

Germplasm Bank Network Grows

The first of what eventually will be a network of 12 clonal crop germplasm banks for agricultural researchers and genetic engineers now is a fully-staffed, going concern at Oregon State University in Corvallis. This unit joins the Regional Plant Introduction Stations and the National Seed Storage Laboratory, which have been maintaining seed propagation crops since the 1940's.

Construction of the Northwest Plant Germplasm Repository (NWPGR) began in 1979, nine years after a Southern corn-leaf blight destroyed half the corn crop in some states. The collection and preservation of thousands of varieties of germplasm (the cellular material that determines plant and animal heredity) is being undertaken in part as insurance against similar near disasters that are bound to occur again. A diversity of genetic materials will be on hand in the banks to provide disease-resistant strains or substitute crop plant as "tide overs" while researchers use the germplasm repository materials to design and reshape through genetic engineering the characteristics of the plants in question.

The chain of repositories is being established under the aegis of the Department of Agriculture, which has awarded the project a high priority underlined by a one-third increase in the proposed budget.

Naturally, the concern for vulnerability in crop plants is of paramount interest in this USDA project. However, Otto Jahn, curator, and N.M. Westwood, horticulturist and research director at the OSU facility, are very much interested in maintaining working contact with other agencies such as the National Park Service as sources for wild plant species.

Both Jahn and Westwood are involved periodically in searches for native wild species connected with small fruits, pears, hazelnuts, hops and mint . . . the species toward which the Oregon facility work is oriented. Inside the series of screenhouses and greenhouses sit row on row of pear, hops, strawberry, blueberry, cranberry, and other plants, each tagged with the data describing its pedigree and origin. Specifically, the NWPGR is charged nationally with collection, evaluation, maintenance, and distribution of clonal germplasm for the above listed species. Laboratories for tissue culture and plant analysis are presently being equipped for use in propagation and germplasm evaluation.

The plants come from all over the world. Last year, Westwood spent 48 days collecting in Japan, Taiwan, and Korea, and returned to Corvallis with more than 200 seed collections of fruit and nut species, representing 29 genera. However,

the exhilaration of this horticultural coup was somewhat dimmed by the fact that at least seven of the species he sought appear now to be extinct in the wild . . . three apples, *Malus floribunda*, *M. taconskii*, and *M. asiatica*, and four pears, *Pyrus aromatica*, *P. hondoensis*, *P. kawakamii*, and *P. dimorphophylla*. The *Pyrushondoensis* still exists as a very few trees growing at the OSU facility — products of seeds sent to Westwood in 1968 by a professor at Kyoto University who collected them in the foothills of Mt. Fuji. Westwood said he also had a few of the *dimorphophylla* pear trees growing at the repository. All of these seven species now seem to have been reduced to a few clones growing in arboretums or collections.

Westwood journeyed to an old orchard near Seoul on the last day of his 1981 trip to see for himself whether a reported orchard of *Malus asiatica*, the only edible native apple of Asia, actually was that species. "I suspected," he said, "that it would turn out to have been hybridized by European strains of apples. But when I arrived I found an orchard of crisp, sweet, oblate apples, one tree of which was more than 100 years old. This predates the introduction of European stock into Asia and I had to conclude that the orchard was authentically *Malus asiatica* in origin."

He described the old tree at the edge of a hill, its trunk no more than 20 centimeters in diameter. The ancient specimen had been planted more than a century before by the owner's great grandfather, and had survived all those years on a sterile granite slope. "It really was a great find," Westwood said. "Especially after having

failed at all previous turns. It made my trip."

Both Westwood and Jahn expressed interest in the Man and The Biosphere Project 14, worldwide biosphere reserves, as a measure for continuation of speciation — the gradual process by which species evolve into new forms. National Park natural areas and the world biosphere reserves are among the remaining protected sites where wild plant species still can continue their contributions to some future world and its needs.

Jahn will be traveling to Scotland, Germany, Denmark, and Sweden late in the summer to attend meetings and do some collecting. Westwood will be visiting three universities in mainland China at approximately the same time.

Because so many species, most of whose characteristics still are unknown, are disappearing forever, the first priority for both Jahn and Westwood is to identify the most endangered of the species known to be important to man, and to concentrate their efforts on finding and preserving them. They are using plant geography maps, worldwide, and carefully planning their exploration time, money and energies in the direction of the species seen as most useful and least likely to survive on their own.

"Wild species are especially valuable to us," Westwood said, "because many of them are immune to our insect and disease pests." With urban and agricultural encroachments threatening many of the Eastern Asia wild species, Westwood said he felt it imperative to focus on these species.



Otto Jahn, Repository Curator, and Peggy Collins, Research Technician, in one of the NWPGR greenhouses.

Germplasm

Presently the Corvallis repository consists of 40,000 square feet of enclosed floor space, 20,000 in screenhouses, about 9,000 in greenhouses, and the remainder in offices, laboratories and service buildings. The staff of 10 is now at full complement. The pilot facility stores about 1,500 individual clones, some 700 of which are varieties of pear. The total in all categories may eventually reach 12,000.

The second link in the repository chain is nearing completion in Davis, Calif. where Dan Parfitt is curator. The mission there is to handle stone fruits, grapes, walnuts, almonds and pistachios. A third repository, still in the design and planning stage at Geneva, N.Y., will focus on apples and grapes.



The Northwest Plant Germplasm Repository at Corvallis, Oregon, as it appeared at the dedication on April 15, 1981. Since then, two greenhouses and three screenhouses have been added to the facility.