

# Atlas 46 a New Barley

resistant to powdery mildew and to scald

Charles W. Schaller

**Resistant to powdery mildew** and scald, Atlas 46 barley offers a means of controlling two important barley diseases occurring in California.

Atlas 46 combines disease resistance with all the favorable attributes of Atlas, which has made the latter one of the leading varieties in the state.

Released to growers in the fall of 1947, it is expected to replace the common Atlas both in acreage and in use by the brewing industry.

Powdery mildew is readily identified by the grayish, moldy growth appearing on the leaves, which gradually turn yellow and die.

Scald is sometimes confused with net blotch, a barley disease to which both Atlas and Atlas 46 are susceptible. Scald lesions are oval in shape with brown margins and gray or white centers.

In contrast to scald, net blotch lesions have dark brown areas irregularly distributed within areas of lighter brown, giving a netlike pattern to the lesion; later the lesions join to form dark brown stripes with irregular margins.

When the early infection of mildew and scald is arrested by unfavorable weather, only limited defoliation occurs. The weakened plants recover and produce an apparently normal crop.

Continuous infection throughout the growing season causes excessive defoliation, stunting and premature ripening, which results in low yields and the pro-

duction of shriveled kernels low in test weight.

Unlike the stripe disease of barley which can be controlled by seed treatment, mildew and scald can be controlled only by the use of resistant varieties.

## Mildew and Scald Losses

Atlas 46 proved a useful tool in tests made to determine yield losses caused by mildew and scald.

Employing the same breeding method with which the rust and bunt resistant wheats were produced, the varietal characteristics and yielding capacity of Atlas were maintained. The yield advantage of Atlas 46 under disease conditions is in proportion to the severity of the epidemic.

In cooperation with the Extension Service, several paired tests of Atlas and Atlas 46 were made in the presence and absence of the diseases in several locations of the state.

## Test Results

In tests conducted for one year there was no significant difference in yield between Atlas 46 and Atlas in 19 nurseries when neither mildew nor scald was present.

In 13 nurseries, where mildew infection was severe in the early stages of growth, Atlas 46 outyielded Atlas by an average of five bushels per acre, which

was equivalent to a 16% increase in yield.

There was no difference in the test weight between Atlas and Atlas 46, indicating that the infected plants of Atlas recovered sufficiently in the later stages of growth to fill the kernels which had formed.

The yield differences were attributed to shorter heads and fewer kernels per head, which would result from early infection. This was confirmed by actual measurement and count.

Losses of this type have never been fully appreciated by the growers since they are not detectable at harvest time.

Although scald is normally more destructive than mildew in California, its occurrence in 1947 was limited. A reduction in yield, approaching that attributed to mildew, occurred in four nurseries where scald was prevalent early in the season. Greater losses from both mildew and scald would be expected in years when weather favors continuous infection throughout the growing period.

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*Atlas 46 mentioned in the above article was developed by F. N. Briggs, Professor of Agronomy and Agronomist in the Experiment Station, Davis, and O. C. Riddle, then Assistant Professor of Agronomy, Davis.*

The Truck Crops Division at Davis is running fertilizer tests with spinach, onion, celery, potatoes, and sweet potatoes.

**Experimental planting of Atlas barley (left) and the new Atlas 46 barley (right) resistant to powdery mildew and scald.**



## MOLYBDENUM

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why so much molybdenum is taken up by the plants growing in the affected areas. Ordinarily, molybdenum is one of the most insoluble constituents of the soil. In certain unaffected localities in California, the total molybdenum content of the soil is fully as great as in some of these affected areas, but it is extremely insoluble.

It would appear from observations in the affected areas that new pastures are likely to be more toxic than those that have been in existence for several years. No satisfactory explanation is available for this.

It has been quite well established that providing hay in the pastures will prevent the disease. As the season progresses the animals will consume more hay, and in September are likely to be using three times the amount they would take in May. A group of heifers supplemented with oat hay in an affected pasture did not develop symptoms, whereas comparable animals on pasture alone showed symptoms of molybdenum poisoning.

The addition of copper in the form of bluestone to the feed or water has been advocated as a preventive. The work in England, and in California, supports this.

There is nothing new in the giving of copper to livestock, although it was not considered as an antidote for a toxic substance. It really was placed in water troughs to destroy growth of algae that were considered harmful. This may be the source of the belief in the beneficial action of copper, whereas in reality it was counteracting molybdenum.

Copper sulfate may be administered preferably in the drinking water, but may also be given in the feed. Care should be exercised as to the amount consumed. The substance is poisonous if too much is given. Only a small amount is necessary to counteract molybdenum.

The animal does not need more than one gram per day—one ounce equals thirty grams—and since that is well below the toxic dose there should be little danger of poisoning.

Copper need be given only during the summer when pasture growth is luxuriant.

The mode of action of copper is not clear, but according to work in Australia an excess of molybdenum interferes with copper utilization.

An excess of copper over an extended period may result in a chronic copper poisoning that may end fatally. A prominent symptom of copper poisoning is red colored urine produced by the breaking down of red cells and resultant passage of hemoglobin into the urine.

1. When possible provide dry roughage for stock on permanent pastures in areas where molybdenum poisoning has been shown to exist.

2. If dry roughage is insufficient to prevent the condition, use bluestone in the water or feed during the summer months at a dose not to exceed one gram per day per animal.

3. Check for parasites when the foregoing symptoms appear. If negative, have feces of affected animals tested for molybdenum.

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## TRUCK CROPS

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Ladino clover or irrigated pastures require water over a long growing period and the average requirement is generally considered to be 4½ to five acre-feet. On extremely heavy soils or shallow hardpan soils which prevent deep percolation, successful pastures have been maintained using only three acre-feet.

Many of these shallow-rooted crops are short-seasoned and when grown on heavy soil or hardpan land, the water requirements may be relatively low—usually around an acre-foot of water per acre—if the soil is moist at time of planting. The bush bean is a good example of this crop type.

When seeds are planted on beds during dry seasons, it is necessary to germinate them by irrigation.

This requires large quantities of water and in some cases, two or more acre-feet have been applied to sprout crops such as lettuce. This is several times the quantity of water necessary to grow the crop after seedling stage.

Water can be saved by keeping the beds low, as far as practicable, so that it will be unnecessary to maintain water in the furrows for long periods to wet the surface.

Planting the seeds close to the edge of

the bed will place the seed nearer the water and germination will require less subbing.

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*For additional information concerning irrigation and water requirements of crops consult your local farm advisor.*



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