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TOBACCO in KENTUCKY

Selecting a Tobacco Transplant Production System

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Farmers now have at least six choices for tobacco transplants:

- *traditional plant beds,*
- *precision seeded beds,*
- *direct-seeded greenhouse plants,*
- *plug and transfer,*
- *container-grown boxed plants, and*
- *bare-root plants.*

There is no "right" system for everyone; an ideal system for one producer may be a costly nightmare for another. The following outline provides some general information about each of these systems.

Traditional Plant Beds

Experience has shown that there is more to providing an adequate supply of plants from a conventional bed than scattering seed and expecting there to be a good, uniform stand of plants when you pull the canvas. A good management program includes:

• **Fumigating** when temperature and moisture conditions are correct. Any equipment used on the bed should be cleaned and treated with a chlorine solution afterwards to minimize disease spread.

• **Proper water management**. Most plant bed losses are due to dry soil conditions. Beds should be irrigated as needed to a depth of 6-8 inches.

• **Insect and disease control**. Beds should be scouted at least weekly after emergence. Contact your local county Extension office for updated information on chemicals and spray schedules.

• **Proper fertilization**. Over-fertilization can result in rapid, succulent growth that produces a weak transplant subject to bruising and disease infection. Excessive use of processed sludge or other organic types of fertilizer may result in plant death due to high levels of trace elements sometimes present in these materials.

Traditional plant beds have been used successfully for years, but proper management is necessary to produce an adequate number of healthy transplants. Producing plants in a traditional bed requires no major cash outlays. Transplant cost is generally less than 3.5 cents each. Diseases and insects can be effectively controlled with currently labeled pesticides. Once plants are pulled they should be used within 2 to 3 days.

Precision Seeded Beds

In the precision seeding system pelletized tobacco seed is drilled, using a special seeder, in a bed that has been prepared in a traditional manner. These seeders are expensive, so the seeding operation is done on a custom basis. The same recommendations that apply to conventional beds apply to precision-seeded beds.

The goal of this system is once-over pulling, so the beds will need to be clipped more frequently than conventional beds. Sanitation of seeding and clipping equipment is critical to this system.

This system has the same costs as those for a traditional plant bed, plus the additional cost of custom seeding, mower, and undercutter to use when pulling the plants. Labor costs at pulling should be less than with a traditional plant bed, but other costs in equipment and custom-seeding make transplants from this system slightly more expensive than traditional bed plants.

Direct-Seeded Greenhouse Plants

Direct-seeded greenhouse plants are relatively new to Kentucky tobacco producers. High quality transplants can be grown that can minimize production problems throughout the growing season. The down-side is that failure can often mean total failure, leaving the grower without plants.

Be aware of these precautions if you are new to this system of production:

• **Sanitation is critical**. There are limited chemicals available to deal with greenhouse tobacco disease problems, so it is essential to exclude diseases from the outset.

• **Initial cost is high**, but at the present reliable suppliers are offering extremely competitive packages compared to houses available for horticultural use.

Shop around, but make sure you know exactly what is included in a package when comparing prices. Most "complete" packages do not include lumber for end walls or float beds and electrical supplies. For a more realistic cost estimate, add 15-20% to the package cost of the house.

• Generally, **as you increase the number of plants per tray you increase the need for management and potential for disease problems**. The 200-cell tray is the most forgiving in terms of management, but does not optimize floor space efficiency (number of plants produced per unit area of the greenhouse).

Using a higher density tray—242, 253, 288, or 338 cells/tray—generally means higher management and increased likelihood of disease problems. It is more difficult to hold plants in smaller cell-size trays for an extended time if weather conditions do not allow transplanting. However, there have been no differences in survivability or yield among plants set at the same time from

different-sized cells, providing the plants taken to the field were healthy.

• **Management is the key to success**. If you are not able to commit an individual to the management of the house, especially during the first 4 to 5 weeks, serious losses could result. Individuals who have been unsuccessful with traditional plant beds or the plug and transfer system will probably not be successful with a direct-seeded greenhouse.

• **Obtaining high quality seed is important**. Good seedling vigor as well as high germination percentage give the best utilization of floor space.

• **Setting-size plants** can be produced from seed in 7 to 12 weeks depending on how the house is managed.

When correctly managed, plants produced under this system:

- *are easy to set (especially with a carousel setter),*
- *are all the same age and size,*
- *exhibit almost no transplant shock, and*
- *tend to grow off more evenly.*

The need to reset is virtually eliminated. Research indicates that plants will be ready to top and harvest 5 to 10 days earlier than plants set at the same time from a conventional bed, with no differences in leaf number or total yield between transplant sources.

Some growers report more ground suckers with greenhouse plants. This is caused mainly by plants being set too shallow or not being set straight in the ground. Ground suckers are usually more prevalent under high soil moisture conditions, regardless of transplant source.

These systems require a high initial capital investment for the greenhouse, seeding, and mowing equipment. Per plant costs can be reduced if more than one tobacco crop is produced in the house each year. Over 7 to 10 years, transplants from this system should be only slightly more expensive than those produced by other methods.

Plug and Transfer

In the plug and transfer system a producer buys small seedlings from a plant supplier, transfers them to larger trays, and floats them in a simple outside water bed for about four weeks.

There is no "standard" water bed; they are often built to fit materials on hand. These are some general guidelines:

• A **smooth, level area** is required for the beds. Five inches of water should be adequate for 4 weeks of growth. Sand or sawdust may be used to level an area.

• **Insulation board** under the plastic liner will help retain heat, especially if water heaters are used. One water heater per 100 square feet of surface area can be helpful, especially if you transfer before May 1. Although a water bed heater can help regulate or improve plant growth it ***will not*** prevent cold injury or prevent freeze damage.

• When considering this system remember that there are **time and labor** involved in the transfer. Fill your trays a day or two before the plants arrive to minimize transfer time. Stack trays and cover with plastic to prevent the mix from drying out before using them. With a little experience you should be able to transfer 1200-1600 plants per hour.

• There have been **problems with soil mix that has fertilizer mixed with it**; since so little fertilizer is required uneven mixing of the fertilizer and mix can result in poor or uneven growth. Scout the beds and add fertilizer if necessary 2 to 3 weeks after transferring. Water-soluble fertilizer with a high nitrate source of N mixed with the water has produced the best and quickest response.

• **Clipping the plants one or two times** produces a stockier plant. Clipping also allows easier setting with a carousel setter. Do not clip off an excessive amount of plant material unless you are trying to hold the plants; in any case, be sure that you do not cut off the terminal bud.

If you are considering greenhouse construction you may want to try plug and transfer first. All material used for plug and transfer can be used in the greenhouse, and starting at this level will give you some relatively low investment experience with container-grown plants.

Additional Options

Other transplant source options include both **container-grown** and **bare-root transplants**. The key to success with these sources is dealing with a reputable supplier. You should assume, especially when dealing with plant-bed raised transplants, that there is a risk of bringing in disease and insect problems.

Summary

Producers have been given more options on how to raise or buy transplants in the last few years than they have had in the last 50 years. No one system is the best for everyone.

Learn as much as you can about each system through information available from your county Extension office, meetings, trade shows, and experiences of others. Look beyond the cost per plant when deciding which system is best for you. Consider being able to schedule planting, and the reduced labor involved in handling and setting container-grown plants.

The transplant production business is growing rapidly, so shop around for the best value for your dollar. Know how much time and money you are willing to invest and be sure of your risks and options.

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