TABLE 3. Comparison of Treatments for the Control of *Pythium* Seed Decay and Damping-off of Cotton Seedlings, Greenhouse Trial, 1977

Treatment*	No. plants emerged	Disease rating of root systems†
Ciba Geigy 48988 50W 1 oz	13.7 a	0.2
Dexon 70W 3 oz + Demosan 65W 10 oz	13.4 a	2.2
Terra-Coat L-21 12 oz	13.2 a	2.9
Thiram 40W 4.5 oz + Demosan 65W 10 oz	11.6 a	3.0
No treatment	3.0 b	3.9

*Significant at the 5% level. Treatments with same letter are not significantly different.
† Scale of 0 to 4. 4 = severely diseased, reddish-brown roots.

TABLE 4. Comparison of Treatments of Acid-delinted Delta Pine 61 Cotton Seed, Spring Trial, 1977

Fungicide*	Rate	No. healthy plants June 3
	oz/100 lb seed	
Terra-Coat L-21	12	189 a
Ciba Geigy 48988 50W + PCNB 75W	1 4	190 a
Difolatan 4F, + Demosan 65W	3 fl 10	186 a
Ciba Geigy 48988 50W Demosan 65W	1 10	179 a
BASF 389F	8	60 b
No treatment	—	38 c
Boots 7503 25W	4	24 c
Boots 7503 25W	16	20 c

*Significant at the 5% level.

adequate commercial control of damping-off.

In a second trial, we compared BASF 389 alone; in combination with Ciba Geigy 48988; and against a standard commercial treatment of Dexon plus Demosan. Treatments were applied as in previous trials and 300 acid-delinted Delta Pine 61 cotton seeds were planted per replicate on May 19. Plots were replicated five times.

Number of healthy appearing plants on June 20 per replicate was: Ciba Geigy 48988 50W 1 ounce + BASF 389 8 ounces, 218; Dexon 70W 3 ounces + Demosan 65W 10 ounces, 202; BASF 389 8 ounces, 160; and no treatment, 138. Results show combination seed treatments were significantly better (5% level) than single seed treatments.

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Barley, wheat, and triticale responses to planting date and seeding rate

Y. Paul Puri ■ Calvin O. Qualset ■ Kenneth G. Baghott

Yield potential of a crop is dependent upon genetic and environmental factors. The environmental factors can be manipulated to exploit the maximum yield potential of a variety. As new varieties are developed or introduced into an area, new and efficient cultural practices must be developed. This study at Tulelake was conducted under irrigation to determine the effects of planting dates and seeding rates on the yield and other agronomic characteristics of wheat, barley and triticale.

Experimental design

Experiments were established on an organic clay loam soil (12 percent organic matter) in 1972, 1973, and 1974 at the Tulelake Field Station. In a split-plot design, four planting dates (April 16, 23, and 30 and May 7) were main plots. One variety each of barley, wheat, and triticale was chosen to represent these crops for the Tulelake region. Previous experiments had shown that they were generally adapted to Tulelake conditions. The varieties included Wocus 71 barley, D6301 wheat, and 6TA-204 triticale. The triticale was kindly provided by B.C. Jenkins and the wheat variety is a short-statured selection from the International Maize and Wheat Improvement Center in Mexico.

Four seeding rates were used for each variety and planting date. The rates were 100, 200, 300, and 400 seeds per 10-foot row. These correspond approximately to the following rates in pounds per acre: 50, 95, 145, and 190 for Wocus 71; 40, 70, 105, and 145 for D6301; and 45, 90, 130, and 180 for 6TA-204. Plot size was four 10-foot rows, with rows 1 foot apart; data were collected from the central 8 feet of the two center rows. The varieties and seeding rate treatments were randomized as subplots within each planting date main plot.

Effect of planting date

Planting date significantly influenced grain yields for all three crops (fig. 1). Based on the 3-year mean performance, April 30 planting was most satisfactory for Wocus 71 barley, whereas early planting gave the highest yields for D6301 wheat and 6TA-204 triticale. The optimum planting date for wheat and triticale may be even earlier than April 16, but unfavorable weather conditions often prevent an earlier planting time at Tulelake.

The decline in yield for wheat and triticale was about 70 pounds of grain for each day that planting was delayed after April 16. Decreased yields with later planting dates were consistent in all 3 years for wheat and triticale, but the barley variety showed increased yield with delayed planting in 2 of the 3 years (fig. 1).

Kernel weight (fig. 2) was reduced with later planting in 2 of 3 years for all crops. Other effects of late planting included reduced plant height, number of days to heading, and lodging.

Effect of seeding rate

Variation in seeding rate had less pronounced effect on grain yields than did variation in planting time (fig. 3). The responses to seeding rate were different in each year for the three crops. The highest yields for Wocus 71 were attained with 145 pounds per acre, but

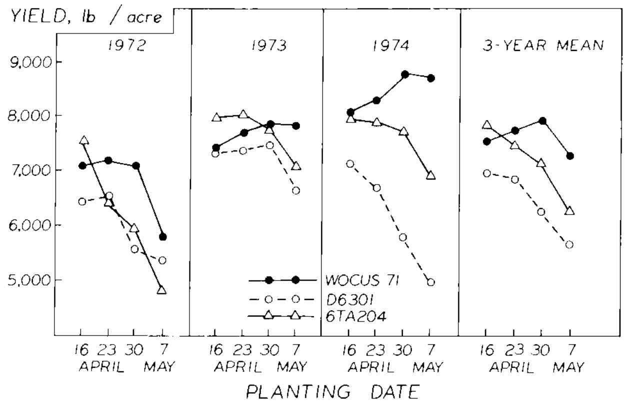

Fig. 1. Yield of Wocus 71, D6301, and 6TA204 planted on various dates in 1972, 1973, 1974 and 3-year mean (average over seeding rates).

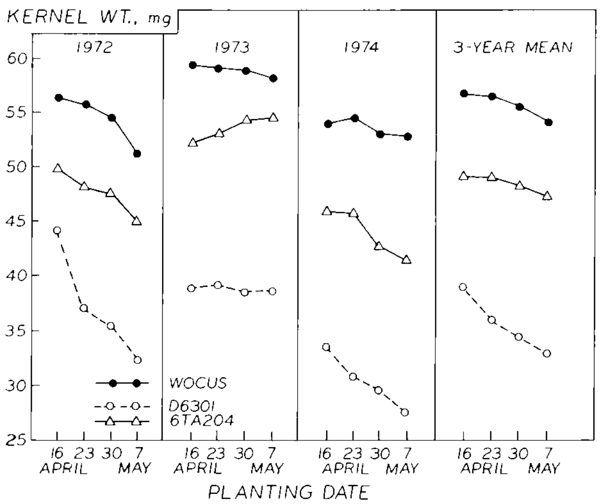

Fig. 2. Kernel weights of Wocus 71, D6301, and 6TA204 planted on various dates in 1972, 1973, 1974 and 3-year mean (average over seeding rates).

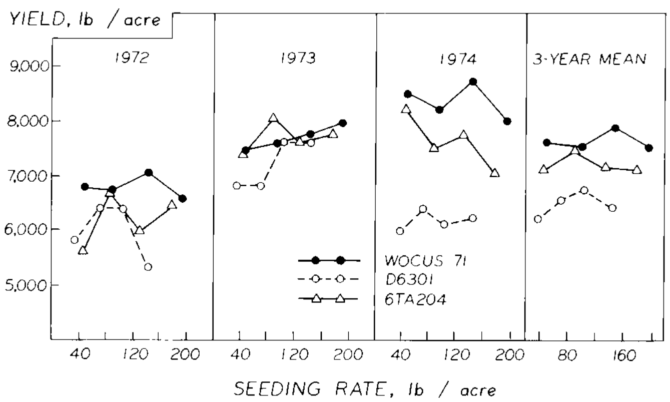

Fig. 3. Effect of seeding rate on yield of Wocus 71, D6301, and 6TA204 in 1972, 1973, 1974 and 3-year mean (average over planting dates).

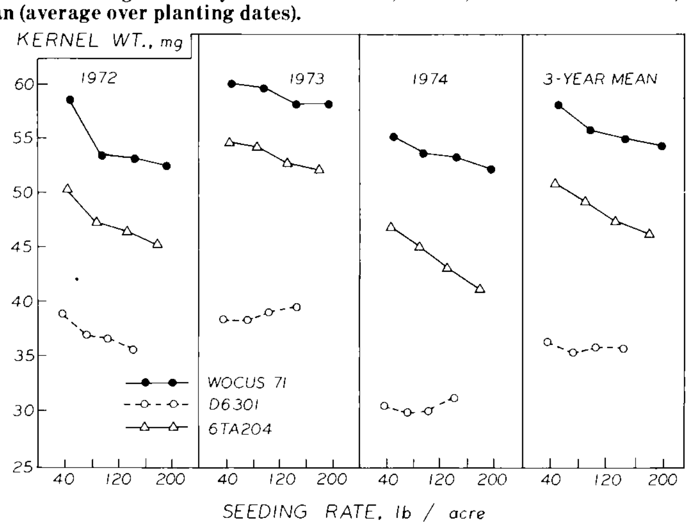

Fig. 4. Effect of seeding rate on kernel weights of Wocus 71, D6301, and 6TA204 in 1972, 1973, 1974 and 3-year mean (average over planting dates).

this was only a 3 percent advantage over 50 pounds per acre. About 105 pounds per acre gave the highest yields for D6301, and 90 pounds per acre was satisfactory for 6TA-204.

Seeding rates given as pounds per acre are not entirely satisfactory for determining optimum planting density because of differences in individual kernel sizes among varieties, even with the same crop. Seeding rates should be adjusted to the most desirable seed number, which was 30 seeds per foot in rows spaced 12 inches apart for barley and wheat, and 20 seeds per foot for triticale in this study.

Figure 4 shows that increased seeding rate resulted in a general decline in the weight per kernel in the resulting crop for Wocus 71 barley and 6TA-204 triticale. The reason for this response is not known.

Conclusions

Delay in planting date of wheat and triticale after April 16 can result in substantial yield losses. Barley showed less dependence on planting date and would be the preferred crop for late planting at Tulelake. Seeding rates over 150 pounds per acre of barley or over about 100 pounds per acre for wheat and triticale are not expected to provide economic return through increased grain yields. Much lower rates, about 50 pounds per acre, gave only slightly lower yields, but such a low rate cannot be generally recommended because of increased potential for stand loss at emergence and increased weed infestation. Seeding rates should take seed size into account because of the differences in size among varieties and crops. Triticale, a new cereal crop for the Tulelake region, can only be economical if it has yields equal to or better than wheat or barley. This study showed that early planting time would enhance the chance for success with this crop. Since there are substantial differences among varieties within each of the crops studied here, it is important that time of sowing, seeding rate, fertilization, and other management factors be investigated as new varieties become available.

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