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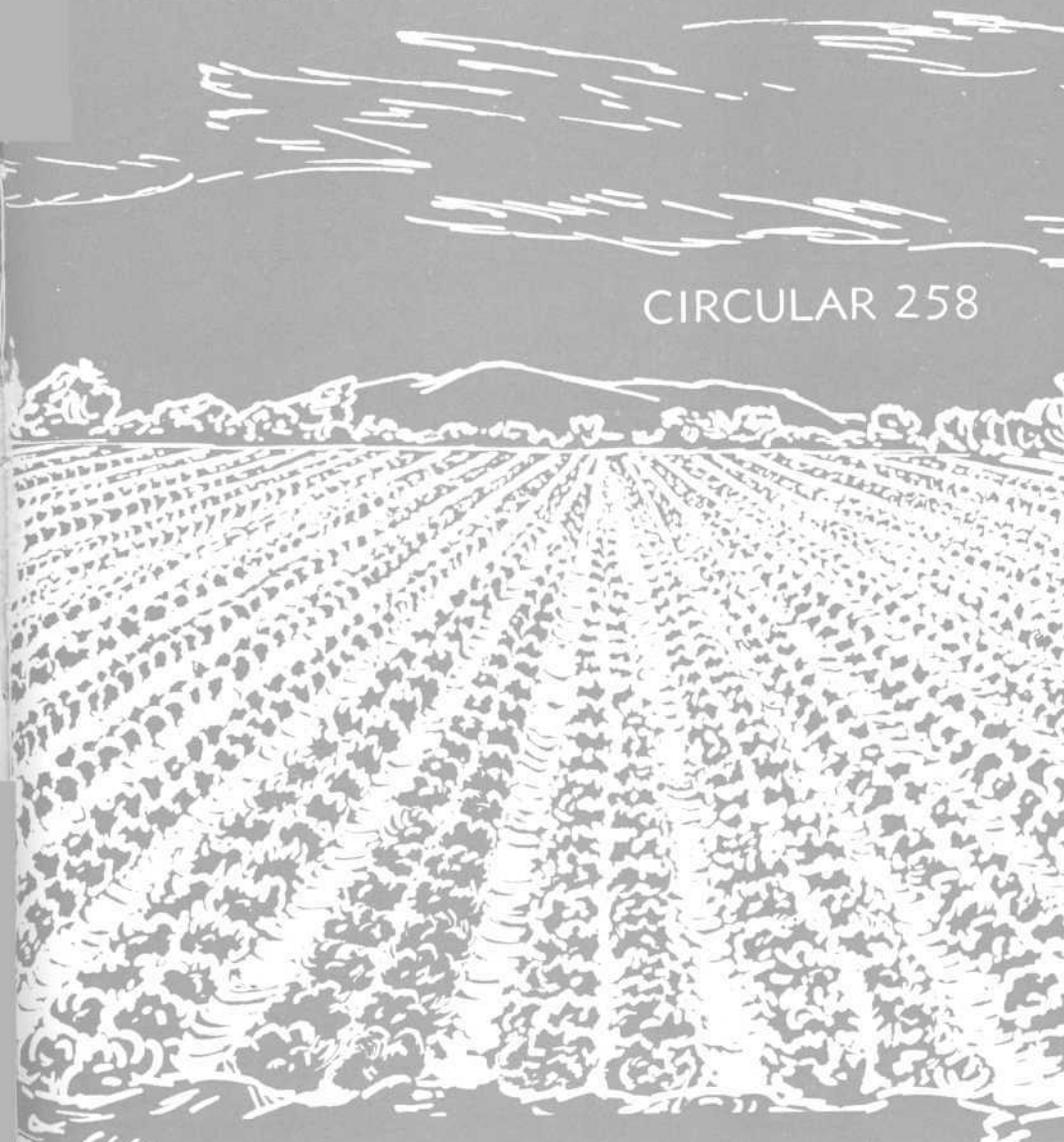
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Control Lettuce Mosaic

In Arizona

CIRCULAR 258



Agricultural Extension Service
University of Arizona, Tucson

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*University of Arizona
College of Agriculture
Agricultural Extension Service
Chas. U. Pickrell, Director
Cooperative extension work in agricul-
ture and home economics, the Univer-
sity of Arizona College of Agriculture
and the United States Department of
Agriculture cooperating. Distributed
in furtherance of the Acts of Congress
of May 8 and June 30, 1914.
3M — March 1958 — Circular 258*

Control Lettuce Mosaic In Arizona

Ivan J. Shields,
Extension Specialist in Plant Pathology

Robert E. Foster
*Associate Horticulturist,
Arizona Agricultural Experiment Station*

Paul D. Keener,
*Associate Plant Pathologist,
Arizona Agricultural Experiment Station
University of Arizona*

What Is Lettuce Mosaic?

Lettuce mosaic is a plant disease caused by a virus. It primarily affects lettuce. The virus exists in the plant cells, and many cells in diseased plants become infected. Because of this, some seeds of these diseased plants will carry the virus. Plants growing from those seeds will be infected with mosaic.

How Severe?

The virus disease may be found in any area in which lettuce is grown or other host plants occur.

Areas of California (especially Salinas) have recorded 100 percent losses in commercial plantings. Growers have been abandoning mosaic-infected areas to escape the disease.

In Arizona, some plantings have been lost due to this disease. Surveys conducted in Arizona recently have shown up to 45 percent in-

fectured mature plants. Fields in the thinning stage contain up to 8 percent mosaic and this can spread!

During the 1957 season there were reports of 75 percent infection in Arizona plantings at harvest time. Carloads from these fields were rejected in San Francisco.

What Can You Do About It?

There are two main things you as a grower can do about lettuce mosaic. One is to use clean seed to keep the disease out of **your** fields. The other is to control weeds in and around your lettuce fields.

1. Buy Clean Seed. Use seed containing 1/10 of 1 percent or less mosaic-infected seeds. This will greatly reduce the amount of the disease brought into an area each year. This is especially important in new areas where the disease has not become established. In new lettuce areas, **the important thing is prevention.** All fields in any

given district should be planted with this special seed. This may require cooperative agreement between growers, but will be well worth the effort.

Ordinary seed planted in one field can contaminate an entire area. This is because aphids carry the disease to healthy plants.

2. Control Weeds. Aphids spread lettuce mosaic to weeds where it can be carried over to the next lettuce crop. The following plants have been shown to be susceptible to common lettuce mosaic:

Lettuce
(both head and leaf types)
Endive
Garden Pea
Weed Hosts:
Prickly lettuce
Prickly sow thistle
Musk thistle
Groundsel
Chicory

You will notice that some of these plants commonly occur as weeds in your fields. Others can be found in gardens, along ditches and roads. Some cultivated flowers are known to be hosts.

What Else?

There are other things you can do that will help control lettuce mosaic.

1. Keep aphid population down as much as possible. A good insecticide program will reduce the chance of virus spread even though it may not eliminate it entirely. Keeping weeds under control is vital, preventing aphid build-up.

Isolate fields as much as possible. Plan rotation programs so that planting lettuce fields adjacent to each other is avoided.

2. Thoroughly disc or plow fields immediately after harvest. Do not allow old plants or stalks to remain to provide a source of infection for newer fields or weeds.

3. Provide "lettuce-free" periods. Schedule planting dates in any one area to allow periods during the year when no lettuce plants are growing.

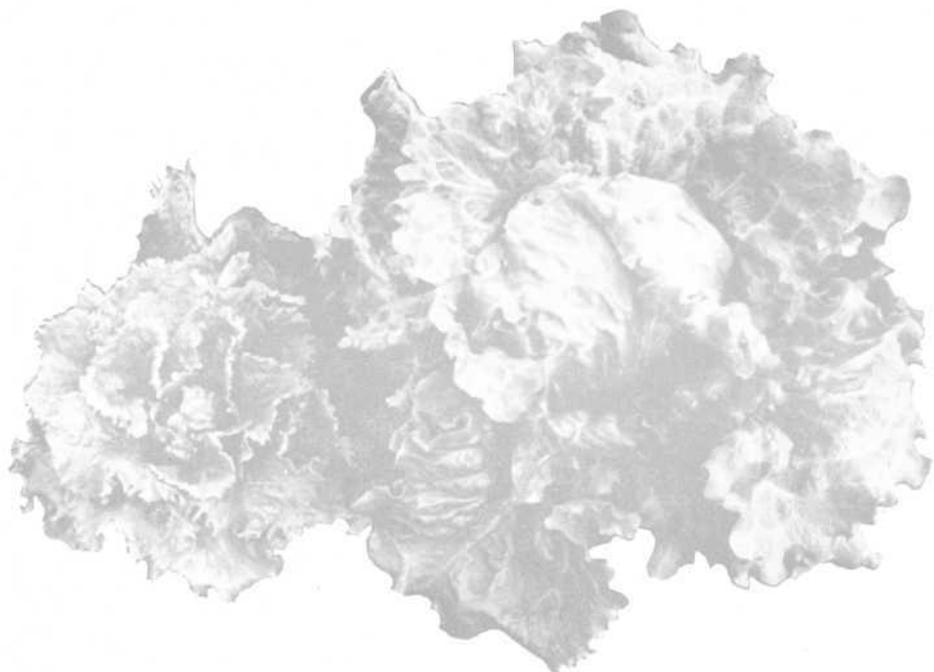
4. Use minimum planting rates. The fewer actual mosaic-infected seeds planted, the better.

5. Isolate lettuce-seed fields. Because a long growing period is necessary to produce a lettuce seed crop, all source of mosaic infection should be eliminated. Mosaic-free seed should be planted; weeds and aphids controlled and diseased plants removed throughout the growing season. This necessitates isolation from all commercial lettuce fields. Mosaic-infested seed fields also provide a dangerous source of contamination for nearby commercial lettuce.

To get a good crop you will need to do the best job you can with land preparation, irrigation, fertilization, insect control, and other cultural operations.

How Do You Recognize Lettuce Mosaic?

In young infected lettuce plants, leaves usually show a mottled or "mosaic" pattern of diffuse light-green or yellow-and-dark-green areas. The areas are of irregular shape and size, sometimes covering the entire leaf blade (See at right). The mottle can be seen best by holding the leaf up to light or by shading.



Lettuce plant at left was seed-infected with mosaic virus. Note severe stunting in comparison with healthy plant at right. The infected plant will not form a head.



This leaf from a seedling of Imperial 615 head lettuce is infected with lettuce mosaic virus. Note the mottled areas.



Other symptoms in the early stage include a downward rolling of leaf margins and stunting of the plant. The degree of stunting depends in part on how late the plant became infected. Stunting often results in close positioning of distorted (twisted and curled) leaves, which results in a rosetting effect of the entire plant (See above at left). In severe infections, death results. Symptoms are most easily seen in early stages of the plant's growth.

As infected plants grow larger, the leaf patterns may or may not remain. The older affected leaves will show a downward curling of the margins. Wilting and flecking of brown dead tissue may appear as symptoms.

Affected plants usually head late. Heads, when formed, are generally small. Heads from virus-infected plants break down sooner than normal ones, both in transit and storage. In many cases, mosaic-infected plants are more easily damaged by low temperatures than non-infected ones.

Is Poor Seed Dangerous?

Four percent of the seed infected is sufficient to cause serious trouble! Because aphids spread the disease from plant to plant, a 4 percent, 2 percent, or even $\frac{1}{2}$ percent start in a field can end up at 100 percent infection at head maturity.

Careful experiments have shown that for effective control, numbers of infected seed in any particular lot must be as low as $\frac{1}{10}$ of 1 percent or less (1 seed in 1,000).

A program to increase the supply of seed with low percentages of mosaic-infection involves careful plant selection, growing seed in a greenhouse, increasing the crop in an area free of mosaic, and keeping the crop as free from aphids as possible. This accounts for the rather short supply of such seed and the

higher price (around \$7.00 per pound of mosaic-tested seed compared to \$3.50 per pound for ordinary seed). Seed companies have invested a lot of money and facilities in "mosaic-free" seed programs.

The terms "Mosaic Tested," "Mosaic Indexed," or "Low Mosaic" in themselves mean nothing, unless they are applied to seed-stocks containing $\frac{1}{10}$ of 1 percent or less mosaic-infected seed. A seed program is not always successful, and due to the scarcity of comparatively mosaic-free seed, less desirable stock has also been marketed.

Thousands of seedlings must be checked to give an accurate measure of the percentages of seed infections present. The result of a good test, as reported on the tag, is the true measure of the value of the seed in a mosaic control program. **One-tenth of 1 percent mosaic infection should be the maximum tolerated, regardless of the special name given to the seed. Demand reliable tests!**

The Extension Service and the research staff of the University of Arizona are always willing to do everything possible to help you solve your problems. If you desire more information on lettuce mosaic, or if you need other help, please feel free to call upon us. Just get in touch with your local County Agricultural Agent.

A SPECIAL PROBLEM

Use of low-mosaic-content seed will pay its own way without considering the spread of the disease in the field. Plants arising from infected seed usually develop such severe cases of mosaic that they die or fail to make marketable heads.

	Ordinary Seed 4% Mosaic	Low Mosaic Seed 1/10 of 1% Mosaic
1. Cost of Seed (25,000 plants per acre)	\$ 7.00	\$14.00
2. Loss due to mosaic infected seed		
.04 x 25,000 plants— 1,000 plants=40 cartons @ \$1.00—	40.00	
.001 x 25,000 plants— 25 plants=1 carton @ \$1.00—		1.00
Total Cost	\$47.00	\$15.00

Gain from low-mosaic-content seed \$32.00
(Any aphid activity in the field will increase this figure.)

Higher price lettuce makes the difference even greater!

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County Agricultural Agent or
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