The Oklahoma Cooperative Extension Service
Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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Locating the Nursery

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http://osufacts.okstate.edu

Determining the site of a nursery operation involves numerous considerations long before actual construction of the facility. Although the information below is intended to guide the entrepreneur in selecting the land on which to build, it can also be used as a checklist when purchasing an existing operation. It is important to know the type of plants you plan to grow and sell, the marketing (retail or wholesale), and if you prefer container or field production or a combination of the two. Be aware that return on a container grown operation will occur in one-third to one-half the time it takes to realize a return for field grown stock. However, production costs and initial investment for the container nursery may be much higher. Also, container operations are more intensive with much less margin for cultural errors. Below are major site selection considerations that should be investigated before nursery plans go beyond paper.

Land

The ideal tract of land has a slight slope, up to five percent, which provides for proper air drainage and excess water runoff. If the soil has a high clay content, a slope approaching five percent may be needed. Otherwise, considerable expense may be incurred to provide an elaborate drainage system. Determine if frost pockets exist in low lying areas and if flooding has occurred on the site. Low lying areas or valleys can sometimes exaggerate the effects of cold and hot air flow because of poor air circulation.

Soil is an important factor to consider unless the nursery is only growing container stock in a soil-less media. Soil is rarely used alone as a container medium but rather, is usually mixed with various organic materials. Ideally, a sandy or silt loam soil with high fertility and good drainage is recommended for container production. When rootballs are dug from field production a finer textured soil such as a clay loam is more desirable. However, successful nursery operations exist under less than ideal soil conditions. Management and cultural practices may have to be adjusted and more energy exerted for high quality plant production where ideal soil types are not present.

Proper soil drainage is vital to successful plant culture. Without proper drainage a number of problems quickly develop and may be insurmountable to the beginning grower. High salts and insufficient soil aeration are but a few of the obstacles which may be encountered.

A soil pH ranging 5.0 to 7.2 is acceptable for the production of most nursery stock. A lower pH will be needed for acid loving plants such as azaleas and rhododendrons. Lowering the pH level can be accomplished by the addition of elemental sulfur or aluminum sulfate. The cost of lowering the pH may be prohibitive for successfully marketing the plants. However, raising the pH is more feasible and can be accomplished by the addition of liming materials. Correct soil pH provides maximum plant utilization of the soil's nutrient levels. The county extension educator can assist you in preparing and submitting a soil sample for testing to determine pH and nutrient status. The cost is relatively low per sample and is usually money well spent.

Water

Good quality water in sufficient quantity is critical regardless of the crops to be grown. Water is the most limiting factor when container grown stock is being considered. All water sources to be used in production must be tested. Research indicates that container or field grown plants may be watered with nearly 600 parts per million (ppm) of dissolved solids. However, seedlings and transplants are normally only tolerant of water with 200 ppm. When conductivity is checked in micromhos per cubic centimeter remember that at 77°F, 330 micromhos/cc is roughly equivalent to 230 ppm.

Your county extension educator can help with submission of water samples for testing. Total soluble salts, pH, calcium, carbonate, magnesium, and sodium levels should be determined prior to growing nursery stock. Soluble salt levels of 250-750 micromhos/cm are acceptable for quality irrigation water.

Municipal water is generally fine, but becomes expensive in large production areas. Although chlorinated water is rarely harmful to plants, even one ppm fluorine may reduce salability of sensitive crops. Additionally, softened water is not appropriate for irrigation purposes. Determine the pressure, pipe size, and flow rate of the water source. When city water cannot be used or is not desirable, determine if a suitable well can be drilled. Also, look elsewhere for water sources such as streams, lakes, etc. Be certain that the water is a reliable source and will not be diverted from your usage at any time in the future. Securing a water source can be accomplished by contacting:

Oklahoma Water Resources Board
Stream/Ground Water Division
1000 N.E. 10th Street
P.O. Box 53585
Oklahoma City, OK 73152

An abundant source of water becomes particularly critical for container grown stock. This type of production entails a major time commitment in frequent watering, sometimes more than once a day in the hot summer months in Oklahoma. Often, at least one inch of water will be required on a daily basis. During hot weather, nursery stock may perish or be severely injured if even one irrigation is missed. Ideally, a backup system for irrigation should be planned, particularly in container production systems.

Air

Air pollutants such as sulfur dioxide, fluorides, and ozone are detrimental to plant growth. Site selection around industrial areas and areas of high vehicle passage could be a problem. However, in most areas of Oklahoma, air quality is not a limiting factor in plant growth.

Utilities

Electricity

It is wise to anticipate electrical needs for the future and provide sufficient capacity for full electric utilization. Currently, electricity is not competitive with natural gas in Oklahoma and is therefore not feasible as a heating source. However, it is good to check with the local electric company to get a commercial rate and determine if there are declining block rates for exceeding a particular energy amount in a given time period.

Natural gas

Natural gas is clean and relatively inexpensive. Also, gas heating systems are generally cheaper to purchase. Should the nursery operation include heated greenhouses, the cost of the energy source will be a major factor in determining the location and size of these structures. Most nursery stock can be over-wintered in unheated structures referred to as cold-frames. This type of production is considerably less expensive and often more economical for the new grower.

Nursery Design

Arranging the various areas of the nursery will depend upon individual needs and goals of the grower. The curvilinear layout is often considered one of the most efficient designs for the nursery (Figure 1). Growing areas and shipping facilities are located outside the functional areas. Try to arrange the facilities to minimize the distance that input materials and salable plants have to be moved.

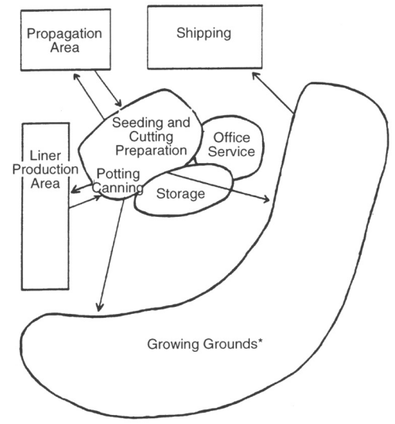

Figure 1. Curvilinear layout of a nursery.

Transportation and Parking

Locating the nursery near a major road will facilitate the movement of plants to and from the site. In planning a retail operation, include ample parking for customers and employees. Provide 18 feet for head-in parking spaces and a 30 foot clearance for back-out and turning. Any curves or turns should have an 18 to 20 foot inside radius. Check for local ordinances which dictate regulations on exits, entrances, and minimum car stall space. Plan for the greatest exposure possible when retailing to the public. Wholesale nurseries must consider access for their buyers. Major roadways are desirable for truck and postal arrangements and close proximity to a major airport may also be desirable.

Labor

Be certain than an adequate labor pool is available for your operation. Operating a nursery business in a remote area, even for a wholesale operation, is not the ideal situation. Keep in mind that a container nursery is more labor intensive than field production. A rule of thumb is to plan for one employee per actual acre of container production compared to one employee for up to seven or eight acres of field production.

Nursery Expansion

A common oversight in nursery planning is the possibility of future expansion. By planning for a larger operation in years to come, the need for relocation will be decreased. Most nurseries will at least double in size within a few years and even greater expansion may be needed.

Additional Reading

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Davidson, Harold, Roy Mecklenburg, and Curtis Peterson. Nursery Management. Administration and Culture. Prentice-Hall, Inc., 1988.

Stanley, John and Alan Toogood. The Modern Nurseryman. Faber and Faber, Ltd., London, 1981.

Industry Trade Magazines

American Nurseryman
111 N. Canal Street
Chicago, IL 60606-7203

Nursery Manager
Box 1868
Fort Worth, TX 76101

Organizations

Oklahoma State Nurseryman's Association
400 N. Portland
Oklahoma City, OK 73107

American Association of Nurserymen, Inc.
230 Southern Building
Washington, D.C. 20005