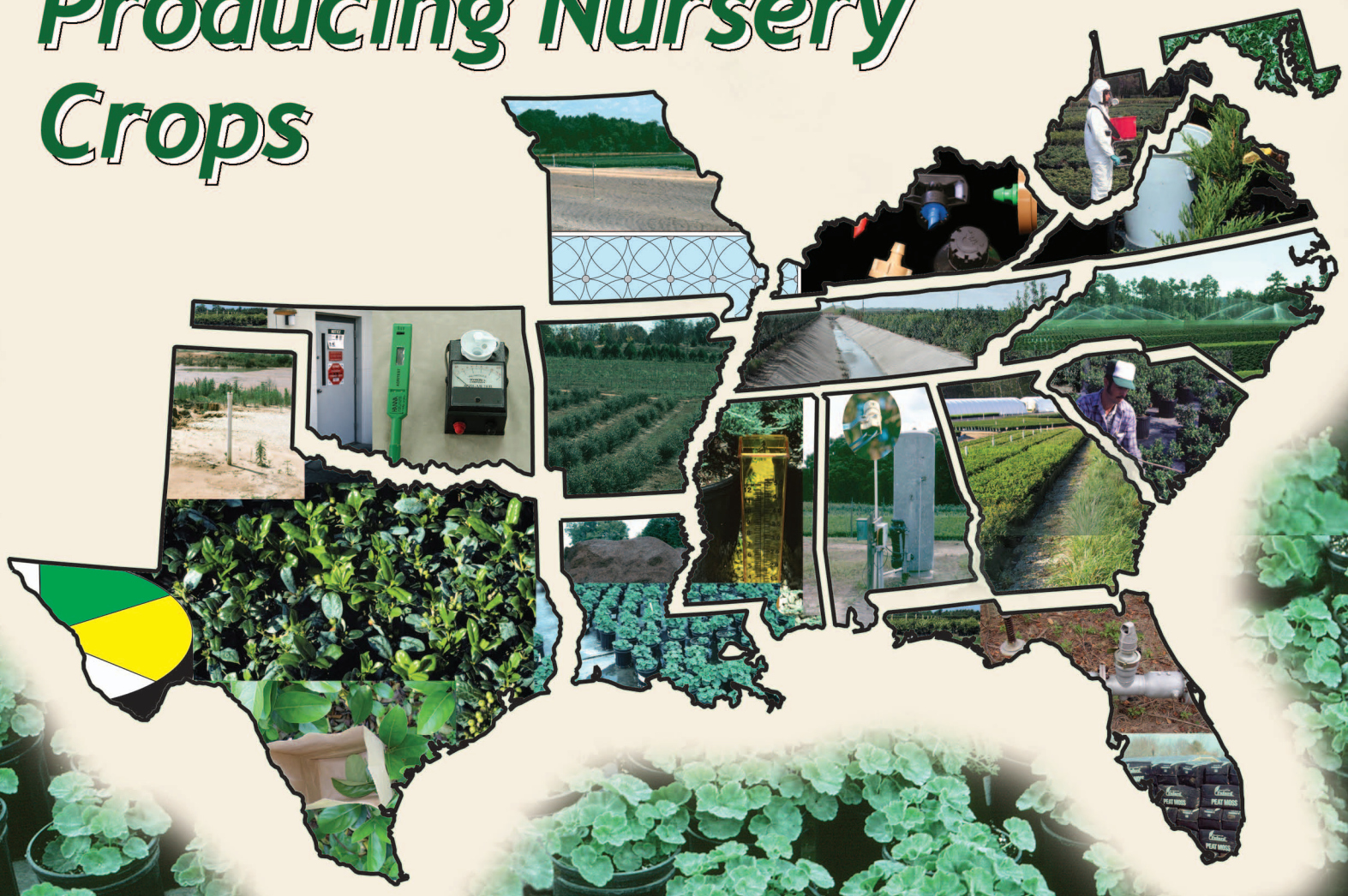
Best Management Practices: Guide for Producing Nursery Crops



Second Edition
2007

General Introduction

Nursery crop production in the U.S. has been well established for over 100 years. Container production of nursery crops began in the 1950's and since then the acreage has continued to increase. Today, ornamental crop production is among the fastest growing sectors of agriculture. Along with the rapid growth of the nursery industry, production methods are in transition from field production to container culture, with container production currently representing about 60% of the industry. Overall cash receipts for the nursery and greenhouse industries were over $13.8 billion in 2002, and sales of woody nursery crops alone increased from $1.1 to $3.97 billion from 1988 to 2003. This reflects significant growth in the southeastern nursery industry. The industry is highly diverse in terms of production practices and materials grown, with over 390 genera and more than 2000 species of ornamentals produced in the U.S. It is estimated that total production acreage in the southeast is greater than 156,300 acres.

Growing plants in containers is a unique production system compared to growing plants in native field soil. Container plants are grown in soilless **substrates** (media) that contain a limited amount of w ater, retain small quantities of nutrients, and confine the roots in a limited volume. Consequently, production inputs such as irrigation, fertilization, and pest control require precise and properly timed applications in quantities that result in maximum benefit. Thus, the opportunity exists to make sure the best possible management strategies or Best Management Practices (**BMP**s) are used, recognizing the site-specific nature of nursery production facilities. BMPs can be defined as schedules of activities, prohibitions, maintenance procedures, and structural or other management practices found to be the most effective and practicable to prevent or reduce the discharge of pollutants to the air or waters of the United States. Best Management Practices also include operating procedures, and practices to control site **runoff**, ground water contamination, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. Thus, BMPs can conserve and protect water resources from adverse environmental impacts that might result from cultural practices used to produce plants. BMPs are site specific and menu driven, thus not all will be implemented, but as many as possible should be incorporated into the production system whether plants are produced in native soils or soilless container substrates. BMPs provide uniform production guidelines regardless of nursery acreage or location.

Most, or some segment of the production management and cultural practices used in the nursery could be modified to ensure that nursery operators are producing plants using environmentally conscious practices. However, this guide will focus on production practices that impact water quality because the southeast nursery industry representatives identified these as needing modifications or guidelines due to imminent environmental concerns.

The purpose of this guide is threefold:

1. Establish a document that puts in writing many BMPs already in place at nurseries.
2. Establish a site-specific menu of management practices that can be implemented regardless of nursery size or location.
3. Promote environmental stewardship among plant producers.

The guide is divided into subtopics dealing with specific production practices. Within a specific subtopic, BMPs are identified in short simple statements with a ◯. The BMPs are research-based where definitive information is

Traffic flow of employees and equipment should be considered in the design and construction of production areas to minimize environmental impacts.

available; otherwise the best judgment available was used to structure a BMP. References and a glossary are provided. Bold green words are defined in the glossary. EPA, USDA, state regulatory personnel, and nursery industry representatives have reviewed the guide. As new information is obtained, the guide will be revised.

Nursery Site Selection

Established nurseries planning to expand or those considering new production sites should consider several aspects of site selection with regard to BMP implementation. Often nurseries are located on a site due to prior ownership of land, expansion of existing container acreage, weather conditions, regulations or ordinances, or desire for rural location. The primary emphasis during planning is usually focused on the nursery layout; designing and constructing production areas for optimal traffic flow; and location of buildings, loading, and storage areas.

Less consideration is often given to site-specific aspects that might have an environmental impact, but it is important to find a location within a geographical area where environmental impacts such as contamination of water, soil, and air can be minimized. Some general considerations are presented below. The Natural Resources Conservation Service (NRCS), water management personnel, Environmental Protection Agency (EPA), and state Cooperative Extension Service personnel can provide assistance and resources needed to make informed decisions.

Container production areas should be graded to transport water away from the site. Avoid placing containers in areas of frequent water collection to minimize the potential for disease.

Location of Nursery Site within Geographic Area

Minimal impacts to ground and surface water (including wetlands) are a major consideration when selecting a nursery location. Ground water is recharged by surface water that flows through native soils. Soils are characterized by the ability of water to pass through them (**permeability**) and this information is available in the county soil survey from the NRCS. Select a site in which soils have low permeability. In highly permeable soils such as sands, water moves rapidly through the soil profile to recharge the aquifer or ground water where well or drinking water is likely obtained. A clay layer or hardpan several feet below the soil surface may result in a confining layer and retard percolating water. Ground water drawn above the confining layer could contain substances leached from the surface. However, good soil drainage is essential to move excess water away from the roots of plants grown in native soil and prevents flooding of the root zone of the sub-surface container in a **pot-in-pot** production system. Well-drained sandy, silty or loamy soils offer the texture needed for these production systems. Some red clay soils with good structure are acceptable. Clay soils with yellow, brown or mottled color suggest poor drainage and aeration and should be avoided. Raised areas or drainage tiles beneath the external pot of the pot-in-pot system can sometimes improve the situation but these site alterations are expensive and less desirable.

Pot-in-pot production systems use a range of container sizes from 7-45-gallon or larger. BMP's for these container sizes specify microirrigation. When combined with proper **cyclic irrigation**, the system presents no additional environmental concerns for the required permeable soils.

Wet areas or sites where **percolation** is minimal should be avoided because flooding is likely to occur and natural wetlands should not be disturbed. However, a **constructed wetland** or **riparian buffer** may be used to purify surface water before release from the site. This may require additional land and a permit.

Avoid locations that are near surface or ground water sources of drinking water for municipalities or communities. Surface water sources are often water

reservoirs used for recreation in addition to municipal drinking water supply. Municipal well field locations may be less obvious but can be identified with assistance from water utility personnel. Another very important consideration of the geographical area is whether or not water use is regulated. Permits may be needed for installing wells and in some locations, new wells are forbidden or ground water quality is poor. Surface water use may also be regulated.

Considerations for a Specific Site

After considering the geographical locations, concentrate on a specific site or parcel of land. Prior use of the land should be documented and environmental audit conducted. Existing plants and wildlife should be surveyed and their locations mapped with obvious geological features such as rock outcroppings, sink holes, surface water including moving and non-moving water. Denote the depth of the average and high water table and rock underlying soil surface. Due to water table depth or rock, it may be difficult to construct runoff water structures or ditch water for recovery, or install wells. Runoff recovery may necessitate using an impermeable groundcover. If so, check local regulations regarding the impact on natural percolation. Verify that existing well water quality and quantity is adequate and that water pumpage and use rights are transferred with property title.

Another important site consideration is wind exposure. Windbreaks can be planted or constructed depending on the amount of land available. If the site does not have an established windbreak, one should be planted or constructed as soon as possible during site development. Above-ground containers, particularly those of small size blow over easily and impart an additional cost to upright. In addition, fertilizer on surface of container substrate dislodges and is lost to runoff.

Considerations presented to locate a container nursery within a geographical area and to select a specific site are general guidelines and not intended to be inclusive. Consider state and local jurisdictions and obtain appropriate permits to situate a nursery for minimal environmental impact.

Published by the
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