

EVALUATION OF NURSERY MANAGEMENT AND IDENTIFICATION OF ORNAMENTAL PLANT SPECIES: A CASE STUDY OF DISTRICT PESHAWAR-PAKISTAN

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Abstract

Nurseries management is a key tool which provides healthy plant resources in the context to plant distribution and urban biodiversity visualization for human being. The current survey study was carried out at Peshawar Development Authority Nurseries Hayatabad Peshawar-Pakistan. This survey was based on the current situation and various methods practiced by the gardeners to manage their nurseries, and distribution of ornamental plant species. The main objective was to improve the current situation of the nurseries and suggest recommendations in light of the highlighted problems. Various attributes i.e. identification of plants, total area of nurseries, soil type, irrigation system, weeding, fertilizer application, propagation method, propagation time, transplanting time, field situation and finally problems of the nurseries were studied. All the agricultural and horticultural practices were not fully applied and practiced in proper recommended way. Out of the total studied parameters, irrigation system that was sprinkler irrigation, was impressive and appreciable. Proper fertilizer at proper time played a vital role in plant growth and nurseries development. The gardeners and other technical and field staff did not conduct their jobs to their fullest and their nurseries management was unsatisfactory. It was concurred that good quality plants production was not achieved and disease identification was missing due to lack of germ plasm unit facility. Weeds were badly impacting nurseries plants and affected their beauty and yield. Various weedicides were used by the nurseries staff to reduce the negative influence of weed infestation. It was recommended that effective planning, punctual staff duty and modern practices should be applied to improve overall structure of the nurseries.

Keywords: Field survey, nurseries management, ornamental plants, parameters, Pakistan

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INTRODUCTION

Nurseries is a place where seedling, sapling or any other planting material are raised and sold out for planting in gardens and orchids. The pre requisites of a successful and remunerative fruit production are the available of true to type, healthy and good quality planting materials. Setting up of a nurseries is a long term venture. It requires careful planning and expertise, because mistake committed initially cannot be rectified easily and may adversely affect the return from the investment. Thus one should pay due attention on every aspects when nurseries is to be established (Singh, 2015).

During the initial days of germination, the fresh seedling needs proper care and protection. To protect and look after small area seedling, it is more convenient and easy as compared to take care of larger nurseries and big areas with tiny seedlings (Rahim *et al.* 2008). Vegetative propagation of plants is more common technique through which plants are reproduced but these methods demand particular management, measures, protocols and care especially during transferring them into the fields. Experienced and determined labor can do all these duties as experienced and aged farmers are the key performers in carrying out better farm operations (Sanaullah *et al.*, 2020a).

Nurseries may broadly be grouped into two on the basis of its size. Home nurseries is an area where planting materials are specifically grown only to cater the needs of the grower's garden. The area is small and the primary consideration is the raising of quality materials. In this type of nurseries, costly methods of nurseries practices are adopted. The commercial nurseries is mainly concerned with economic return from the investment and therefore, very expensive nurseries practices are avoided without affecting the quality of the products. This type of nurseries can be subdivided into two groups, i.e. rural

nurseries and urban nurseries (Saleem *et al.*, 2007). Rural nurseries is situated in a village near high road or railway station. In general, the size of rural nurseries may be large as the land and labor charges are cheaper. The products are also sold at a cheaper rate. On the other hand, the nurseries which are located inside the city or close to it are known as urban nurseries. As the land is very costly and not easily available, the size of this type of nurseries is usually small. The labor charges, transport cost etc. are also very high, but these are compensated by the higher price of products and volume of sale. Sometimes they act as middle men i.e. procure planting materials from rural nurseries and resale to the customers (Saleem *et al.*, 2007).

Establishing a successful nurseries, landscape operation or garden center is not a simple matter. It requires a large investment in land and facilities, familiarity with the laws and restrictions on all levels and units of government and the assembling of a cohesive, productive group of people to accomplish the goal of the organization. Therefore, prior to selecting the sites, all factors should be considered and evaluated. Advice from specialist in the area of real estate, soil science, horticulture, entomology, pathology, water resources and associated areas should be solicited and evaluated. Considerable assistance may be obtained from country agricultural agents, soil conservation service and extension specialist located at land grant universities. It is also highly desirable to have worked in the industry for a number of years prior to starting a nurseries business (Cattivello and Danielis, 2008).

Objectives of the study

1. To identify trees, shrubs, creepers, hedge plants, edge plants, ground covers, climbers and various seasonal flowers.
2. To identify the problems faced in nurseries establishment.

3. To work for the improvement of nurseries culture in the study area and formulate suggestions.

Previous related studies

Improvement and management of nurseries is a vast field involving many other aspects of agriculture. For a detailed study of nurseries improvement a number of factors are needed to be studied, many researchers have worked on such aspects and factors. A review of some previous research work is cited here. Tolley (2012) worked on observations of citrus propagation in South Africa, Citrus tree production and its nurseries improvement. In conclusion, he offered suggestions towards improving nurseries technology in South Africa. Kuden and Kaska (2010) evaluated various budding methods for nurseries plants grown in subtropical areas. The studies were conducted for 2 years with stone fruits, pears and apples. In all cases, chip budding gave better results than T-budding. Similarly, Takahashi and Hagiwara (2008) explained management methods of entrepreneurial type of greenhouse floriculture farming and analysis of administrative abilities of entrepreneurs in Gunma. They concluded that the daily cultural management of a nurseries was the responsibility of the hired staff, and problems were to be looked at by the manager. It was established that the administrative abilities of the manager directly affect the nurseries business and management.

Rahim *et al.* (2008) studied the performance of some herbicides i.e. Tribunil, Bladex, alone and in combination with pronamide for the control and eradication of weed species such as *Sorghum helepense* L, *Cynodon dactylon* L, *Convolvulus arvensis* L, *Medicago denticulate* L, *Anagallis arvensis* L in different established nurseries. Furthermore, Cattivello and Danielis (2008) worked on Floriculture in the Friuli-Venezia Giulia Region, while Klimenko *et al.* (2008) reported the promising stock of peach for establishing nurseries in southern Ukraine for the betterment of the

country economy. Davidson *et al.* (2007) studied Nurseries Management Administration and Culture in New Jersey, USA.

Saleem *et al.* (2007) demonstrated the profile of nurseries business in Hazara district-Pakistan. McMahon (2013) investigated the propagation of Sand plums (*Prunus angustifolia*) where experiments were performed in the field and in the greenhouse. In the field experiment, t-budding and cleft grafting were evaluated, while chip budding was used in the greenhouse experiment. Aitken and Arnold (2004) tested the comparative weed control of four herbicides on peach in USA. Melnik (2004) enlightened application of herbicides to seedlings in the fruit nurseries. He observed the resistance of seedlings in the nurseries to the applied herbicides. Alan W. Hodges *et al.* (1998) presented data of various aspects of grown nurseries in different fields of Florida, USA. Salvatore and Newman (2010) emphasized the need for effective and timely management of grown nurseries in favor of the farmers and commercial growers. It was stated that without carrying out efficient protective measures, nurseries may fail at early stages of the development.

MATERIALS AND METHODS

Study site

The study was based on a survey and improvement of plant species at the ornamental nurseries of District Peshawar, located at 34.01 °N latitude, 71.35 °E longitude at an altitude of 350m above sea level with sub-tropical climate (Ahmad *et al.* 2019). Peshawar is located about 1600km north of the Indian Ocean. Both the summer and winter weather are extreme (Basit *et al.*, 2019), characterized by severe winter and prolonged hot summer, where the average minimum temperature during winter is 5°C and maximum up to 47°C during summer. The wettest month (with the highest rainfall) is March (78mm), and driest month (with the lowest rainfall) is June (7mm)

approximately (Gilani *et al.*, 2021). The main goal was to identify plants, know and record the current situation of the green belts by different aspects and parameters, where some major improvements were also recommended.

Parameters studied

1. Identification of plants

In this parameter, different plant species were identified.

2. Area measurement

The total area of nurseries was measured with the help of measuring tape.

3. Soil type

During the survey, best type of the soil was used for nurseries purposes and consequently for better result.

4. Irrigation system

The irrigation system used for the nurseries was recorded.

5. Weeding

Weeds infestation was investigated time to time and also the number of times per month was recorded in which the weeding was done.

6. Fertilizer application

The frequency of fertilizer applied was recorded.

7. Propagation method

The method of propagation was assumed either sexual or asexual (budding, grafting and cutting).

8. Propagation time

The amount of time after which these plants get ready for propagation was recorded.

9. Transplanting time

The amount of time after which the young trees get ready to be planted in new area, was recorded.

10. Field situation

The situation of field was recorded, either it was slope or plain, sunny area or shady place.

11. Problems of nurseries

The different problems of nurseries were observed and recorded during the survey.

RESULTS AND DISCUSSIONS

1. Identification of ornamental plant species

During a field survey to the nurseries at Hayatabad, District Peshawar, we found various plants which are discussed as below.

Trees

Among the trees studied during the survey, *Alstonia* (*Alstonia scholaris*; Apocynaceae), Neem (*Azadirachta indica* A. Juss; Meliaceae), Kanak Champa (*Pterospermum acerifolium*; Malvaceae), Bottle Brush (*Callistemon lanceolatus* D.C.; Myrtaceae), Ashoka (*Saraca asoca*; Fabaceae), Arjun (*Terminalia bellerica* Roxb.; Combretaceae), Lachi (*Eucalyptus camaldulensis*; Myrtaceae), Mulberry (*Morus alba* L.; Moraceae), Pine (*Pinus caribaea* Morelet; Pinaceae), Silver oak (*Grevillea robusta*; Proteaceae), Sukh chain (*Pongamia pinnata* (L.); Papilionaceae), Sumbal tree (*Bombex ceba*; Bombacaceae), Peepal (*Ficus religiosa* L.; Moraceae), Rubber fig (*Ficus elastica* L.; Moraceae), Sephora or Texas mountain laurel (*Dermatophyllum secundiflorum*; Fabaceae), Popular or cottonwood (*Populus*; Salicaceae), Blue Jacaranda (*Jacaranda mimosifolia*; Bignoniaceae), Sterkolia (*Sterculia foetida* L.; Malvaceae), and Sheesham, rosewood or Tahli (*Dalburgia sissoo*; Fabacea) were the obvious trees in the plant market.

Indoor plants

Some of the indoor plants like *Aloe vera*, *Araucaria*, Coleus; Lour, *Begonia rex* or Painted-leaf Begonia, Bryophyllum (*Kalanchoe* sect. *Bryophyllum*; Crassulaceae), Syngonium (Araceae), *Dracaena* (Asparagaceae), English ivy or

common ivy (*Hedera helix*; Araliaceae), *Agloanema* (Araceae), Purple heart (*Tradescantia pallida*; Commelinaceae), Schefflera (*Schefflera arboricola*; Araliaceae), Golden pothos or Devil's ivy (*Epipremnum aureum*; Araceae), Asparagus grass or common asparagus fern (*Asparagus setaceus*; Asparagaceae) and Zebra-plant (*Aphelandra squarrosa*; Acanthaceae) were observed at the study site.

Ground covers

Among the ground cover plants, *Duranta erecta* (*Duranta repens*; Verbenaceae), Spider plant (*Chlorophytum comosum*; Asparagaceae), Japanese Euonymus (*Euonymus japonicas*; Celastraceae), Crown-of-thorn or Euphorbia or Christ plant (*Euphorbia milli*; Euphorbiaceae), Joyweeds or Alternanthera (Amaranthaceae), Iresine or P.Browne (Amaranthaceae), Junipers (*Juniperus*; Cupressaceae), Brasilia (Compositae), Mouse thorn or Ruscus (*Ruscus hypoglossum*; Asparagaceae), Silver dust or dusty miller (*Centaurea cineraria*; Asteraceae), Karonda (*Carissa carandas*; Apocynaceae), Chinese croton or excocaria (*Excoecaria cochinchinensis*; Euphorbiaceae) were the prominent plants found at the surveyed nurseries.

Shrubs

Additionally, various shrubs like *Cassia glauca* or Glossy shower (*Senna surattensis*; Fabaceae), Jasmine (*Jasminum*; Oleaceae), Hibiscus (*Hibiscus rosa-sinensis*; Malvaceae), Hamelia (Rubiaceae), Nettlepurge or Jatropha (*Jatropha*; Euphorbiaceae), Ghaneri or Lantana (*Lantana camera* L.; Verbenaceae), orange jasmine or jessamine (*Murraya paniculata*; Rutaceae) Marwa (*Origanum majorana* L.; Oleaceae), Oleander (*Nerium oleander*; Apocynaceae), Motia (*Jasminum sambac*; Oleaceae), Gul-e-cheen (*Plumeria*; Apocynaceae), Gardenia (Rubiaceae), Harsingar or Night-flowering jasmine (*Nyctanthes arbor-tristis*; Oleaceae), Trumpetbushes (*Tecoma*; Bignoniaceae) and Lal jhari (*Euphorbia Cotinifolia*;

Euphorbiaceae) were the main shrubs recorded at the nurseries site.

Climber and Creepers

At the nurseries, different climber and creeper plants were recorded, some of them were; Creeping fig (*Ficus pumila*; Moraceae), Bombay creeper or Curten creeper (*Arimounia elliptica*; Asteraceae), Clerodendran (*Clerodendrum*; Lamiaceae), Climber rose, *Mostera delicious*, Passiflora, Railway creeper, *Bougainvillea spectabilis* and *Tecoma grandiflora*.

Palm

Similarly, the Alexander palm, Bottle palm, Bismarkia palm, Can palm, Fish tail palm, Italian palm, Phoenix palm, Kangi palm, Ravenia palm, Washingtonia and Little lady palm were the palm category of plants noted during the survey.

Seasonal flowers

To record more information and data at the nurseries site, we observed *Zinnia* (*Zinnia Elegans* L.; Asteraceae), *Kochia* (*Bassia scoparia* L.; Amarathaceae), *Portulaca* (*Portulaca* spp.; Portulacaceae), *Cosmos* (*Cosmos* spp.; Asreraceae), *Cocks comb* (*Celosia argentea* var. *Cristata*; Amarathaceae), *Plumed cockscomb* or *silver cock's comb* (*Celosia plumosa/Celosia argentea*; Amaranthaceae), *Marigold* (*Tagetes erecta* L.; Asteraceae), *Petunia* (*Petunia* spp.; Solanaceae), *Snapdragon* (*Antirrhinum majus*; Veronicaceae), *Phlox* (*Phlox* spp.; Polemoniaceae) among the overall seasonal flowers.

2. Area

Total area of nurseries was measured with the help of measuring tape which was about two acre. It was enough to complete the entire Cantonment area of district Peshawar in which one Kanal area was established for research.

3. Soil

Soil of nurseries which was utilized for plantation was the mixture of farmyard

manure, silt and clay. For the establishment of nurseries, soil should be tested that either it is fit for nurseries or not. It should contain proper quantity of organic matter. The soil should not be sandy which makes difficulty in making slices for evergreen plants.

4. Irrigation system

Entire nurseries were irrigated by sprinkler irrigation method. This reduced the wastage of water as well as weed infestation. The following table shows the irrigation intensity used by staff in nurseries for different plants.

Table 1. Irrigation intensity for different plants in nurseries and in field

S. No	Plants	Irrigation in nurseries	Irrigation in field Summer	Irrigation in field Winter
1	Duranta	Regular in summer	4 times in a week	1-2 times in a month
2	Iresine	Regular in summer	4 times in a week	1-2 times in a month
3	Nenthera	Regular in summer	4 times in a week	1-2 times in a month
4	Euphorbia	Regular in summer	4 times in a week	1 times in a month
5	Bougainvillea	Regular in summer	4 times in a week	1 times in a month
6	Kangi palm	Regular in summer	3 times in a week	1-2 times in a month
7	Ficus	Same	3times in a week	1-2 times in a month
8	Citrus	Same	2 times in a week	1-2 times in a month
9	Plum	Same	2 times in a week	1-2 times in a month
10	Apricot	Same	2 times in a week	1-2 times in a month
11	Guava	Same	2 times in a week	1-2 times in a month
12	Pomegranate	Same	1-2 times in a week	2-3 times in a month

Source: Field survey, 2019-20

Bajwa and Rehman (2008) stated that young citrus plants are irrigated weekly in summer and fortnightly in winter, pomegranate, peach, apricot and plum could be watered after 20 days in summer. Our study observations are slightly different from the above quoted statements. Proper amount of irrigation at proper growth stages of plants is very crucial and needful.

5. Weeding

Weeds cause many problems in fields and nurseries as well as results in

considerable yield loss in major crops in Pakistan (Hussain *et al.*, 2007). In today's agricultural system, farmers tend to apply various herbicides in order to protect their crops from weed infestation (Sanaullah, 2020b). But overuse of weedicides is discouraged as it causes several environmental and health related issues (Marwat *et al.*, 2011). The impact due to weed infestation was assessed time to time and the invasive weeds were identified.

Several weeds were pointed out in the nurseries like; *Cyprus rotendus* L., *Euphorbia prostrate* Aiton, Crab grass, *Convolvulus arvensis* L., *Sorghum halepense* (L.) Pers., *Traxicum officinale* L,

Poaannua, *Tribulu sterrestris* and *Portulaca oleracea*. The time duration after which the staff in nurseries performed their hoeing and weeding in the nurseries is given in Table 2

Table 2. Weeding time for different plants in nurseries

S. No	Plants	Weeding in nurseries	Weeding in the field
1	Duranta	1-2 times a month	After 2-3 month
2	Iresine	1-2 times a month	After 2-3 month
3	Nenthera	1-2 times a month	After 2-3 month
4	Euphorbia	1-2 times a month	After 2-3 month
5	Bougainvillea	1-2 times a month	After 5 month
6	Kangi palm	1-2 times a month	After 5-6 month
7	Ficus	1 times a month	Twice in year
8	Citrus	1 times a month	Twice in year
9	Plum	1 times a month	Twice in year
10	Apricot	1 times a month	Twice in year
11	Guava	1 times a month	Twice in year
12	Pomegranate	1 times a month	Twice in year

Source: Field survey, 2019-20

6. Fertilizer application

Fertilizers are significant input for increasing the fertility of the growth medium and thus enhances cope yield

(Sanallah *et al.*, 2020c). The intensity of fertilizer applied for different plants in nurseries by staff was recorded which is given in the Table 3 below.

Table 3. Fertilizer application intensity for different plants in nurseries

S. No	Plants	Fertilizer application in nurseries	Fertilizer application in field
1	Duranta	after 2 month	After one year
2	Iresine	after 2 month	Same
3	Nenthera	after 2 month	Same
4	Euphorbia	after 2 month	Same
5	Bougainvillea	after 2 month	Same
6	Kangi palm	after 2 month	2 times in a year
7	Ficus	Same	2 -4 times in a year
8	Citrus	Same	2 -4 times in a year
9	Plum	After 3-4 month	2 -4 times in a year

10	Apricot	After 3-4 month	2-4 times in a year
11	Guava	After 3-4 month	2 -4 times in a year
12	Pomegranate	After 3-4 month	2-4 times in a year

Source: Field survey, 2019-20

These results are totally in contrast to the findings of Bajwa and Rehman (2008) who stated that fertilizer should be applied to the citrus plants every 2-4 times a year during different seasons. Pomegranate, apricot and peach should be given fertilizer four times per year during different growth stages, while for plum this intensity should be less. For ground

cover plants, fertilizer should be applied after the 2nd week of transplantation.

7. Propagation method

Crops could be propagated through both; sexual and asexual methods but mostly asexual methods of propagation were found in the surveyed nurseries. The vegetative propagation methods used in nurseries are given in Table 4.

Table 4. Propagation techniques used in nurseries for different plants

S. No	Plants	Propagation Techniques
1	Duranta	Cutting
2	Iresine	Cutting
3	Nenthera	Cutting
4	Euphorbia	Cutting, grafting
5	Bougainvillea	Cutting, layering, budding
6	Kangi palm	Suckers
7	Ficus	Cutting, layering,
8	Citrus	T- budding, side grafting
9	Plum	T- budding
10	Apricot	T- budding
11	Guava	Layering
12	Pomegranate	Tongue Grafting

Source: Field survey, 2019-20

Chaudhary (2006) stated that persimmon can be ring or T- budded and cleft or tongue grafted, plum and apricot can be ring or T- budded and cleft grafted, citrus

can be T- budded, Veneer grafted and can also be grown from cutting or layering. These cited statements are in accordance to our study results.

8. Propagation time Following is the data regarding the time period after which

these plants were ready to be propagated vegetatively.

Table 5. Time taken by the plants in subject to be ready for propagation

S. No	Plants	Ready for propagation	Season/month
1	Duranta	Plant height up to 3-4 inch	June- July, Feb.
2	Iresine	Plant height up to 3-4 inch	June- July, Feb.
3	Nenthera	Plant height up to 3-4 inch	June- July, Feb.
4	Euphorbia	Plant height up to 3-4 inch	June- July, Feb.
5	Bougainvillea	After a year	June- July, Feb.
6	Kangi palm	After 3-4 month	Feb.
7	Ficus	After 2-3 year	June- July, Feb.
8	Citrus	After 3 year	June- July
9	Plum	After 1 year	June- July,
10	Apricot	After 1 year	June- July,
11	Guava	After 1-2 year	June- July,
12	Pomegranate	After 1 year	June- July, Feb.

Source: Field survey, 2019-20

9. Transplanting time

The time period after which the plants were ready to be transplanted or

transferred to new area was recorded and presented in Table 6 below.

Table 6. Transplanting time for different plants

S. No	Plants	Shifted to new area Orchard/ landscaping
1	Duranta	After 3-4 month
2	Iresine	After 3-4 month
3	Nenthera	After 3-4 month
4	Euphorbia	After 3-4 month
5	Bougainvillea	After 1 year
6	Kangi palm	After 3-4 month
7	Ficus	After 1-2 year
8	Citrus	After 3 year
9	Plum	After 1 year
10	Apricot	After 1 year
11	Guava	After 1 year
12	Pomegranate	After 1 year

Source: Field survey, 2019-20

10. Field situation

The data regarding the physical situation of field was recorded which is required for

the new shifted plants to orchards or new area. Table 7 depicts data of field scenario observed in nurseries during the survey.

Table 7. Field situation of different plants

S. No	Plants	Field situation
1	Duranta	Sunny
2	Iresine	Sunny
3	Nenthera	Sunny
4	Euphorbia	Sunny
5	Bougainvillea	Sunny
6	Kangi palm	Sunny, partial sunny
7	Ficus	Sunny
8	Citrus	partial sunny
9	Plum	Sunny
10	Apricot	Sunny
11	Guava	Sunny
12	Pomegranate	Sunny

Source: Field survey, 2019-20

Chaudhary (2006) stated that citrus can be transferred to orchards during spring, peach in early spring, apricots are transferred to orchards after one year of budding or after three years of life.

11. Problems of nurseries

Soil was not levelled which appreciated weeds growth during raining. Some plants were kept in shaded area, while they required fully shine and sunny condition, while nurseries had lack of germ plasm

unit. The main purpose of germ plasm unit establishment is the production of good quality yield and seed which has increased demand in the market. To protect the growing material from viral diseases and reach it safe and sound to the grower, the quality seeds and budding and grafting woods are required to be distributed to certified nurseries. Lastly, lack of green house was noted in which plants are grown in controlled environment.

CONCLUSIONS

Different flowers and plants were seen during the field survey to the nurseries. Based on study findings, it was concluded that there was lack of proper planning, management and less or no interest of the field staff. It was observed that improved and recommended

horticultural and plant practices were not followed while carrying out field activities at the nurseries. It was established that plant propagation was not shifted to the specific place on time, plants who needed sunny environment were kept under shade and germ plasm unit as well as greenhouse were found missing. It was suggested that latest horticultural and

agricultural practices should be used and encourage full time office and field duties of the management staff in order to improve and develop the nurseries. Furthermore, genetically modified plants should be included and proper mechanism

may be developed for the timely identification of diseases and work should be done to effectively combat invasive weeds to avoid disease attack and weed infestation.

REFERENCES

- Ahmad M, Khattak MR, Jadoon SA, Rab A, Basit A, Ullah I, Khalid MA, Ullah I, Shair M (2019) Influence of zinc sulphate on flowering and seed production of flax (*Linum usitatissimum* L.): A medicinal flowering plant. *Int J Biosci* 14:464-476.
- Aitken, J.B and C.E. Arnold. 2004. Comparative weed control with four herbicides in peach. *Florida State Hort. Soc. USA*. 44(22): 305-307.
- Alan W. Hodges, L.N. Satterthwait, J.J. Haydu. 1998. Business analysis of ornamental plant nurseries in Florida. Deptt. food and resources economic university of Florida. Pp. 22-25.
- Bajwa M.I and F. Rehman. 2008. Orchard and their fertilizer management. *Agri. Env. Forest. Fert. Comp. Limit. Lahore. Pak.* 1: 41-154.
- Basit A, Khan S, Sulaiman Shah S, Shah AA (2019a) Morphological features of various selected tree species on the greater university campus Peshawar, Pakistan. *Int J Bot Stud* 4:92-97.
- Cattivello, C. and R. Danielis. 2008. Floriculture in the Friuli-Venezia Giulia Region. *Natizier-ERSA*. 13(5):13-17.
- Chaudhary, M.I. 2006. Introduction of fruit crops. *Horticulture. National Book Foundation Isl. Pak.*, 5:442-480.
- Davidson, H.R., Mecklenberg and C. Peterson. 2007. *Nurseries Management Administration and Culture*. New Jersey Prentice. 4: 72.
- Eisedman, J.A and M.B. Thomas. 2005. Nutrition Methods and time of budding for peach nurseries trees. *The Int. Plant Propagators Soc.*, 36: 494-499.
- Fakayod, S., Bamidele, A. Molaniyi and J.J. Ademole. 2008. The study examined the ornamental plants nurseries business in Nigeria. *kawara state north central Nigeria*. Pp. 39-42.
- Gilani, S. A. Q., Abdul Basit, M. Sajid, S.T. Shah, I. Ullah. H.I. Mohamed. 2021. Gibberellic Acid and Boron Enhance Antioxidant Activity, Phenolic Content, and Yield Quality in *Pyrus Communis* L. *Gesunde Pflanzen* <https://doi.org/10.1007/s10343-021-00555-5>
- Hussain, Z., K.B. Marwat, M. Saeed, B. Gul, M.R. Khalil. 2007. Survey on weed problem in wheat crop in district Chitral (a higher altitude area) of NWFP Pakistan. *Pak. J. Weed Sci. Res.*, 13: 121-127.
- Klimenko N.I., O.E. Klimenko and S.A. Kosykh. 2008. Promising stock for peach in southern Ukraine, Sadovostvo-I-Vinogradarstvo. *Cab. Abst.*, 22(1): 6-7.
- Kuden, A., and N. Kaska. 2010. Research on different budding methods in propagation of temperate zone fruit nurseries plants grown in subtropical areas. *Hort. Abst. Doga. Turktarim*. 15(3): 759-764.
- Marwat, K.B., M.A. Khan, S. Hashim, K. Nawab and A.M. Khattak. 2011. Integrated weed management in wheat. *Pak. J. Bot.*, 43: 625-633.

- Mcmahon, E.A. 2013. Propagation of Sand Plum (*Prunus Angustifolia*) Marsh.: an Exciting Start to Domestication (Doctoral dissertation, Oklahoma State University). Pp. 32-35.
- Melinik, N.M. 2004. Application of herbicides to seedlings in the fruit nurseries. *Weed sci. J.*, 33(2): 61.
- Rahim, A.A., Jabbar, B.A. Malik and A.A. Hashi. 2008. Performance of selected herbicides in Lentil. *PWSS. Abst.*, 3: 14.
- Saleem, A.B., M. Zubair, G. Ayub and S. Akhtar. 2007. The profile of nurseries business in Hazara. *Sarhad. J. Agri.*, 23: 56.
- Salvatore, M. and P. Newman. 2010. Nurseries surveyed in southern California adopt best practices for water quality. *Ben faber UCCE ventura country*. Pp. 57-60.
- Sanaullah, A. Basit, A. Khan, W.U. Rehman, Nasrullah, A. Khan, M.A. Raza and I. Ullah. 2020c. Estimating cost and net return: A profitability comparison of maize and potato in district upper Dir of Khyber Pakhtunkhwa, Pakistan. *International Journal of Biosciences*. 16(2): 444-453.
- Sanaullah, U. Pervaiz, S. Ali, M. Fayaz and A. Khan. 2020a. The impact of improved farming practices on maize yield in federally administered tribal areas, Pakistan. *Sarhad Journal of Agriculture*, 36(1): 348-358.
- Sanaullah. 2020b. Significance of agricultural extension in addressing the weed infestation impact on major crops in district bajaur KP-Pakistan. *Pak. J. Weed Sci. Res.*, 26(4): 481-489.
- Singh, K.P. 2015. Ornamental plants and garden design in tropics and subtropics. *J. of Ornamental Hort.*, 18(3&4): 147-150.
- Takahashi, N. and T. Hagiwara. 2008. Management methods of entrepreneurial type of green-house floriculture farming and analysis of administrative abilities of entrepreneurs. *Bulletin of the Gunma Agri. Exper. Stat.*, 3: 1-16.
- Tolley, I.S. 2012. Observations of citrus propagation in South Africa. *Proceeding of the Int. Plant Propagators Soc.*, pp. 32-120.