Effects of Volunteer Wheat on the Yields and Quality of Two-rowed Barley

Masakazu Komatsuzaki*, Ryuichi Sago* and Oritaro Endo**

Materials and Methods

The experiment was conducted in the experimental field of the Faculty of Agriculture Ibaraki University in 1992. The soil was brown volcanic ash (Kanto loam). Barley (Hordeum vulgare L. subsp. distichum L.) seed, cv. Amaginizyou was broadcasted on November 3 at sowing rates of 0.4, 0.8 and 1.2 kg/a (planting rates of 1,000, 2,000 and 3,000 plants per are, respectively). Wheat (Triticum aestivum L. cv. Norin 61) as a volunteer weed was seeded simultaneously with the barley seeds. Volunteer wheat seedlings were thinned out after emergence and were set in areas of barley planted at each of the three rates in number of 0, 50, 100, 200 and 500 plants/a, respectively. The overall plot size of the barley field was 3 m by 2 m and two replications were made. Fertilizer was applied prior to sowing: N 0.7 kg/a; P₂O₅ 0.7 kg/a; K₂O 0.7 kg/a. Barley and volunteer wheat were harvested on June 3, 1993, and the number of ears and grain yield were measured. The regression equation of contamination rate and volunteer wheat density was then calculated in the fields sown at different rates.

Results and Discussion

1. The effect of different densities of volunteer wheat on barley yield.

Table 1 shows the relationship between barley yield and volunteer wheat density at different rates of barley sown. The number of ears and grain weight of volunteer wheat was lower with the higher barley sowing rate. But the number of
ears of volunteer wheat per hill was constant at the same barley sowing rate. Thus, grain yield per are of largely depended on the density of volunteer wheat.

The number of ears of volunteer wheat was only a very low 0.3-3.0% of barley ears within the range of 50-200 volunteer wheat plants per are. The effect of volunteer wheat on barley yield was little in the plots of density of volunteer wheat at 50-200 plants per are.

But in the plot of 500 volunteer wheat plants/a, yield loss was 9.8%, 6.8% and 0.7% at the sowing rate of 0.4 kg/a, 0.8 kg/a and 1.2 kg/a, respectively. And it was presumed that the number of barley ears was not due to decrease the yield on barley.

It was clear that the loss of barley yield by volunteer wheat plants was less when the rate of barley sowing was higher.

2. Relationship between contamination rate of wheat in barley and volunteer wheat plant density.

Fig. 1 shows the relationship between percentage of contamination rate of the wheat in barley grain and volunteer wheat density at different barley sowing rates. At all rates, the percentage of contaminated wheat increased with greater volunteer wheat density, however, this rate was higher at lower barley sowing rates.

A contamination rate of up to 0.2% of foreign grain is allowed in two-rowed barleys by the inspection standard (Japanese Agricultural Products Inspection Law). According to the regression equations, 24 plants/a and 73 plants/a are allowed for the sowing rate of 0.4 kg/a and 1.2 kg/a, respectively.

These results showed that the increasing of barley sowing rate was a practical method by which to decrease the contamination rate of volunteer wheat using an alternating cropping sys-
tern of barley and wheat.

References


