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Effects of Sowing Date on Grain Yielding and Related Traits in Rapeseed

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Abstract - The objectives of this experiment was to evaluate the effect of seeding and transplanting date on yield and quality of rapeseed experiment were conducted in the research field of Chungcheongnam Do(Taejun) Agricultural Research and Extension Services with Yudal, one of the rapeseed cultivar of different growth characteristics among the six treatments were examined and recorded. Results showed that yield components such as plant height, length of ear and pod, number of branches and pods and percentage of pod setting and seed set were highest at the plot with direct seeding in Sep. 10. In this treatment yield of seed, 1,000 grains weight and weight of 1ℓ were highest. On the basis of vegetative and yield parameter of direct seeding in Sep. 10 was the best sowing date of rapeseed crop in Chungcheongnam Do region of Korea. Experiments were conducted in the research field of Chungcheongnam Do(Taejun) Agricultural Research and Extension Services with Yudal variety, which showed different growth characteristics. Yield components such as plant height, length of ear and pod, number of branches and pods and percentage of pod setting and seed set were highest at the plot with direct seeding in Sep. 10. Yield of seed, 1,000 grains weight and weight of 1ℓ were highest at the direct seeding in Sep. 10. Judging from the results reported above, seemed to be direct seeding in Sep. 10.

Key words - Seeding date, Seed yield, Rapeseed

Introduction

The origin and early culture of rapeseed is obscure due to many interspecific hybrids of Brassica species and extremely difficult tracing of the evolution of the species. The earliest written records of rapeseed(200 to 1,000 B.C.) are found in India. Rapeseed was introduced into China from Korea more than 2,000 years ago. However, the cultivation of rapeseed for oil production has a shorter history as compared with sesame and perilla cultivation in Korea. Rapeseed has been grown widely as an important winter crop and its as an oil seed crop in the southern part of Korea including jeju island, where it is grown cultivation area, production and yield per unit area. particularly, rapeseed is grown as one of the most important sightseeing resources for tourists in Jeju island. Monocropping of the rapeseed is obtained from late September to early June for transplanted cultivation, and from early October to mid-June for directly sown cultivation in Korea. Stand establishment of rapeseed is easy, and the plants can tolerate a wide range of pH even though optimum soil acidity is around seven. According to our experience rapeseed also can be grown on marginal soil condition. On light, sandy loam soils, rapeseeds do well in Korea as they start regrowing early in spring and the root system become deep, thus suffering less from drought and/or coldness.

However, the small seeds need shallow sowing ranging from one to three cm and enough moisture in the surface layers for germination. The winter rapeseed is also grown well on the paddy low land after harvesting rice crop in Korea. It seems to be fairly tolerant to wetness and salinity even though prefering well aerated soils and without water-logging. Too much water favours attacks by fungi on the roots and decreases tolerance to low temperatures during winter and early spring. Thus it is important that surplus surface water should be drained away, particularly when grown on the paddy low land area. On the other hand, the soil should not be prepared too much since a heavy layer of fine particles will cause lack of air if the soil is saturated with water in clay soils.

In Korea, *Sclerotinia* species attacking stem and branches is destructive if cultivation is too intensive, but this fungus is dependent upon quite special weather condition. When grown on the upland, it is generally serious if rapeseed cultivations do come frequently in the crop rotation. However, when grown on the paddy low land after rice cultivation, continuous rapeseed cultivations are successful because of killing the fungus by flooding during the rice growing period. The rapeseed is sown alone in the sequential cropping systems as a row

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crop. Rotations are important in growing rapeseed on the upland in Korea. These results are similar to others obtained elsewhere, and indicate the high compensatory pows of rapeseed plants(Kae *et al.*, 1994 ; Kwon 1994a ; Kwon 1994b ; Kwon *et al.*, 1984 ; Bang *et al.*, 1994 ; Hwang *et al.*, 1993 ; Lee *et al.*, 1994 ; Lee *et al.*, 1974 ; Kae *et al.*, 1971 ; Kwon *et al.*, 1972 ; Lee *et al.*, 1972a ; Lee *et al.*, 1972b ; Kim *et al.*, 1984a ; Kim *et al.*, 1984b).

Yudal variety, which is an industrial rapeseed is currently grown for lubricating oil, materials of cosmetics and plastic film. Therefore the purpose of this study is to examine the effect of seeding date and transplanting date on yield and quality of rapeseed.

Materials and Methods

Rapeseed variety, Yudal for lubricating oil, materials of cosmetics and plastic film was grown at the experimental field of Mokpo Branch station of Crop Experiment Station in Korea. Seeds were sown in main field on Sep. 10 sowing in nursery, Mar. 10 transplanting in main field, Sep. 20 sowing in nursery, Mar. 10 transplanting in main field, Sep. 30 sowing in nursery, Mar. 10 transplanting in main field, Sep. 15 sowing in nursery, Oct. 25 transplanting in main field, direct seeding in Sep. 10 and direct seeding in Mar. 10.

The date of yield and yield components were investigated for 3 years from 1998 to 2000. The complete randomized block design was used and treatments were randomly applied in each of the three blocks. The size of each experimental unit was $20m^2$(4m×5m). The fertilizer was applied in the field at a ration of N-P_2O_5-K_2O = 10-8-8 kg/10a and other cultural practices were followed as the conventional method in the southern region of Korea.

Results and Discussion

Comparisons of the agronomic characters among seeding date and transplanting date

Mean values of the measured characters are presented in Table 1.

As shown in Table 1, bolting date ranged from Mar. 15 to May 27, flowering date from Apr. 10 to June 10, flower ending form May 5 to June 25, maturing date June 10 to July 16, bearing day form 35 to 60 and growth duration form 198 to 280 day. All characters showed large variations.

Among the treatments, bolting date, flowering date, flower ending date and matruing date were larger in direct seeding in Sep. 10.

As shown in Table 2, plant height ranged from 81 to 108cm, ear length from 49 to 62cm, pod length from 5.9 to 6.4 cm, number of branches and pods from 8, 31, to 36, 49 respectively, and percentage of pod and seed from 8.4, 92 to 13.0, 100. All characters showed large variations.

However, crop of direct seeding on Sep. 10 had higher plant height, ear length, number of pods per ear, percentage pods and seed setting.

Yield characters

Mean values of yield characters are listed in Table 3. As shown in Table 3, seed yield ranged from 119.4 to 359.5 kg/10a, seed capacity from 180 to 502 ℓ/10a, weight of 1ℓ from 660 to 689g and weight of 1,000 grains from 2.5 to 3.5g.

Direct seeding on Sep. 10 gave the highest seed yield, yield index, weight of 1ℓ (g) and weight of 1,000 grains.

The results indicate that seeding date and transplanting date show different adaptabilities to particular environment and seeding date of direct seeding in Sep. 10 seems to be the most suitable treatment for

Table 1. Variation of inherent characteristics of rapeseed variety Yudal in Chungcheongnam Do region of Korea

Treatment	Bolting date	Flowering date	Flower ending (date)	Maturing date	Bearing date (day)	Growth duration (day)
Sep. 10 sowing in nursery, Mar. 10 transplanting in main field	Mar. 21	Apr. 21	May 15	June 20	59	262
Sep. 20 sowing in nursery, Mar. 10 transplanting in main field	Mar. 24	Apr. 20	May 13	June 20	58	272
Sep. 30 sowing in nursery, Mar. 10 transplanting in main field	Apr. 9	Apr. 24	May 21	June 23	59	263
Sep. 15 sowing in nursery, Oct. 25 transplanting in main field	Mar. 25	Apr. 27	May 12	June 18	60	280
Drect seeding in Sep. 10	Mar. 15	Apr. 10	May 5	June 10	59	280
Drect seeding in Mar. 10	May 27	June 10	June 25	July 16	35	198
Mean ± SD	Mar.±16	Apr.±18	May±18	June±12	55±4.00	259±30.97

Table 2. Agronomic characteristics of rapeseed variety Yudal in Chungcheongnam Do region of Korea.

Treatment	Plant height (cm)	Ear length (cm)	No. of branches per plant	No. of pods per ear	Percentage of pod setting(%)	Pod length (cm)	Percentage of seed set(%)
Sep. 10 sowing in nursery Mar. 10 transplanting in main field	95	61	36	39	10.7	5.9	94
Sep. 20 sowing in nursery Mar. 10 transplanting in main field	81	60	33	37	11.1	6.0	97
Sep. 30 sowing in nursery Mar. 10 transplanting in main field	83	56	26	31	13.0	6.4	93
Sep. 15 sowing in nursery Oct. 25 transplanting in main field	105	62	43	49	10.3	6.2	100
Drect seeding in Sep. 10	108	62	36	49	13.0	6.4	100
Drect seeding in Mar. 10	102	49	8	39	8.4	5.9	92
Mean ± SD	95±11.47	58±5.09	30±12.24	41±7.09	11.1±1.74	6.1±2.36	96±3.52

Table 3. Yield characteristics of rapeseed variety Yudal in Chungcheongnam Do region of Korea

Treatment	Yield (10a)			Wt. of 1ℓ (g)	Wt. of 1,000 grains (g)
	Seed (kg)	Index	Seed capacity (ℓ)		
Sep. 10 sowing in nursery Mar. 10 transplanting in main field	296.3	96	431	689	3.3
Sep. 20 sowing in nursery Mar. 10 transplanting in main field	285.0	93	419	681	3.4
Sep. 30 sowing in nursery Mar. 10 transplanting in main field	281.3	92	426	662	3.1
Sep. 15 sowing in nursery Oct. 25 transplanting in main field	307.4	100	467	660	3.5
Drect seeding in Sep. 10	359.5	117	502	689	3.5
Drect seeding in Mar. 10	119.4	39	180	667	2.5
Mean ± SD	275±81.23	-	404±114.18	674±13.32	3.2±0.38

autumn sowing of yield components at the Chungcheongnam Do (Daejun) area of Korea.

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