

SESSION III

CONSERVATION OF FOREST GENE RESOURCES

MODERATOR: R. E. SCHOENIKE

CROP GERmplasm INTRODUCTION AND PRESERVATION

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Abstract --The Agricultural Research Service, U.S. Department of Agriculture, has a systematic program for introducing plant germplasm and providing for its evaluation, use, and preservation. New introductions are obtained mainly through correspondence, planned explorations, and P.L. 480 projects. Incoming materials are inspected, checked for proper nomenclature, documented in published inventories, and distributed. Four Regional Plant Introduction Stations are the prime receivers of the germplasm on a crop priority basis. Seeds are obtainable from working stocks of these stations and the Small Grains Collection. Long-term preservation of seed is the responsibility of the National Seed Storage Laboratory. Plant materials such as cultivars, inbred lines, genetic stocks, and plant introductions are stored under favorable conditions. Agronomic, horticultural, forest, and aesthetic crop seeds are all qualified for storage. There are more than 82,600 accessions in storage.

Additional keywords: Plant Introduction, seed storage, plant germplasm, genetic vulnerability.

There is an increasing worldwide awareness of diminishing crop germplasm, especially in rapidly developing countries. The importance of introducing, using, and preserving crop germplasm in the United States is magnified by the fact that relatively few crops (sunflower and several small fruits) are native and by the vulnerability of some crop cultivars with narrow genetic bases. The bulk of our new germplasm must come from foreign sources. Use of such germplasm is the most practical approach in developing pest resistance, amenability to mechanical harvesting, quality, yield, and other characteristics desirable in crop cultivars.

It seems most appropriate that the Southern Tree Improvement Conference be concerned about the preservation of tree germplasm. Our objective in this paper is to acquaint you with the systematic program of the Agricultural Research Service, U.S. Department of

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Agriculture, for crop germplasm introduction, use, and preservation. Emphasis will be on preservation for future use.

PLANT INTRODUCTION AND FOREIGN EXCHANGE

The Germplasm Resources Laboratory is the focal point for plant introduction. Program specialists assess germplasm needs, determine proper areas for collection, conduct or provide back-up support for explorations, document and distribute new accessions, screen limited groups of germplasm for certain characteristics, and conduct research on potential new crops. Introductions are obtained through correspondence, foreign and domestic explorations, and through special programs such as P.L. 480 projects. Incoming materials are inspected by plant quarantine officials for possible insect and disease pests. This is a highly important safeguard for established economic crops in the U.S. Accessions are also checked for proper scientific name and authority, documented in published inventories (fig. 1), and distributed in accordance with established procedures and priorities.

325175. *PRUNUS PERSICA* (L.) Batsch Rosaceae. Peach.
From Kenya. Seeds purchased by R. E. Pezdue, Jr., Crops Research Division, Plant Industry Station, Beltsville, Maryland. Received Feb. 2, 1968.
Col. No. 9519. From Nairobi market. Originally from farm of Dr. Spears, Limuru, and Mrs. Morson, Kiambu. Purchased Jan. 22, 1968.
- 325176 and 325177. *MALUS SYLVESTRIS* MILL. Rosaceae. Apple.
From Canada. Plants presented by the Horticulture Division, Central Experimental Farm, Ottawa. Received Feb. 8, 1968.
325176. 'Ottawa 3'.
325177. 'Ottawa 12'.
325178 to 325526.
- From the Union of Soviet Socialist Republics. Seeds collected by Willis H. Skrdla, agricultural explorer, Crops Research Division, Regional Plant Introduction Station, Ames, Iowa. Numbered Feb. 2, 1968.
325178. *ACER CAMPESTRE* L. Aceraceae. Maple.
Col. No. S-319. Stavropol region. Collective farm near Bekeshevskaya village. Low area near stream. Branches small; bark ridged, similar to *Euonymus* × *alatus*.
325179. *ACONITUM* sp. Ranunculaceae.
Col. No. S-206. Stavropol region. Above Teberda village on top of Mt. Halipara, south slope. Elevation 2,166 m. Seed from several plants.
325180. *AGROPYRON CRISTATUM* (L.) Gaertn. Gramineae.
Crested wheatgrass.
Col. No. S-83. Stavropol region. High ridge on rocky limestone soil, south of Stavropol.

Fig. 1. A partial-page sample from a published plant inventory, illustrating the type of information that is recorded for plant introductions.

There were about 9,300 new accessions in 1972. Those that must be propagated, or placed in post-entry quarantine, go to the Glenn Dale, Md., Plant Introduction Station. These materials are distributed after they have been propagated and/or declared virus-free by plant quarantine specialists.

Numerous requests for U.S. crop cultivars and Plant Introductions are received from other countries. For example, about 35,000 items in 1,100 shipments were sent to 110 countries in 1972. In addition, more than 2,200 cultivars or species were provided under special arrangements to AID missions. These exchanges foster good working relations, contribute to foreign research programs, and open new channels to germplasm needed by U.S. crop specialists.

Requests for germplasm are channeled through Regional Plant Introduction Stations and Regional Technical Committees to our germplasm laboratory. Other government agencies such as FS, SCS, CSRS, and State AES participate in the Regional Technical and the National Coordinating Committees. The private sector works with these groups by making known their germplasm needs. There is no FS representative on the Southern Regional Technical Committee.

USE OF GERmplasm

Four Regional Plant Introduction Stations are the prime receivers of introduced germplasm. Distribution to these stations is based on established regional crop priorities. These priorities do not always imply that a given crop is more important in one Region than another; it does provide coverage for all crops. New accessions are grown out for increase, general evaluation, and possible screening for insect and disease resistance. Working stocks are available to all cooperators upon request. The Regional Coordinators and state technical representatives make recommendations concerning germplasm needs and coordinate evaluation and use of germplasm within the region or respective state.

The Small Grains Collection at Beltsville has more than 68,000 accessions of wheat, barley, oats, rye, Aegilops, and rice. This is a working-stock collection for domestic and foreign researchers. New introductions are increased, characterized, and added to the collection stocks. Generally, all cereal accessions are grown the first season in detention nurseries to determine freedom from exotic pests.

The Regional Stations and the Small Grains Collection are responsible for providing seed for long-term storage by the National Seed Storage Laboratory, Fort Collins, Colo.

CROP GERmplasm PRESERVATION

The National Seed Storage Laboratory began operations in 1958, and is responsible for long-term preservation of valuable crop germplasm.

The Laboratory is primarily a storage facility but is also a source of seed when not available elsewhere. Researchers at the Laboratory experiment on seed-storage factors related to longevity.

Let us examine in some detail the operations of this important facility. All types of seeds--agronomic, horticultural, forest, and aesthetic are qualified for storage under minimum standards for quantities and viability. Several categories, including currently released cultivars, inbred lines, obsolescent germplasm, (old cultivars) genetic stocks, Plant Introductions, differential host cultivars, virus-indicator plants, and physiologically useful species, will be accepted. Incoming seed samples are tested for germinability, stored in pint containers in one of eleven cold-storage rooms at 40° F and 32 percent relative humidity, and retested for germinability after 5 years. Lower temperatures can be used if necessary. Crop characteristics of each sample are punched on accession cards. This helps in handling seed requests when certain characteristics are sought. Seed samples can be rejected if germination percentages are below prescribed standards. In the event of seed deterioration, renewal from stored stocks will be accomplished through contract or by cooperating agencies.

There are more than 82,600 accessions presently in storage. These are broken down into broad groups as follows:

Small grains, sorghum, corn	43,865	Ornamental	514
Oilseed, forage, cotton,		Chemurgic (New crops)	339
tobacco, sugar	19,318	Genetic	4,102
Vegetable	14,480	Strategic	11

You will note that there are no tree-seed lots in the listing above. Tree seeds do qualify for storage. In fact, we invite and encourage our colleagues who work with tree germplasm to process new introductions through our documentation system and preserve seeds in the National Seed Storage Laboratory. We will also cooperate in locating foreign sources of tree germplasm in accordance with the present program policy of the USDA Forest Service, Washington, D.C.

For storage, a minimum of 20,000 seeds of tree species would be required. A larger quantity will be necessary if germination test procedures are not known. Germination standards (usually 75 percent or above) have been set for most crops. These standards might well vary for tree seeds because of dormancy factors, short viability of moist temperate tree seeds, etc. Special investigations in storage methods for various tree seeds might be required.

For further information on policies and storage details for the National Seed Storage Laboratory, contact Dr. L. N. Bass, Head NSSL, Ft. Collins, Colo. 80521.

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