AGRICULTURE

Seed for Tomorrow

With bad seed no amount of fertilization and cultivation will produce a high yield, yet good seed can bring the benefits of plant breeding to farmers.

By BENITA TALL

THE PROSPERITY of a nation can rest within a tiny seed.

This is no over-statement, but a fact. A poor seed will develop into a poor plant. Many poor plants mean low yields for the farmer. And low yields for the farmer—especially in a nation whose economy is based on agriculture—can mean lowered living standards and poverty for the nation.

Throughout centuries of man's history as a farmer, the seeds he has sown for his food and his animals' food have been the big "question mark" in his life. If good seed were planted, it was largely a matter of chance: the qualities of the seed usually were unknown. Sometimes a field produced a good yield and the farmer could save the seed for the next planting. Sometimes a neighbor's field had a high yield and the seed was shared in hopes of continuing and spreading the prosperity that good seed brought with it.

It was in such simple ways that seed selection was practiced. Today, however, this has become an extremely complex and important work involving governments as well as individuals.

An example of the benefits the use of of improved seed can bring to a nation's agriculture is seen in the development of hybrid corn in the United States. It is perhaps the most striking example of the application of genetic principles to practical breeding.

Corn Yield Increases

From 1933 to 1956, the percentage of hybrid corn in the total U. S. corn crop grew from 0.2% to 96%. Our farmers now receive increased annual yields of at least 750,000,000 bushels through use of double hybrid seed. This, in turn, represents an annual dividend of $75 for each research dollar spent on breeding.

Other countries have benefited from similar seed research projects. Largely as a result of the introduction of an improved variety of rice, the average yield of this important food crop in Egypt has increased more than 30% within the past few years.

The creation of Marquis wheat in Canada made possible the opening of the prairie provinces for cereal production. This has meant an increased financial return of $100,000,000 each year for at least 15 years.

Throughout western Europe the use of hybrid corn is increasing. It has been estimated that the value of the increased production due to the use of hybrid corn in some 15 countries now amounts to about $70,000,000.

Improved varieties of cotton helped Brazil weather several economic crises in past years.

Recently the Food and Agriculture Organization, a United Nations body, has played a leading role in promoting international cooperation for the use of high-quality seed. It has brought technical assistants and equipment to under-developed countries. As an established organization for the exchange of scientific information, many countries have used its facilities. FAO is now engaged in a program of support for a world seed campaign. The use of first-class seed is the most rapid and effective, as well as the cheapest way of making available to the farmer the results and progress of the plant breeder's work, B. R. Sen, director of FAO, said recently.

In many respects what FAO seeks to accomplish on an international scale, especially in the economically underdeveloped areas, the U. S. has already achieved.

A three-point program has been suggested for each national government to follow in their seed improvement campaign:

1. crop and tree improvement;
2. seed production, certification and distribution;
3. education, extension and propaganda.

In the U. S., the Department of Agriculture participates in the whole seed program through its regulatory and research divisions.

The newest phase of this work was recently opened with completion of our National Seed Storage Laboratory on the campus of Colorado State University at Ft. Collins. Here the country's precious store of seeds can be preserved and maintained for future possible use.

The Laboratory, a $450,000-facility directed by Dr. Edwin James, past regional coordinator for the southern regional cooperative program on new crops, houses valuable breeding stocks. In its special rooms will be kept the permanent seed collection of all introduced species still remaining from some 60 years of plant exploration, as well as breeding stocks recommended as of possible value for the future.

Ideal Storage

Close wild relatives and primitive varieties of important crops can also be kept under the ideal conditions they need—whether it is low temperature and high humidity or high temperature and low humidity or any combination of these factors.

The Laboratory will also maintain a "master file" of worthwhile plant varieties. Any qualified scientist in the U. S. and its possessions may receive laboratory seed

SEED VAULTS—A tray of some of the individual seed containers in the National Seed Storage Laboratory, Ft. Collins, Colo., is checked by Dr. L. N. Bass, U. S. Department of Agriculture seed physiologist. About 300,000 seed accessions of one quart each could be kept in the laboratory's nine storage rooms. Various temperature and humidity levels can be maintained in these rooms.

(without cost) if it is not available elsewhere. It will also be possible for foreign researchers to obtain needed seed.

The value of a specific seed stock as basic germ plasm for the future is the criterion for acceptance. Each one accepted must be fully documented as to source and its development history, the USDA pointed out. Seeds will be tested from time to time to ensure that deterioration does not set in.

Actually, our national seed laboratory might be looked upon as the culmination of a program. Many other nations have yet to achieve adequate programs for testing and breeding new varieties of seed, selecting seed for use under specific conditions and climate, arranging for distribution of high quality seed, and improving seed production techniques such as seed bed preparation, weed control, harvesting, grading and storing.

Various countries will have various needs in the field of seed research and study. In most of the underdeveloped countries there is an urgent need for better education and propaganda showing the concrete benefits that can be achieved with better seed.

With growing populations, many peoples throughout the world face a very real problem of food shortage in the near future. Starvation is a problem today for some. One of the quickest and most efficent methods that could be used to reverse this trend is the extensive use of high quality seed.

Every farmer, from Chile, India, Egypt, Cambodia, to The Netherlands, Sweden, Canada and the United States, can see with his own eyes what happens when he plants "good" seed.

The good seed may mean food on what had been a bare table. Or it may mean a new money crop. Either way, the tiny seed is acquiring new importance here and throughout the world.

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ENGINEERING

Soviets Claim Inventing "Underground Rocket"

THE RUSSIANS claim they have developed the first underground rocket for burrowing holes in the earth.

A report by the Central Intelligence Agency in Washington says the rocket nose has a pulverizing device which contains liquid fuel and compressed air. In operation, "powerful flames spout from openings in the pulverizer" to open a path for the rocket. The rocket, which can be guided, thus opens a cylinder-like tunnel as it blazes its way through the earth, the CIA report said.

Quoting from the magazine *Magyar Nemzet,* published in Budapest, the CIA reports the rocket was invented by engineers of Tadzhik S.S.R. of the U.S.S.R.

First experiments have yielded satisfactory results. In practice, the device is to be used for laying underground irrigation canals and pipes, the report states.

United States Government experts speculate that the rocket may be a further development of a technique used in the U. S. for "ten years." In this technique, known as jet flame piercing, a flame fed by oxygen is used to flake off rock—a process known as spalling. Washington mining experts believe the Russian rocket is a combination of several similar "cutting heads" which would cover an area large enough to make a tunnel.

One U. S. Bureau of Mines expert said the Russian term "underground rocket" is probably more graphic than accurate.

"The name implies the rocket gets in there and zoom! There she goes!" Actually, he said, the drilling process probably would be slow.

The Russian underground rocket probably is guided by controlling the play of flame from the rocket head, but even so it would probably cut a "wiggly path," one expert said. He implied the Russian rocket would have to be quite spectacular to outclass the fast cable-laying machinery now used in America. Some of this machinery not only digs a straight trench, but fills it after the cable is laid.

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MEDICINE

Man's Cancer Disappears After Blood Injection

A 32-YEAR-OLD man apparently has been cured of cancer after receiving blood from a second man who had spontaneously recovered from the same kind of cancer.

Drs. Wilbur C. Sumner and Alvan G. Foraker of Jacksonville, Fla., told the James Ewing Society meeting in New York that they acknowledged the possibility of coincidence. But they pointed out that only one previous case is known in which a person sponstaneously recovered from malignant melanoma, the type of cancer that often starts in moles.

(Malignant melanoma can be cured if removed by surgery in a very early stage. If neglected, it tends to spread swiftly and cannot be benefited by radiation or any known chemical agents.)

The young man recovered at the age of 28. A year later, a small cancer area was found in one finger, which was removed. Since then, there has been no further sign of the disease.

The young man's recovery suggests that the 250 cubic centimeters of blood he received must have contained some type of defense against melanoma, and that this was transferred to him, the doctors said.

National Cancer Institute laboratory tests on blood samples from both patients revealed no virus activity. No effects were seen when the sera was added to melanoma cells growing in test tubes or mice. This might be due to species differences, the doctors said.

A third patient with a far-advanced case was similarly treated. But there was no beneficial effect. This patient, however, unlike the others, had widespread internal deposits of cancer.

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