Auburn University's Foundation Sweetpotato Program

James M. Dangler, Robert A. Burdett, and Marlin H. Hollingsworth[1]

Commercial sweetpotato transplants are produced from bedded storage roots. Growers frequently produce their own transplants to prevent the introduction of diseases and pests and to reduce the costs compared to purchasing transplants. Having the desired variety available at planting is also important. Although transplants appear vigorous and healthy, they may be off-type, contain mutations, or harbor diseases and insect pests from the transplant bed.

To produce high yields of roots in the field, growers must keep their rootstock free of pests. Maintaining the characteristics of the variety is

[1] Respectively, Assistant Professor of Horticulture; Professor of Agronomy and Soils; and Superintendent, North Alabama Horticulture Substation.

Leaflet 107 November 1994
Alabama Agricultural Experiment Station Auburn University
Lowell T. Frobish, Director Auburn University, Alabama

another important function of a transplant producer. By growing true-to-type sweetpotatoes, the industry consistently presents an appealing product to consumers. The quality of the roots that are bedded, therefore, is a very important consideration in the sweetpotato transplant production system.

To help sweetpotato growers produce a high-quality product, certification standards have been developed by the Alabama Crop Improvement Association, Inc. The standards include requirements for transplants in the bed and the field, the roots, as well as root storage conditions. The root length (three to nine inches), diameter (one to three and one-half inches), and tolerances for defects, are specified. Transplant packaging and transportation also are regulated.

Three classes of sweetpotato roots are produced in the program (the table). Foundation (first generation) sweetpotatoes are the direct progeny of Breeder's sweetpotatoes. Registered (second generation) and Certified (third generation) sweetpotatoes have greater tolerances for defects and the presence of pests than Foundation sweetpotatoes. Sweetpotatoes in any class may not have storage rot, harbor sweetpotato weevils, or be mixed with other varieties of sweetpotatoes. Avoiding mixes, which occur when roots or transplants of two or more varieties are placed together, is very important.

Transplants for the production of Foundation sweetpotato roots must be produced from field vine cuttings or from sprouts cut, not pulled, from bedded storage roots. The requirements for Foundation and Registered transplants are the same. In the plant bed, *Fusarium* blackrot, scurf, wilt, or stem rot may not be present. Transplants of varieties can not be mixed. In the field, plants must also be free of *Fusarium* wilt or stem rot, serious viruses, other objectionable pests, and other varieties of sweetpotatoes. In the bed, the requirements for transplants to produce Certified roots are the same as the other classes in the plant bed. In the field, however, wilt or stem rot and virus diseases each may affect up to 0.1% of the crop. When a pest affects the crop and there is no tolerance established for that pest, the decision whether to certify the crop is made by the Association coordinater on a case-by-case basis. Off-type (figures 1 and 2) and diseased plants and roots are rogued from the field or transplant bed. Certified sweetpotatoes may be "recertified" only if a severe shortage of planting material exists.

Another important difference between Foundation sweetpotato roots and the roots in the other classes is that the internal root quality of Foundation sweetpotatoes is better, because they are not far removed from Breeder's Seed. Although the breeder has the primary responsibil-

ity to maintain the purity of a variety that is important to the industry, the Alabama Crop Improvement Association, Inc., operates the selection program to carefully maintain the characteristics of the variety and provides these sweetpotatoes to producers. Because commercial sweetpotatoes usually do not produce seed and the seed does not breed true, propagation is vegetative. Unfortunately, sweetpotatoes mutate and variations in root shape, and external and internal flesh color occur frequently. This certification program was initiated in 1982 to avoid these problems and maintain the original characteristics of the variety. Vigilance and strict adherence to good management practices are required throughout the program to maintain the desired characteristics because these defects are transmitted to the next generation through transplants which do not show signs of the change(s). Certification programs also are conducted in Louisiana and North Carolina.

Sweetpotatoes with exterior defects are fairly easy to eliminate from a lot. Poorly-shaped roots or roots with growth cracks or veins are not appealing to the consumer (Figure 3). Georgia Red and Georgia Jet frequently develop veins at the surface of the roots. Mutations in skin color occur less frequently, but this defect occurs in all varieties (Figure 4). Eliminating internal defects, however, is more difficult. To reduce the incidence of these defects, each root of Foundation Seed is cut crosswise and examined for changes in internal flesh texture and color. Only sweetpotatoes which exhibit the desired characteristics of the variety are used to produce transplants.

Sweetpotatoes which have been stored through the winter may exhibit white-colored flesh. The white flesh which develops in Jewel is easily distinguished from the normal orange flesh (Figure 5). When this white flesh dries during curing and storage, cavities may develop through the length of the root (Figure 6). Defective Nugget roots turn purple within seconds after cutting (Figure 7). The colored area becomes dark brown within minutes. A white section or "wedge" of an orange-fleshed root may be observed (Figure 8). Within a few generations, partial or total degeneration may occur resulting in sweetpotatoes with white-colored flesh.

The Alabama Crop Improvement Association, Inc. produces Foundation sweetpotato roots which are the progeny of Breeders' sweetpotatoes. Foundation, Registered, and Certified roots are available to growers to improve the quality of their sweetpotatoes. The roots produced in the program have a low tolerance for the presence of insects and diseases. In addition to keeping sweetpotatoes free of pests, varieties are screened to assure growers

Figure 1. Plants exhibiting irregular growth, such as thick stems (below), are rogued in the field.

Figure 2. Plants in the field or transplants are rogued if they produce leaves without chlorophyll.

Figure 3. (Right) Sweetpotatoes with insect damage or irregular shapes, veins, or growth cracks are eliminated from lots of sweetpotatoes in a foundation program.

Figure 4. Mutations in sweetpotato skin color occur frequently.

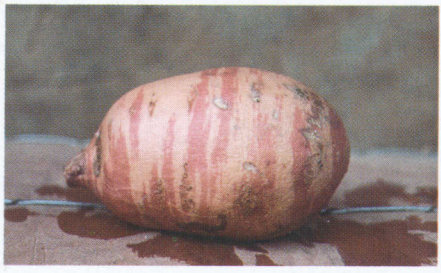

Figure 5. White-colored flesh develops in sweetpotatoes during extended storage. Potatoes on the right and left are defective.

Figure 6. As water is lost during storage, white-colored flesh of stored sweetpotatoes develops cavities.

Figure 7. Defective Nugget sweetpotatoes turn purple when cut.

Figure 8. Wedges of white tissue or white roots occur in many sweetpotato varieties within a few generations if defective roots are used to produce transplants.

that the sweetpotatoes are true-to-type and that varieties are not mixed. As a result of this program, producers can obtain planting stock with the characteristics consumers find desirable. With good management and the use of recommended cultural practices, producers can obtain high yields of quality sweetpotatoes.

MAXIMUM TOLERANCES FOR DISEASE, INSECT DAMAGE, AND INTERNAL QUALITY OF SWEETPOTATO ROOTS BY CLASS

Defect[2]	Maximum tolerance		
	Foundation	Registered	Certified
Blackrot	None	None	0.10%
Internal defects	None	No standard[1]	No standard[1]
Nematode	None	0.2 %	0.5 %
Other varieties	None	None	None
Scurf	None	None	0.10%
Storage rot	None	None	None
Sweetpotato weevil	None	None	None
Wireworm	1.00 %	2.00 %	5.00 %

[1]Roots are not examined.

[2] When *Streptomyces* root rot, bacterial soft rot, or other diseases or noxious pests are observed, the decision to certify is made according to the severity of the problem.