

production, especially in early stages of selection, when many lines are under test in many small, replicated plots. Cultural management of small test plots is a real test of adaptability and resourcefulness of the manager.

A computer database is required to manage data. Appropriate statistical software is needed to assist in designing plot size and replication, and to statistically analyze differences in final results.

A tissue-culture laboratory and growth chamber/greenhouse/screenhouse facilities are usually required if in vitro-produced plantlets are used for field testing. Controlled plant growth facilities may be required to propagate plants to be tested before moving them to the field. A fully equipped analytical and molecular laboratory is necessary to determine chemical and biochemical composition of transgenic plants.

3. Methods

3.1. Plant Culture

3.1.1. Field Preparation

Cultivation, of pre-emergence herbicide for weed control, and treatments to control soil pathogens should be applied. In general, the standard treatments used in commerce for the parental cultivar are desirable, since they provide the conditions under which the transgenic cultivar must perform.

3.1.2. Propagation of Transgenic and Control Lines

The type of propagants used in field testing will depend largely on whether the crop is grown from true seed or vegetative parts.

3.1.2.1. VEGETATIVELY PROPAGATED PLANTS

Since in vitro plantlets are immediately available following transformation, it may save time to proceed with initial testing of lines using in vitro-produced, R_0 plantlets. Although vegetatively produced crops are always grown in the R_0 generation, the size and physiological condition of plant parts used as seed can markedly influence yield and quality. Thus, final field evaluation should not utilize in vitro plantlets as the seed, but should utilize the seed of commerce. However, it is often difficult to produce vegetative seed free of contamination with seed-borne viruses or other pathogens that may interfere with evaluation. In such cases, in vitro plantlets may be maintained as a backup.

3.1.2.2. SEED-GROWN PLANTS

In crops that are produced from true seed, it is much easier and less labor-intensive to use true seed than vegetatively propagated plantlets, even in initial field testing. If the transgenic species is genetically self-compatible, R_1 segre-