The comparative effects of thorough fall plowing and combined fall and spring disking on the control of these blights were studied in field experiments at the Arlington Experiment Farm, Rosslyn, Va. Fall plowing gave excellent control of the blights in 1921 and 1924, when the fall-plowed and the disked fields were separated by half a mile. It also gave excellent results in 1926, but less favorable results in 1927, when the plots were separated only 200 to 250 feet. Although the blight fungi were probably carried into the fall-plowed plots from the disked plots in 1927, thus partly vitiating the effects of the fall-plowing, it is doubtful whether fall-plowed areas should be used for tomatoes when they are closer than one-fourth mile from tomatoes grown on disked or spring-plowed land. In all of our plowing experiments, the tomatoes grown on thoroughly fall-plowed land have been freer from blights than other tomatoes grown on spring-plowed land on the same farm.

W. S. PORTE and
FRED J. PRITCHARD.

---

**TOMATO Yellows Due to Virus That Causes Curly Top in Beets**

Tomato yellows has long been known in the Pacific West, but it remained a mystery until recently. It was described a number of times under various synonyms, such as western blight, yellow blight, summer blight, and a few others. Tomato plants affected with yellows are distinguished by a general yellowish discoloration, upward rolling of their

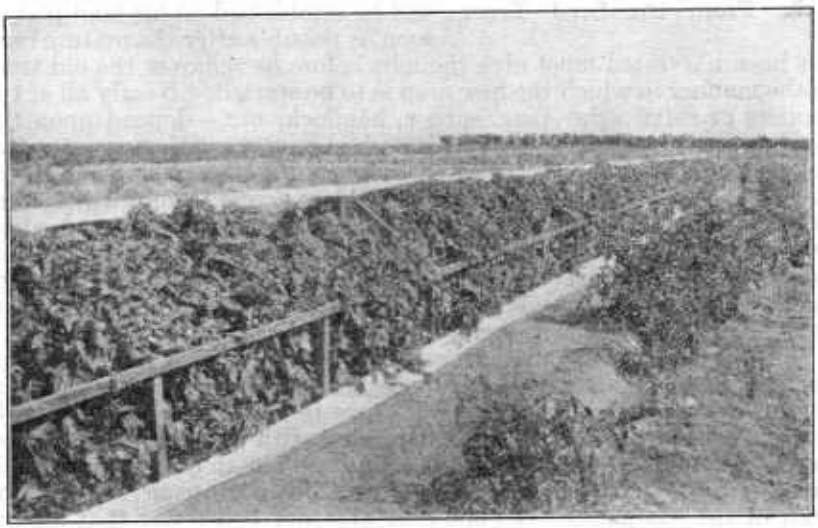

FIGURE 226.—Two rows of tomato plants, one protected by a muslin cage until the end of June (on the left), the other unprotected (on the right). The protected plants were free from yellows and completely filled the row, while 87 per cent of the unprotected plants were either dead or dying from this disease. Shafter, Calif., July, 1927

leaves, and extreme rigidity. Internally, such plants reveal carbohydrate contents much higher than normal, likewise a higher percentage of soluble nitrogen.

It has been definitely established by the work of M. B. McKay, of the Oregon Agricultural Experiment Station, that tomato yellows is induced by the same virus that causes curly top of sugar beets and is transmitted by the beet leaf hopper (*Eutettix tenellus* Baker). How-

ever, the writer's work shows conclusively that the progress of the disease after the infection depends to a large extent on environmental conditions. The combined effect of these conditions may be measured roughly by evaporation. High rates of evaporation correlate with high percentages of the disease and with a greater severity of its symptoms. Light is the most important single factor. The yellows curve closely parallels the light curve when inoculated tomato plants are placed under a series of different light conditions.

Shading in the field has a doubly beneficial effect. It enables some plants to overcome the infection and also tends to repel the insects and thus to reduce the amount of infection. Knowledge of this fact has been put to practical use by the writer. Tomato plants were shaded in the field by means of muslin cages and certain tall-growing economic plants such as sunflower. In the southern San Joaquin Valley of California, in years when yellows reached 100 per cent in unprotected fields, less than 50 per cent of plants were affected in the rows interplanted with sunflower, still less under muslin tents, and none within insect-proof cages. The protective crops and the muslin covers could be removed about July 1 with very little danger of a later infection. Older plants do not contract the disease as readily as do younger plants.

MICHAEL SHAPOVALOV.

---

## TREE Crops May Be Wind Sown at Distance From the Seed Trees

The owner of a woodland who wants to make sure that a new crop of trees will be established on his land just as soon as possible after the mature crop has been harvested must give thought before he removes the old trees to the manner in which the new crop is to be started. Nearly all of the conifers or softwoods—pine, spruce, hemlock, etc.—depend upon the wind to scatter their seeds. With such species a satisfactory stand of young trees can safely be counted on within a reasonable time if the cutting is not too wide for the seeds to blow across from uncut timber to windward. If the area to be cut is too wide to depend upon seeding from the trees outside, or if there is no mature timber left on the windward side, it is necessary to leave enough seed trees scattered through the cutting to reseed the area. In either case it is necessary to know how far the seeds will be carried by the wind.

To find out what the distances are a series of tests has been conducted on the campus of the University of California. Ninety-eight lots of seeds were released 100 feet above the ground from a flag pole and the movements of the seeds measured with stop watch and tape. To check these tests in the free air against results in quiet air, 27 additional lots of seeds were dropped 160 feet down the concrete elevator shaft of the campanile—the 300-foot masonry bell tower that adorns the campus—early in the morning when temperature conditions within the tower were such that the air was perfectly at rest.

### Wings Act As Parachutes

Tree seeds of the type adapted to distribution by wind have wings but they do not fly. Their wings merely act as parachutes which offer resistance to their fall through the air. While they are falling they drift with the wind. The distances they travel from the parent tree depend upon the length of time required for the seeds to drop from the