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## Original Research

# Researchable Issues of Ornamental Plant Nurseries: A Case Study of Pattoki

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**ABSTRACT**

Quite a good number of horticultural nurseries with focus on ornamental plants are located at Pattoki (District Kasur, Punjab, Pakistan) and its adjoining areas. At these nurseries hundreds of thousands of plants are raised throughout the year. Generally, Pattoki nursery business is based on traditional methods of plant propagation thereby involving a number of technical issues. Thus, in the present study, a survey was conducted to identify some of the important issues related to propagation and management of ornamental plants at these nurseries. In order to generate required information, a total of 50 nurseries were selected. This sampling of nurseries was based on convenience sampling method due to lack of complete list of nurseries. The respondents (nurserymen) were interviewed on semi-structured questionnaire with open ended questions. Based on feedback received from nursery growers, some key issues were identified during survey, including lack of respondents' willingness to register their businesses (96%), concern over transfer of insect pests with soil (14%) and lack of willingness to seek guidance from experts (70%). Some of the responses came 100% positive or negative, viz. type of pots used was 100% clay pots only, 100% use of silt only as traditional soil medium for filling of pots, no record keeping (100% nurseries) of important nursery operations, not hiring any expert staff for supervision (100% nurseries) and no soil medium treatment(s) before use (100% nurseries).

***Keywords:*** *Plant propagation, management, problems' identification, survey.*

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## INTRODUCTION

World-wide the business of ornamental plant nurseries and greenhouses is contributing significantly to the national economy of many countries. Researchers have always tried to identify the problems and issues of ornamental plant nurseries and suggested their possible solutions. Haque et al. (2007) considered the business of ornamental plant nurseries profitable as it generates income and also serves as a source of employment. They also observed some issues such as dearth of funds for government nurseries and deficiency of improved seeds and seedlings for private sector or NGOs' owned nurseries. Gagliardi and Brand (2007) conducted survey of 114 members of the Connecticut Nursery and Landscape Association to analyze preferences of nurseries for reducing sale of billions of dollars of invasive plants and found that only 14.5% respondents considered the Japanese silver grass (*Miscanthus sinensis*) and 8.1% respondents considered butterfly bush (*Buddleja davidii*) to be invasive. Asiedu et al. (2012) pointed out some problems of nursery industry in Ghana which included scarcity of certified plant material, lack of financial assistance, unavailability and unreliability of cheaper irrigation source, infestation of pests on planting materials, cases of theft, insufficient space and differences in the prices of produce. Merritt et al. (2012) conducted survey of 43 nurseries in Florida to evaluate the U.S.-Canadian Greenhouse Certification Program (USGCP). The key problems identified by them were unclear wording about some of the requirements and impracticality of complete segregation for keeping domestic and imported plants, and also found that the growers were well aware about the economic loss due to the presence of diseases and/or pests. Krishnan et al. (2014) stated that the main aim of all ornamental plant nurseries was to produce quality seedlings in sufficient quantity to satisfy the users' needs.

With the development of floriculture and landscape sector in Pakistan, now the business of ornamental plant nurseries is thriving well particularly in big cities. Saleem et al. (2007) noted an increasing demand of nursery business in the country. Pattoki area has gained a central position in this scenario. Pattoki is a small town in district Kasur that can be approached both by main GT (Grand Trunk) Road and railways and is about 80 km from Lahore, the capital city of Punjab. With the passage of time, a large number of small and big nurseries have been established in the area where millions of ornamental plants are propagated throughout the year either from locally available propagation materials or from seeds and seedlings brought from different part of the country or imported. These nurseries have also become source of employment for a large number of people particularly local communities. Additionally, these ornamental plants are not only used for beatification of private/public property, but also help in improving local environment. Ahtisham et al. (2017) collected data of the exotic and indigenous plants from 210 nurseries located in Pattoki area and reported

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the presence of 147 plant species belonging to 52 families which included 61, 46, 11, 8 and 15 species of tree, shrubs, palms, grasses and indoor plants, respectively.

While managing ornamental plant nurseries' business certain problems and issues have been discussed by various researchers. While developing a profile of nursery business in Hazara during the year 2001-02, 45.8% respondents stated snail as a main pest, 70.8% of them had a demand of earthenware pots, 70.8% of them had shade houses only, 75% had no specialist at their nurseries and 75% nurserymen were not providing landscape services, home delivery and facility of internship for students (Saleem et al., 2007). At ornamental plant nurseries, production of quality seedlings at lower cost is required to satisfy the end users' needs. Mass production of seedlings may adversely affect their quality (Dedefo et al., 2017). It, therefore, seems necessary to define minimum standards of quality production in order to facilitate the business and to gain consumers' confidence (Krishna et al., 2014). Parrella et al. (2015) suggested more effective legislation to govern the control of pests among plant propagators, as being invasive species; the pests might disturb regulatory activities in urban, agricultural and natural settings. Kenis et al. (2018) particularly considered the trade of live ornamental plants as the main cause of introduction of invasive plant pests. Keeping in view the importance of the business of sale of ornamental plants at Pattoki nurseries, a survey was conducted to explore some important issues and challenges being faced by nursery growers with the ultimate aim of improvement in nursery business in future.

## MATERIALS AND METHODS

The study was based on a survey conducted in March-April, 2017 by interviewing the growers of selected ornamental plant nurseries in Pattoki area (district Kasur, Punjab, Pakistan) with the purpose of identifying significant issues and problems related to current research gaps of nurseries' business. A total of 50 growers of plant nurseries were selected for interviews. Up till now the complete list of ornamental plant nurseries in Pattoki area is lacking. Therefore, the selection of nurseries was based on convenience sampling technique. Only the willing respondents were interviewed. For generating the desired information, a semi-structured questionnaire was prepared with open-ended questions covering different aspects and possible problems of plant propagation, the management of nurseries and other important features of nursery business. Pilot study was conducted by interviewing growers of eight nurseries to assess the strength of the questionnaire. In the light of feedback of responses obtained from pilot survey, the questionnaire was finalized with a little addition/deletion of questions for the collection of desired data. Major questions included: was the respondent's nursery registered with Federal Seed Certification and registration Department (FSC&RD), Islamabad, with definite business mandate, and if not, were they willing to do so; during purchase, propagation and sale of plant material what kind of problems they faced with respect to pests and diseases; what type of pot material they used for plants; what kind of soil medium they used for filling the pots and for propagation; in case they faced problems related to pests, diseases, soil medium, propagation, or other nursery-business related problems, how they sought help of experts; were they maintaining documentation in the form of record keeping for better future planning. The responses of interviews were grouped, coded and then arranged on excel sheet. Mainly MS Excel program was used to get frequencies and percentages of data and to interpret them in the form tables and graphs having percentages and frequencies. The coded and grouped data were then transformed to SPSS for getting possible effects of variables.

## RESULTS AND DISCUSSION

Results of variables under study have been presented in the form of figures followed by concise discussion.

### Willingness of respondents for nursery registration

In Pakistan, Federal Seed Certification & Registration Department (FSC&RD), Islamabad is meant for registration of seeds and plant varieties as well as plant nurseries. Unlike fruit plant nurseries, none of the nurseries of the respondents in Pattoki area was registered with FSC&RD. Respondents were asked if they had desire to get their nurseries registered with the respective government department or not? Data presented in Figure 1 depicts that a nominal percentage of respondents (4%) was willing for this task, while overwhelming majority of respondents (96%) had either no idea of nursery registration or they were unaware of the importance of nursery registration. Perhaps lack of knowledge about importance of registration of nurseries which ensures true to type production of plants under certain regulations and lack of education of nurserymen were the main reasons behind the situation. The main benefit of nursery registration is availability of true to type, certified disease free and labeled plants produced under supervision of skilled staff to the growers. The practice of ornamental plants nursery registration has been initiated in the country at government level. There is great need to start the same practice at private level because private nurseries are the major source of provision of fruit and ornamental plants. Rajwana et al. (2013) stressed production of mango plants in cleaner environment of nurseries. Therefore, on the lines of fruit plant nurseries, proper legislation is also required for ornamental plant nurseries. Krishnan et al. (2014) reported that 30-40% demand of planting material was being met in India by the registered nurseries, while rest of the demand was being met from unorganized sectors, thereby suggesting the need for establishing more plant nurseries in organized sector.

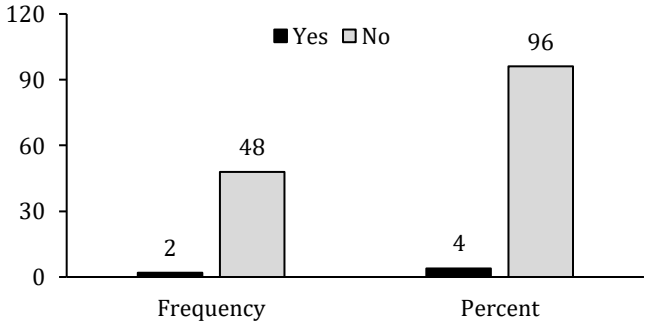


**Figure 1:** Willingness of respondents for registration of nurseries.

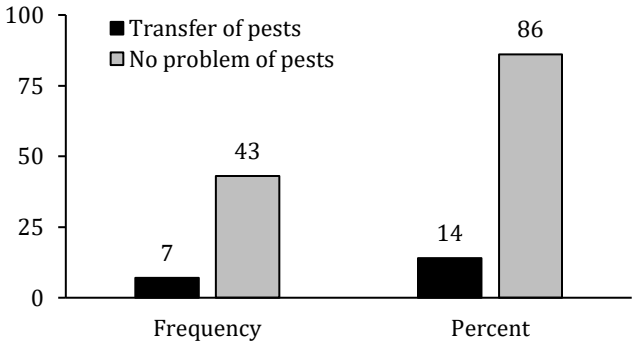


**Figure 2:** Transfer of pests during transportation of plant material.

**Transfer of pests and diseases during transportation**

World-wide this has become a matter of concern for biologists that many kinds of pests are rapidly transmitted to various places with transportation of plants. The situation is also alarming in Pakistan. Due to faulty control system and lapses the threat of spread of diseases and pests is always there no matter how strong quarantine is (Anonymous, 2005). Although, measures of supervision on presence of pests and diseases have been tightened in the country by the Quarantine Department in the recent past, still lot of actions remain to be executed carefully in terms of quarantine laws, like effective inspection of items of import, to ensure health of plants at nurseries by inspection teams of Quarantine Department in collaboration with respective Agriculture Department, etc. Most probably due to lack of knowledge, most of the respondents were unaware of the seriousness of current situation. Figure 2 indicates that about 14% respondents were cautious about the transfer of pests with soil media or with infected plants during transportation. In this regard it is suggested that nurserymen and growers need training about quarantine and health of plants so that they can effectively impart their role in production of disease and pest free plants. Further, quarantine laws need to be implemented more strictly.

Presence of pests and pathogens impose threats to the success of nursery business. Production of pest and disease-free plants is a major aim of nursery business worldwide. For example, Adeduntan (2015) studied the business of ornamental plants in Nigeria and concluded that inadequate land and pest attack were the major constraints to nursery production of ornamental plants in Akure metropolis. It is clear in documented research that trade of ornamental plants moves pest species from one country to another (Parrilla et al., 2015). Respondents were asked to tell about important pests and pathogens they observed in their nurseries. They replied in general and not according to the severity of pest attack. According to their answers, important pests and pathogens were scales (particularly on roses), snails, slugs, thrips, aphids, leaf miner, galls, downy mildew, leaf spot and virus symptoms. Respondents were inquired how did they identify and control pest and disease attack? In response they disclosed that they tried to control the pests by choosing insecticides as per their own knowledge of experience or according to the advice of dealers of pesticide companies.

**Perception of respondents about need of experts' guidance**

The perception of respondents was sought about their interest to get technical help and guidance from experts (usually government staff of Agriculture Department) in case of technical matters, e.g. identification of proper pest and its suitable control, use of hygienic propagation materials, true naming of plants with accurate classification (Fig. 3). Relatively a high percentage of respondents (60%) expressed their will to seek help of technical persons in order to resolve their technical issues, whereas 40% respondents desired to manage the problems at their own in the light of their experience. This situation demands strong liaison between nurserymen and technical staff of Agriculture Department of the respective government.

**Preference for pot material**

Survey results show that 100% nurserymen were using as well as they preferred the use of clay pots. Main reason of the use of clay pots is their easy availability, cheaper rates and their porous nature which makes them cool in hot weather. The main problem with the use of clay pots is that they are heavier in weight which results in increased rates of transportation. Further these pots are also fragile in nature. It is, therefore, suggested that pots made from other materials (plastic, fiber, etc.) be introduced so that transportation may become easy, particularly at far off places. Nambuthiri et al. (2013) proposed that alternative containers could be made from a number of natural materials such as peat, spruce fibers, rice hulls, wood pulp, wheat, coir (coconut fiber), bamboo, rice straw, or mixed with composted cow manure. Being semi-porous in nature, these fiber containers promote air and water exchange between the surroundings and rooting substrate.

**Nature of soil media for pot plants**

Growing medium is of special importance in the business of nursery production of ornamental plants. The quality of growing medium is directly related to the growth and the development of the cuttings, mainly their shoot and root growth (Sudarjat et al., 2018). Selection of correct soil media components is the key to the successful production of plants (Robbins, 2009). The results of survey showed that in Pattoki all the plants were being multiplied in simple silt (locally called as "Bhal") which is usually collected from canals. Sometimes it is enriched with the addition of organic matter like leaf compost, or seldom with farm yard

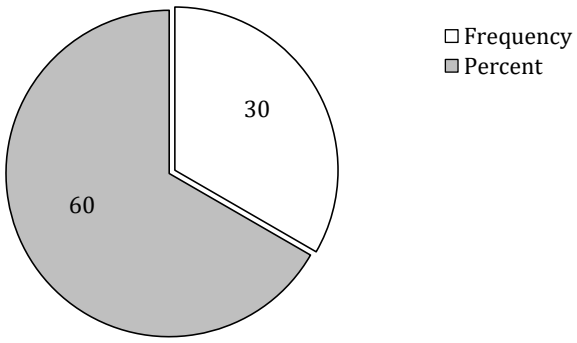


**Figure 3:** Demand of technical guidance of respondents from experts.

manure. No standardized medium is being used at these plant nurseries. In the present study, it was revealed that 100% nurserymen were using conventional silt medium. This medium is not even sterilized before use. Further, it is heavy in weight that causes more freight charges. Also, this kind of media may contain germs which are transported from one place to another without any check. It is very important to standardize the potting media for specific types of ornamental plants for harvesting many types of benefits. Now peat substitute is also available easily in the country. The northern areas of Pakistan are heavily forested with pines and other kinds of plants. Naturally decomposed fallen leaves could also be a good source of organic matter.

**Record keeping**

Record keeping helps to identify weaknesses and strengths, improve the respective business, minimize problems and expand chances of future success (Wilkinson, et al., 2016; Anonymous, 2017). Thus, proper record keeping ensures formulation of better future policies. In the present study it was found that nurserymen (100%) were not interested in maintaining any kind of record regarding production, sale, management, price, list of retailers etc.

Record keeping entails proper level of education. As the education level of people in Pakistan is very low. In view of authors, perhaps this kind of practice demands hiring of some educated person which the nurserymen would not afford. In the world, such help is sought from computer technology. For example, different computer options are available to both growers and retailers of the nursery industry in Australia (McSweeney and Bailey, 2001). Similarly, in India many types of software for the sale of nursery plants, complete inventory and management are available in the market (Krishnan, 2014).

Thus, in the present study, many flaws were observed in the nursery business at study area of Pattoki and its surroundings. Main issues can be concluded as lack of interest of nurserymen for registering their nurseries with FSC&RD, lack of awareness for the spread of insects and diseases, lack of interest for supervision of their nursery business by experts, lack of preference for balanced and standardized soil media and lack of interest in proper record keeping. It is suggested that proper measures are required to be implemented in the form of legislation to streamline and strengthen nursery business in the country. At least one model nursery may be established by the government at major cities in the country which could serve the leading and guiding role for other nurserymen. Strong liaison between nurserymen, growers and government departments is also need of the time.

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