

## Beltsville Plant Scientists Find New Way to Detect Stripe Mosaic

Two new research weapons against stripe-mosaic (false stripe) disease of barley and wheat have been developed in work at USDA's Agricultural Research Center, Beltsville, Md.

The weapons are simple, easy-to-do tests that identify plants infected with mild or latent strains of the seedborne virus. These tests provide a practical and effective method of selecting virus-free plants of commercial varieties for use in building up supplies of healthy crop seed for distribution to growers.

Stripe-mosaic disease, ranging from mild to severe, is widely distributed in barleys throughout the United States. Distribution in wheat is not yet clearly known, but experiments with several commercial varieties indicate that milk forms of the disease may be cutting yields more seriously than has been supposed. In recent tests with Rushmore wheat, for example, an extremely mild strain of the stripe-mosaic virus reduced yields about 30 per cent. In Pilot, infected with a natural mixture of mostly very mild and semivirulent strains, yield down 64 per cent.

Stripe-mosaic virus is the only

virus known to be carried in the seed of a grass species. Since there is no known method of killing the virus in the seed, selection of virus-free plants is the only means of combatting this important cereal disease.

Mild or latent strains of the virus produce few or no visible symptoms, even in highly susceptible varieties of wheat and barley. But scientists have suspected for some time that a virus is causing the progressively lower yields in certain areas planted to particular varieties. Farmers say the varieties are "running out", but there is no sound genetic explanation for the claim. It now looks as if an answer to some of these cases has been found in symptomless strains of stripe-mosaic virus.

The new methods of detecting plants carrying milk or latent strains of the virus were developed by ARS pathologist H. H. McKinney. He describes them as "insurance against passing very milk strains that do not come to expression in our most sensitive tester plants." In other words, they are used as supplementary tests in routine indexing of plants for freedom from the disease.

The only methods now available for screening out these milk viruses involve serological testing or the use of an electron microscope. Both require highly skilled scientists and expensive equipment — all badly needed for more fundamental studies.

McKinney's tests — the "blocking test" and the "synergy test" — are so simple that any high school graduate can learn to run them under minimum supervision.

McKinney and associates at Beltsville have isolated virus-free plants of several wheat and barley varieties and are beginning to increase seed for larger-scale field tests at cooperating State

## Record Feed Grain Carryover Predicted

### Carryover Predicted

The total carryover of feed grains into 1957-58 from this year's big supply is likely to be around six million tons more than the record 43 million tons carried over into 1956-57, according to the May 21 Feed Situation report of the Agricultural Marketing Service.

The total supply of feed grains and other concentrates available for the 1956-57 feeding year is now estimated at slightly over 200 million tons, which is about four million tons more than in 1955-56.

The current AMS report indicates, however, that total disappearance of feed concentrates from this big supply will be slightly smaller than in 1955-56, mainly due to reduced exports.

Agricultural experiment stations. Compana and Wintex barley and an Agropyron-wheat hybrid are among those screened so far.

The blocking test requires only healthy tester (highly susceptible) plants and a virulent strain of stripe-mosaic virus. The test is based on McKinney's discovery that a barley or wheat plant infected with a mild form of the virus is immune to a severe form. The milk virus blocks further infection by the virulent strain. Thus, if a plant inoculated with a virulent strain does not come down with the disease, chances are the plant was already infected with a milk or latent strain.

All seedlings that show signs of the disease are removed from a given lot, and the apparently healthy ones are planted far enough apart to prevent inter-plant contact. Since the object is to obtain virus-free plants, the selected seedlings cannot be inoculated directly. Instead, juice is pressed from a sample leaf of each plant and inoculated into virus free tester seedlings of barley or wheat. (Thorough sampling is important because the virus may not be present in all leaves of a mildly infected plant.) After 10 days, if these inoculated seedlings show no sign of the disease, they are inoculated with a virulent strain of the virus.

If they still fail to react, the virulent strain must have been blocked by a mild strain transmitted in the juice from the selected plant. The plant is therefore considered a virus carrier and is discarded.

On the other hand, if inoculated seedlings develop stripe mosaic, no blocking has occurred. The selected plant is considered healthy and suitable for producing virus-free seed.

The selected plants can be sampled and tested several times, and the tester plants can be inoculated with the virulent strain at least twice to detect possible escapes.

The synergy test is a rather radical departure from the conventional concept of screening disease-free plants. It is based on another McKinney discovery: that plants infected with both stripe-mosaic virus and brome-mosaic virus produce accentuated reactions. That is, the two viruses team up and pack a bigger wallop than either can alone. So McKinney used the brome virus to betray the stripe-mosaic into showing itself.

To run the test, brome-mosaic virus is inoculated directly into the selected plants. Those already infected with milk or latent stripe-mosaic virus become severely stunted and show heavy chlorotic markings on the leaves. These plants are virus carriers and should be discarded.

A "milk" reaction indicates that the plant is infected with the brome virus only. Thus, these plants are considered free of stripe-mosaic infection and good for propagating purposes. (The brome-mosaic virus is not seed-borne and will not affect subsequent yields of grain.)

The synergy test requires less time and work than the blocking test and may prove to be more practical, the Beltsville researchers believe.

## Some of World Is Better Fed Than America

### Is Better Fed Than America

WASHINGTON — Herschel D. Newsom, Master of the National Grange, has pointed out that Americans are not well fed compared with many sections of the rest of the world.

Newsom said evidence of this was that the U. S. stands 13th in the per capita consumption of milk and dairy products.

Ireland leads the world in the per person consumption of milk and dairy products, he said, with an annual per capita consumption amounting to nearly 1,500 pounds. Five nations, namely, New Zealand, Sweden, Australia, and Canada all consume over 1,000 pounds per capita per year, he pointed out, while the United States figure stands at about 700 pounds.

Red meat consumption in this country, he said, is less than 175 pounds per person, placing it fifth among the world's family of nations. Only in the field of poultry meat, Newsom says, do the people in our nation lead the world. Average consumption of

## Farm Marketing Cash Up Four Per Cent

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Latest AMS figures on the demand and price situation show that farmers received 8.4 billion dollars from farm marketings in the first four months of 1957, up three per cent from the same months of 1956. Receipts from livestock and livestock products, at 5.3 billion dollars, were six per cent more than in the same months of 1956. Crop receipts were 3.1 billion dollars, about the same as last year.

poultry meat in the U. S. is better than 35 pounds annually per person, while Canada, holding second place has an average of around 30 pounds.

Uruguay is the top red meat eating country with a per capita consumption of 232 pounds a year. Australia, second, consumes 288 pounds per person; New Zealand, third, 192 pounds; Argentina, fourth, 182 pounds.

Newsom said that "this is evidence enough that farmers are going to have to take a far more active interest in self-help sales promoting and merchandising programs. We are in competition with every other industry in the country," he said, "for the consumer's dollar, and we are not getting our share."

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