *Acacia albida* (13.8C), *Albizzia lebbek* (13.45C), *Pongamia glabra* (13.36C), *Cassia fistula* (12.6C) and least in *Acacia modesta* (11.98C).

It is also clear from Table 3 above that the highest root shoot ratio was recorded for *Bauhinia variegata* (2.19A) which was significantly higher than *Acacia tortilis* (1.55AB) *Acacia nilotica* (0.85B) *Parkinsonia aculeata* (0.75B) *Leucacena leucocephala* (0.68B) *Acacia albida* (0.68B) *Albizzia lebbek* (0.62B) *Cassia fistula* (0.61B) *Acacia modesta* (0.50B) and *Pongamiaglabra* (0.56B).

It is clear from Table 4 that the root penetration was highest in case of soil (28.4 cm) which was significantly higher than other farmyard and compost treatments. Shoot length was highest in compost (27.1) which was significantly higher than farmyard manure and soil treatments. Differences in root shoot ratio had also marked differences with soil having value of (1.2) while compost and farmyard manure had non-significant differences.

Root and shoot weight

Fresh and dry weight of root and shoot of multipurpose tree saplings after one month of sowing is given in Table 6. It is clear from the Table 6 that the highest root fresh weight was recorded in *Acacia nilotica* which was significantly higher than all other species. *Albizzialebbek* was second highest in dry matter which was significantly higher than *Bauhinia variegata*; *Parkinsoniaaculeata* is higher than *Cassia fistula* but different and is non-significant *Pongamiaglabra, Acacia tortilis*, *Cassia fistula*, *Parkinsoniaaculeata* but significantly lower than *Acacia nilotica*.

It is also clear from the Table 5 that the highest shoot fresh weight was recorded in *Bauhinia variegata* which is significantly higher than all other species. *Albizzia lebbek* was second highest followed by *Acacia tortilis, Acacia*

albida, *Parkinsonia aculeata*, *Pongamia glabra*, *Cassia fistula*, *Leucacena leucocephala*, *Acacia modesta* and *Acacia nilotica*.

It is clear from the above Table 5 that the highest shoot dry weight was recorded in *Bauhinia variegata* which was significantly higher than all other species. *Albizzia lebbek* was second highest followed by *Pongamia glabra*, *Acacia albida*, *Acacia tortilis*, *Parkinsonia aculeata*, *Cassia fistula*, *Leucacena leucocephala*, *Acacia modesta* and *Acacia nilotica*. Table 6.

Fresh and dry weights of root shoot in different growth media are given in Table 7. Highest fresh and dry weight of roots is observed in compost medium followed by farmyard manure and least in soil medium.

DISCUSSION

Plants seeds are stored as essential genetic resources used for species biodiversity, ecological unit conservation, restoration and domestication (Berjak and Pammenter 2004). On the other hand, there has been little study on storage behavior and seed germination of numerous plant species, particularly forest plant species. It is predicted that cheap and reliable seed storage skills could decrease forest genetic resource erosion or extinction all over the world. This analysis takes stock of the data gaps on storage behavior and seed germination of some essential plant species of commercial importance. Storage behavior, seed germination and further aspects of seed germination complications such as pulp composition, hard seed testa, phenolic compounds and hormonal imbalance.

(Hayat *et al*., 2008) and so, it is vital that leguminous trees are included in the harvesting systems as legumes are beneficial of enriching the nitrogen content of the soil by fixing atmospheric nitrogen. It has been stated that net profits of legumes are very high so often equal to the accumulation of 50 to 100kg of N ha^{-1} (Phoomthiasong *et al*., 2003). During food scarcity period in Pakistan, accessibility of green forage is the key limiting factor in livestock rearing and this lack may increase up to 75% (Bashir *et al*., 2001). Legume forage is essential for livestock rearing because it is rich in, minerals, protein, calcium, phosphorus, and vitamins (Unkovich *et al*., 1997). The present study includes leguminous trees like IpleIple, *(Leucaenaleucocephala),* Black Siris, *(Albezialebbak,* White Siris, *(Albizziaprocera),* Phulai, *(Acacia modesta),* Kikar *(Acacia nioltica),* and sufaidkikar, (*Acacia albida).*

In the mitigation and adaptation to atmospheric greenhouse gases, trees play a vital role (IPCC., 2000). In comparison to all other kinds, agroforestry has been considered to have the maximum potential for carbon sequestration as the system offers the chances of synergies among both adaptation and mitigation. The amount of carbon existing in the aboveground and belowground biomass of an agroforestry method is far better than that in an equal land-use system without plants and vegetation. It has been assessed that in Southeast Asia, agroforestry methods have the ability to store 12-228Mg C ha^{-1} in moist tropical lands and 68-81Mg C ha^{-1} in arid lands (Murthy *et al.,* 2013).

Seed germination is termed as the appearance of the embryo from the seed (Bewley and Black 1983). Some plant seeds have inherent seed dormancy well-known as main seed dormancy, which is generally caused by maternal tissues. For instance, this might be due to embryo immaturity at harvest, inhibition of water uptake, restriction of embryo expansion and the lack of leaching of inhibitors (Hilhorst *et al*., 2006). In this case, such seeds do not grow despite occurrence of favorable development conditions. *Parinaricuratellifolia* seeds are related with immature embryo, and therefore the seeds need after-ripening procedure to take place before they are effectively germinated. In this case, seed storage is necessary to allow the after-ripening procedure to occur. According to Amen *et al*. (1968), the balance among growth promoters and inhibitors may play an important role in regulatory embryo maturation, and therefore the seeds are dormant at harvest. With improvement in storage period, the hormonal stability shift in favor of the growth promoters, and later the major seed dormancy is then broken to allow the seeds to grow.

Seed size difference has much significance in ecological implications. It can affect seed growth. Seedling establishing differs by seed size. Big size seeds have a tendency to create seedlings that are more probable to survive to development than seedlings from minor seeds, but not always. Seedling appearance (Berdahl and Barker., 1984) and seedling establishing differs with seed size. Germination rate is also affected as large seeds grow more rapidly than the small ones (Marshall *et al*., 1986). Competitive capacity of a tree rest upon the quantity of food kept in their seeds. Seeds with great quantity of food have higher competitive capacity than those seeds which have a smaller amount of food contents. Large seeds have a tendency to create seedlings that are more possibly to survive to development than the saplings made from the minor seeds, however it does not always occur (Wulff *et al*., 1986). While dormancy breaking the treatments was given, growth percentage was enhanced significantly. Amongst dormancy breaking treatments, nicking provide the highest germination, though hot water provide the lowermost growth percentage suggesting the seeds could not tolerate the shockwave of high temperature which reduced germinating ability of the seed. This outcome is reliable with the research made by Bhardwaj *et al.* (2003). The comparison of early germination with viability challenging showed that seeds were dormant ones. Due to hard seed coat and slow imbibition *Albizzia lebbek*

show the poor germination (Khan and Tripathy, 1987) presence of a micropylar plug (Dell *et al*., 1980). In this research, acid scarification treatment for 15 minutes and soaking in warm water for 3hrs were found tremendous for enhancing germination percentage. Exogenous dormancy is removed by acid. Hard seed coat is the foremost hindrance in enhancing growth of *Albizzia* species (Sur *et al*., 1987). The results of this research were also in harmony with the results of these writers. Since warm water treatment associated to acid scarification is cool to apply and inexpensive, it is suggested that for increasing growth in this species. Amongst the dormancy breaking treatments, the acid scarification intended for 30 minutes and nicking were the greatest once take out no single hard seed coat but as well micropylar plug. These treatments were found appropriate for breaking physical dormancy of the seeds of this species. This end result is reliable with the results of the research conducted by Bahorun *et al.* (2005). Also, warm water treatment as well damaging to seed sustainability of this species and these adverse effects were related to interval of soaking. In this research, highest growth was found from the seeds of *Dalbergia sissoo* when soaked in tap water for 2hours. Results recommended that more growth of this species may be achieved without any seed treatment. While treatments were applied for softening the seed coat, important enhancement in germination was observed. This recommended that the retarded growth was due to physical dormancy, which slow the penetration of water to the inside of the seed. Rigid seed coat was accountable for absence of oxygen, water and other nutrients to the embryo. Although, when dormancy breaking treatments of warm water, nicking and acid scarification for different time intervals were applied.

CONCLUTION

Slow growth and low survival ratio of multipurpose plants and vegetation as an end result of bad quality plant seedlings hamper determinations through insignificant scale farmers in improvement of effective agroforestry methods. These can be attributed to the physical and chemical properties of the soil developing medium used. With the recent high and developing demand for excellence agroforestry plants and vegetation, farmers are progressively raising planting stock on their farms. However, inadequate technical knowledge often hindered success. Such growth media contribute to chemical and physical conditions that may be unsuitable for quality seedling growth. Survival rate and slow growth lead to extra charges in replacement planting as well as hindered benefits. Growing media compost gave higher seed germination percentage as related to silt and farm media. Compost contain growing media also provided higher height of growth for seedlings survival rate than sand and farm soil. It also provided seedlings with higher sturdiness quotient. The chemical and physical properties of on-farm plant nursery growing media that had the highest effect on *Tamarindusindica* seedling quality were the total pore volume aeration, pore volume, total nitrogen, wet bulk density, organic carbon, calcium and magnesium. Influence of small-scale farmers' plant nursery growing media on agroforestry tree seedlings' quality in Mt. Kenya region is also in line with where maximum seed germination was obtained in compost medium (Kungu *et al*., 2008).

REFERENCES

Amen RD (1968). A model of seed dormancy. Botanical Reviews, 34, 1-31.

Arora DS, Kaur J (1999).Antimicrobial activity of spices. Int. J. Antimicrob. Agents, 12: 257-62.

Baig MB, Shabbir A, Nowshad K (2008). Germplasm conservation of multipurpose trees and their role in agroforestry for sustainable agricultural production in Pakistan.Int. J. Agric. Biol, 10 (2).

Bakshi MPS, Wadhwa M (2007). Tree leaves as complete feed for goat kids. Small Rumen Res., (69)74-78.

Baskin CB, Baskin J (1998). Ecologically Meaningful Germination Studies. In Seeds: Ecology, Biogeography and Evolution of Dormancy and Germination. Academic Press, 5-26.

Berdahl JD, Barker RE (1984).Selection for improved seedling vigor in Russian wild rye grass.Can. J. Plant Sci, (64) Marshall, D.L. (1986). Effects of seed size on seedling success in three species of Sesbania (Fabaceae). Ame. J. Bot. (73) 457–464.131–138.

Bewley JD, Black M (1983). Physiological and Biochemistry of Seeds in Relation to Germination Development, Germination, and Growth, Springer-Verlag, Berlin, Germany, 306 pp

Bewley JD, Black M (1994).Seeds Physiology of Development and Germination. Plenum Press, London, p. 445.

Bonsi MLK. Osuji PO, Thuah AK (1995). Effect of supplementing tef straw with different level of Leucaena or Sasbania on the degradability of tef straw, sesbania, leucaena, tagaste and vernonia and certain rumen and blood metabolities in ethopianmenz sheep. Anim. Feed Sci. Technol, (52) 101-129.

Brew-Baker JL (1976). The Woody Legume, Leucaena Promising Source of Feed, Fertilizer, and Fuel in the Tropics. Acapulco, Mexico, Sponsored by Banco de Mexico.

Clem RL, Esdale CR, Conway MJ, Macintyre D (1993). Beef production from commercial Leucaena leucocephala pastures in a dry subtropical environment. Proceedings of XVII International Grasslands Congress.

Coder KD (1996).Identified Benefits of Community Trees and Forests, University of Georgia Cooperative Extension Service - Forest Resources Publication, FOR 96-39.

Cota Sánchez JH, Abreu DD (2007).Vivipary and offspring survival in the epiphytic cactus Epiphyllumphyllanthus (Cactaceae). J. Exp. Bot. (58)3865–3873.

Craig E,Wilkinson K (2004). Nitrogen Fixing Trees-A Brief Introduction. The over story is distributed by Agroforestry Net, Inc., P. O. Box 428, Holualoa, Hawaii 96725 USA.

Dell B (1980). Structure and function of the strophiolar plug in seeds of Albizialophantha. Ame. J. Bot. (4)556 - 563.

Dwyer JF, McPherson EG, Schroeder HW, Rowntree R (1992).Assessing the Benefits and Costs of the Urban Forest, [in] J. Arboriculture 18(5), pp 227 - 234.

El-Adawy TA (2002). Nutritional composition and anti nutritional factors of chickpeas (*Cicerarietinum* L.) undergoing different cooking methods and germination. Plant Foods for Human Nutrition, (57), 83–97.

Fenner M, Thompson K (2005).The Ecology of Seeds. Cambridge University Press, Cambridge.
Flora of Pakistan (2007). University of Karachi., Pakistan.
Flores J, Jurado E, Arredondo A (2006). Effect of light on germination of seeds of Cactaceae from the Chihuahuan Desert, Mexico. Seed Science Research, 16, 149–155.
Hartman HT, Kester DE, Davies FT, Geneve RL (1997). Plant propagation: principles and practices. 5th ed. Upper Saddle River, NJ: Prentice Hall Press.
Henke LA (1933). Value of Koa Haole (*Leucaenaleucocephala*) as a feed for dairy cows. Progress Note 1. Hawaii Agricultural Experiment Station, Honolulu, Hawaii.
Hilhorst HWM, Bentsink L, Koorneef M (2006). Dormancy and germination. In: Basra AS (Ed) Handbook of Seed Science and Technology. The Haworth Press, NY, USA, pp 271-302.
Hutton EM (1974). Tropical Pastures and Beef Production. Reprint from World Animal Review. No.12. FAO, United Nations. Rome.
IPCC (2000) IPCC Special Report on Land Use, Land Use Change and Forestry. Summary for Policy Makers. Geneva, Switzerland.
Khan ML, Tripathi RS (1987). Ecology of forest trees of Meghalaya. Seed germination and survival and growth of Albizialebbeck seedlings in nature. Indian Journal of Forestry, (10) 38-43.
Khan MM (1989). Economic analysis of agroforestry options for small irrigated farms in Punjab. Professional paper in partial fulfillment of the requirements for the Degree of Master of Science. Colorado State University fort Collins, Colorado.
Khattak AB, Zeb A, Bibi N, Khalil SA, Khattak MS (2007). Influence of germination techniques on phytic acid and polyphenols contents of chickpea (*Cicerarietinum* L.) sprouts. Food Chemistry, (104) 1074–1079.
Kung BJ, Kihara J, Mugendi DN, Jaenicke H (2008). Effect of small-scale farmers' tree nursery growing medium on agroforestry tree seedlings' quality in Mt. Kenya region. Scientific Research and Essay, 3 (8), pp. 359-364.
Malik MY, Sheikh AA, Shah WH (1967). Chemical composition of indigenous fodder tree leave. Pak. J. Sci, (19) 5-7.
Munn RE, Fedorov V (1986). The Environmental Assessment, IIASA Project Report, International Institute for Applied Systems Analysis, Laxenburg, Austria.s analysis of pre-harvest sprouting resistance in white wheat. Field Crops Research, (91) 63–69.
Murthy IK, Gupta M, Tomar S, Munsi M, Tiwari R, Hegde GT, Ravindranath NH (2013). Carbon sequestration potential of agroforestry systems in India. J. Earth Sci. Clim. Change, 4(1) 1-7.
N"Goran A, Gnahoua GM, Oualou K, Balle P (2002). Evolution of maize yield after tree fallow in a humid forest zone of Cote d"Ivoire, Cahiers d"Etudeset de RecherchesFrancophones/ Agricultures France). (11) 145-149.
Pakistan National Conservation Strategy (1990). Ministry of Food, Agriculture and Livestock, Government of Pakistan, Islamabad.
Pakistan National Forest Policy (2010). Ministry of Climate Change, Government of Pakistan, Islamabad.
Palin DJ (1984). Institutional arrangements for forestation.In:N.P. Wiersum (Editor), Strategies and Designs for Afforestation, Reforestation, and Tree Planting, Proceedings of international symposium on the occasion of 100 years of forestry education and research in the Netherlands, Wageningen. Pudoc, Wageningen, pp. 312-330.
Phoonthiasong J, Toomsan B, Limpinuntana V, Cadisch G, Payanothai I (2003). Attributes affecting residual N-fixing mungbean and groundnut cultivars. Biol. Fert. Soil, 39(1) 16-24.
Radosevich SR, Holt JS, Ghersa CM (1996). Weed ecology implications for management. 2nd ed. John Wiley, New York, USA.
Ramírez-padilla CA, Valverde T (2005). Germination responses of three congeneric cactusspecies (Neobuxbaumia) with differing degrees of rarity. J. Arid Environ. 61, 333–343.
Razzaq A, Hashmi NI, Khan BM, Hobbs PR (1990). Wheat in Barani Areas of Northern Punjab: PARC/CIMMYT Paper. Coordinated Wheat Progmamme, PARC, Islamabad, Pakistan
Rios JL, Recio MC (2005). J. Ethnopharmacol, 100:80-84.
Rojas-Aréchiga M, Orozco-Segovia A, Vázquez-Yanes C (1997). Effect of light on germination of seven species of cacti from the Zapotitlán Valleyin Puebla, México. J. Arid Environ. 36, 571–578.
Rojas-Aréchiga M, Vázquez-Yanes C, Orosco-Segovia A (1998). Seed response to temperature of Mexican cacti species from two life forms: an eco physiological interpretation. Plant Ecology 135, 207–214.
Sanchez PA (2002). Soil fertility and hunger in Africa. Science. 295:2019–2020.
Sanchez PA, Buresh RJ, Leaky RRB (1997). Trees, soils and food security, Phil. Trans. R. Soc. London, Ser. B 353 (1997), pp. 949–961.
Sheikh MI, Bukhari AS, Khan QA (2000). Baseline survey of three irrigated plantations vizChanga Manga, LalSohanra and Kundian. Pp.152 Pb.For Sector Dev. Project.
Simão E, Socolowski F, Takaki M (2007). The epiphytic Cactaceae Hylocereussetaceus (Salm-Dick ex DC.) Ralf Bauer seed germination is controlled by light and temperature. Brazilian Archives of Biology and Technology 50, 655–662.
Supple KR, Razzaq A, Saeed I, Sheikh AD (1988). Barani Farming System of the Punjab- Constraints and Opportunities for Increasing Productivity.Agriculture Econ.Research Unit, NARC, Islamabad, Pakistan.
Sur K, Lahiri AK, Basu RN (1987). Improvement of germinability of some forest tree seeds by acid scarification and hydration dehydration treatments. Indian Agriculturist 31: 115-122.
Tonye J, Ibewiro B, Duguma B (1997). Residue management of a planted fallow on an acid soil in Cameroon: crop yields and organic matter fractions, Agrofor. Sys.37: 199–207.
Unkovich MJ, Pate JS, Sanford P (1997). Nitrogen fixation in Australian Mediterranean Agriculture. Austral. J. Agric. Res. 48: 267-293.
Valverde T, Quijas S, López-Villavicencio M, Castillo S (2004). Population dynamics of Mammillariamagnimamma Haworth (Cactaceae) in a lava-field in Central Mexico.Plant Ecology 170, 167–184.
Vozzo JA. (2002). The tropical tree seed manual.U.S. Department of Agriculture, Forest Service. Washington, DC: U.S. Government.
Washa (2015). Potential of the Dark as a Factor affecting Seed Germination. Intern. J. Sci. Techn. Volume 5 No.2.
Wulff RD (1986) Seed size variation in Desmodiumpaniculatum. II. Effects on seedling growth and Interaction effects of seed mass and temperature physiological performance. J. Ecol. 74: 99–114.