Finding New Crops, Saving old Stocks Gets Added Emphasis in Research

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FINDING NEW CROPS, SAVING OLD STOCKS (USDA)

Development of profitable new crops and preservation of valuable breeding stocks to improve our old crops will get added emphasis in USDA crop research in the coming year.

Intensive study will be started on three potential crops — **Dioscorea, Simmondsia,** and the timber bamboos All of these have possibilities

And a new bank (National Seed Storage Laboratory) will be built in Colorado for the long-time retention of plant species collected abroad or from the wild for use in developing better crops of all kinds.

The seed bank, for which Congress recently appropriated $450,000, will be built on a campus site donated by Colarado A and M College at Fort Collins. It will house the permanent seed collection of all introduced species still remaining from six decades of plant exploration as well as breeding stocks recommended as of possible value for the future Many of the collections have been lost — some lost forever — because of inadequate space and opportunity to preserve and revitalize them. Future accessions of plants reproducible through seeds will be stocked at the Colorado laboratory as long as there's any likehood of their usefulness as crops or breeding material.

(minerals required in minute amounts) occur in many scattered soils in western irrigated areas, along the Gulf and Atlantic Coastal Plains, and possibly elsewhere. Some trace minerals, zinc and iron included, can't be supplied through the soil since they're converted to unavailable form by other soil constituents. That keeps plants from getting enough of the minerals naturally present or applied.

Foliar sprays are an effective means of applying nutrients, but some sprays — zinc and iron, for example — cause severe foliage burn under most conditions. Since those two are among the elements that can't be supplied through alkaline or certain other soils, dormant spraying is a practical solution. That makes it doubly important to know when trees are ready to take in the bark sprays.

Studies at USDA's Agricultural Research Center, Beltsville, Md., show that during complete dormancy nutrient sprays enter only through pruning wounds and other breaks — not through normal bark. Absorption through bark occurs only after growth starts.

ARS plant physiologists C. P. Harley and L. O. Regeimbal and horticulturist H. H. Moon made these discoveries by treating apple trees with needed mineral elements and then testing the various tissues for presence of those elements. Treatments were made with nitrogen, phosphorus, and rubidium, but the same principles should govern a tree's receptiveness for zinc, iron, and other minor elements that you'd supply for bark feeding. Fortunately the major nutrients — nitrogen, phosphorus, and potassium — can be supplied through the soil.

In these studies, urea was used for its nitrogen content, potassium acid phosphate for its phosphorus, di-ammonium phosphate for nitrogen and phosphorus, and rubidium chloride for the rubidium. The phosphorus in potassium acid phosphate and the rubidium chloride were in radioactive form for convenience in tracing, while the other materials were in conventional form and called for standard chemical analysis. Each compound was painted in bands around the branches of trees and the tests made periodically in various tissue layers in the treated zone at various distances up and down the branches.

The scientists found none of the elements in question beneath the uninjured epidermis of treated trees during February, but did find it in phloem and xylem tissues where bark was scraped or cut. Early in April, when flower buds were in the green-tip to cluster stage but vegetative buds still tight, substantial amounts of the nutrients showed up beneath normal bark that had been treated and even some distance from the point where applied. Of course scraped or cut surfaces absorbed much more of the materials, but frozen wood, somewhat less. It was clear that penetration in uninjured bark doesn't occur until the tree is growing.

Microscopic study of the branches showed why absorption coincides with new growth. Since outer bark is inelastic, cambial growth produced many longitudinal cracks in the bark and transverse cracks at the leaf scars and lenticels. Rainwater, dew, and even the moisture normally transpired outward through the bark dissolves the nutrient salts and washes them through the cracks to the absorptive phloem tissues.

The pattern of movement also is interesting. Once growth started, the materials moved inward and to some extent radially. After reaching the tree's up-and-down channels of transport, they showed up at quite a distance, but especially in buds upward from the treated zone. Most of the nutrient went into the buds and shoots along the main channel of flow from a painted pruning wound Around mid-April or a little later greatest concentration was in the flower buds then developing most actively. At the end of April the nutrient material was most concentrated in the rapidly growing young terminal leaves.

C. O. Ehlanson, in charge of plant introduction work in ARS, anticipates that in the years to come the laoratory will serve as a repository for many of the close wild relatives and primitive varieties of our important crops. These plants contain characters such as disease resistance that may be valuable in developing new commercial varieties. Erlanson cites the history of clover introductions. Of thousands of breeding lines introduced since 1898, only 1 out of 50 is now available.

Some seeds are short-lived and other quite long-lived, but most of them can be kept far longer — even up to several decades — in a dry atmosphere and at cool, uniform temperatures. The laboratory will provide those ideal conditions as far as possible. The seeds will be tested from time to time, and whenever deterioration shows up they will be grown out to get fresh replacements.

The laboratory will maintain active contact with researches likely to have use for the introduced species in breeding work. Thus, seed stocks will be discarded only after certain they have no further value.

The laboratory will also maintain a sort of master file of worthwhile plant varieties to guard against their discard and the loss forever of potentially valuable plasm. Many of our old varieties of maize, fruits, and other crops have been superseded by new ones and lost without the opportunity of again examining those old varieties for genetic characters needed for new problems.

The Colorado laboratory has the job of maintaining the permanent deposit. But most of the same materials will be available for use through the four regional plant introduction stations run cooperatively by ARS and the State experiment stations, and through other research channels.

Some study has already been made of the three plants viewed as potential new crops. The **Dioscorea** famly of wild tropical yams, which contain source materials for the anti-arthritic hormone cortisone, have been collected and tested to find productive, high-quality stocks (AGR. RES., January 1956, p. 8). **Dioscorea** will now be tried on a substantial scale under cultivation to perfect a method of growing it profitably.

Timber bamboos have proved successful for several purposes in ARS experiments (AGR. RES., August 1954, p. 12). Bamboo will now be grown under cultivation to determine how successful it may be as a new crop.

The third plant, **Simmondsia chinensis,** a native desert shrub growing in our Southwest and parts of Mexico, yields an abundance of hard wax that can substitute for imported oils and waxes. Extensive seed collections will be made in the early future preparatory to field and chemical testing. Studies have shown that this plant's waxes are satisfactory substitutes for imported sperm oil and carnauba wax, possibly for ouricuri oil, in a number of industrial products. Those materials are sometimes scarce. **Simmondsia** might therefore provide a profitable use for several thousand acres of southwestern dry land if it can be economically produced.

Select Top-Grade Macaroni Products

Watch for telltale signs of good macaroni products.

Quality in macaroni, noodles, and spaghetti depends first on taste. A mild, wheaty flavor is desirable, says Elsie Bamesberger, extension specialist in consumer education at the Pennsylvania State University.

Taste and cooking characteristics are closely linked. To be a top-grade macaron product, it must hold its shape in cooking, be firm to the palate, not mush together, and leave clear cooking water.

West Chester Bull Summarized Sire

PETERBOROUGH, N. H — Jewell's Cathedral King, registered Guernsey bull, owned by J. W. McCoy, West Chester, Pa., has become a Summarized Sire, according to the American Guernsey Cattle Club. To attain this distinction, a bull must have at least 10 daughters with official production records.

"King", has 42 tested daughters that have made 95 official records Their average production is 9,306 lbs of milk and 467 lbs of fat, when converted to a twice-day milking, 305-day, mature equivalent basis.

This fine Guernsey bull was bred by H. H. Buckley, Oneoita, N. Y This bull's sire was Rilma's Cathedral Rose's King and its dam was Sadie's Cathedral Jewell, that posted an official production record of 17,629 lbs of milk and 782 lbs of fat.

"King", also has had four of his registered daughters classified with an average rating of Very Good.

ADD SIMILES

She attracts no more attention than a thermometer after the arrival of a cool wave. — Toledo Blade.