

## Chloride Fertilizer Inhibits Leaf Rust in Winter Wheat

By Travis D. Miller

*Texas research confirms that chloride (Cl) can suppress leaf diseases in winter wheat. More remains to be learned about the relationship, but Cl fertilization is a part of wheat disease control and yield enhancement.*

**LEAF RUST** (*Puccinia recondita*) is perennially a major threat to winter wheat producers in the southern wheat producing regions of the Great Plains. This disease, to a great extent, limits the area of viable wheat production in Texas and the Gulf Coast. Research in the northern and central Great Plains suggests that Cl fertility has a positive effect on reducing fungal diseases of wheat, including leaf rust. Trials were initiated in the Blacklands of Texas to evaluate the effect of Cl fertility on leaf rust and grain yield during the 1990-91 and 1991-92 growing seasons.

### Texas Results

Results have been mixed in Texas trials. In the three 1991 trials, no effect was observed from Cl treatment in two locations, with a slight suppression of rust noted at a third. During the 1992 season, a trial was successfully established near Meridian, TX. Response to applied Cl fertilizers was dramatic, as illustrated in **Table 1**.

Leaf rust in the variety 2158 had almost completely destroyed (80 percent) all leaf area by mid-grain fill in the absence of Cl, while plots treated with Cl fertilizer had significantly more green leaf area during grain fill (see photo). Leaf rust ratings for Cl-treated areas ranged from 5 to 45 percent on May 1, or mid-grain fill. Spring topdressed Cl treatments were appreciably less rust infected than fall treatments. Chloride applied as ammonium chloride (NH<sub>4</sub>Cl) appeared to suppress leaf rust

more than potassium chloride (KCl) when compared as spring topdress treatments. No difference in leaf rust infection was

**Table 1. The effect of chloride fertilizer source and time of application on leaf rust infection of winter wheat. Meridian, TX. 1992.**

Fertilizer source	Rate, Cl lb/A	Time applied	Leaf rust rating, % 5/1/92
NH <sub>4</sub> Cl	40	Feekes 5.0	5
NH <sub>4</sub> Cl	40	Preplant	45
KCl	40	Feekes 5.0	30
KCl	40	Preplant	45
Check <sup>1</sup>	0	--	80

<sup>1</sup>All plots were treated with 100 lb/A 18-46-0 preplant incorporated, 100 lb/A 32-0-0 on 2/15/92 and 147 lb/A 34-0-0 on 3/11/92.

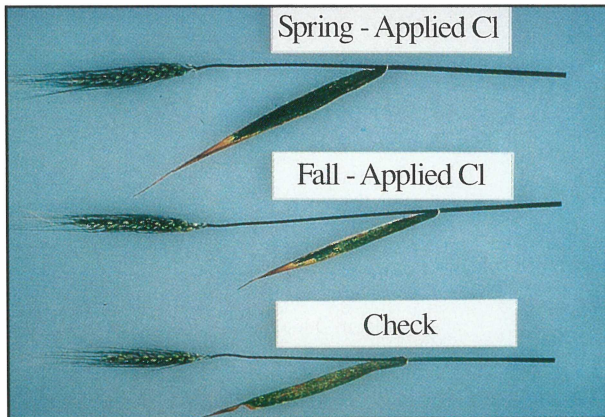
noted between sources of fertilizer applied in the fall.

While many factors remain to be studied at this time regarding the dramatic suppression of leaf rust in 1992 and the apparent failure of Cl to suppress leaf rust at 2 of 3 sites in 1991, several key differences can be noted. These include:

**Variety.** The variety 2158 was strongly affected by Cl treatments, in 1992. It was not evaluated in 1991. This is consistent with data from other researchers who report a strong interaction between Cl response and variety.

**Rainfall.** The 1992 site received more than 30 inches of rain between preplant and spring topdress treatments. This may have leached much of the available Cl fertilizer

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**WHEAT** plots treated with chloride fertilizer had significantly more green leaf area during grain fill than untreated plots. Spring topdressed treatments were less infected with rust than fall treatments.

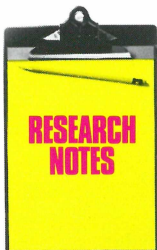
from the profile, resulting in significant deficiencies between fall and spring treatments. High rainfall could also have enhanced the environment for disease.

**Soil test Cl levels.** Sites in 1991 measured 3 to 5 parts per million (ppm) Cl in the surface 2 feet of soil. The 1992 site tested less than 1 ppm Cl.

### Conclusions

Chloride fertilizers can suppress leaf rust in winter wheat in Texas. Results are not entirely consistent or predictable, but Cl fertility can provide an economical suppression of leaf rust under some growing conditions. ■

## Missouri



### Potassium May Affect Alfalfa Susceptibility to Insect Damage

**RESEARCHERS** have studies on an established pure stand of alfalfa to determine the effect of potassium (K) sources on the susceptibility of alfalfa to insects and diseases.

The 1991 data indicate that statistically significant differences in insect numbers do exist among various K fertility treatments when insect numbers reach or exceed economic threshold levels.

Data indicated that recommended rates of potassium-magnesium sulphate ( $K_2SO_4 \cdot 2MgSO_4$ ) reduced numbers of

alfalfa weevil larvae by 31 and 49 percent for Julian dates 100 and 114, respectively. Larvae numbers were reduced by 50 and 59 percent, respectively, with recommended potassium chloride (KCl) rates on the same dates. Potassium sulphate ( $K_2SO_4$ ) at recommended rates reduced alfalfa weevil larvae by 27 and 34 percent, respectively.

While it appears that alfalfa weevil are in some way suppressed by better K nutrition, potato leafhopper did not show the same response. There were no apparent relationships among K sources and foliar disease symptoms at this early stage of experimentation. ■

Source: W. C. Bailey, J. T. English, and J. R. Brown. 1992. The effect of potassium-magnesium sulphate upon the susceptibility of alfalfa to insect, disease, and nutritional problems. Agronomy Misc. Publ. 92-01, Dept. of Agronomy, Univ. of Missouri, Feb. 1992. p. 168-182.