

Changes of forage and grain yield by seeding date and rate in mountain area winter Oat(*Avena sativa* L.)

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Objectives

Oat grain and forage are useful feeds for race horse. Race horse farm, which is 500 horse stable being construction in Jangsu, Jeonbuk. This study was conducted to find out the effect of seeding date and rate on forage and grain yield in mountain area winter Oat.

Materials and Methods

1. Variety : Samhangwiri
2. Seeding date and rate : Sep. 25, Oct. 5, 15 and 15, 20, 25kg per 10a.
3. Plot design : split-plot design
4. Survival rate was examined by whether regrowth of stem and root or no at 20days after cutting(stem 2.5cm, root 1.2cm) and planting on sand pot.
5. Ion leakage rate was examined by rate of 3 hours shaking conductivity(200mg in 20ml D.W.) to total(autoclave) conductivity.

Results and Discussion

Before winter, number of leaves in main stem were 5.0, 4.2, 3.5 in 03/04 year and 6.3, 5.8, 4.7 in 04/05 year, stage of spike differentiation was IV, II, I in 03/04 year, and VII, III, II in 04/05 year at Sep. 25, Oct. 5, Oct. 15, respectively. After winter, withered leaf rate was lower and survival rate was higher as seeding date was late. Cold injury was the lightest in Oct. 5 seeding date. Difference of heading date in Sep. 25 and Oct. 15 seeding date was 3 and 7 days in 03/04, 04/05 year, respectively. Forage yield was the heaviest in Oct. 5 seeding date and more heavy above 20kg seeding rate. Grain yield was heaviest in Oct. 5 seeding date, and 25kg seeding rate.

Table 1. Change of plant growth and spike differentiation before wintering and cold injury after wintering by seeding date and rate.

seeding date	year	before wintering(late-Dec.)				after wintering(mid-Feb.)				
		plant height (cm)	No. of leaf (per stem)	spike length (mm)	spike differentiation stage (I ~ X)	withered leaf rate (%)	survival rate (%)	Ion leakage rate (%)	cold injury degree (1~9)	
Sep. 25	03/04	14.0	5.0	0.6	4	55.4	80	25.2	5	
	04/05	19.7	6.3	1.6	7	62.7	82	28.3	5	
Oct. 5	03/04	9.7	4.2	0.4	2	44.0	91	19.0	3	
	04/05	16.1	5.8	0.5	3	57.7	94	15.9	3	
Oct. 15	03/04	9.0	3.5	0.3	1	31.7	100	15.5	3	
	04/05	11.1	4.7	0.4	2	57.5	100	20.9	5	

Table 2. Heading date and forage yield by seeding date and rate,

seeding date	seeding rate (kg/10a)	heading date		fresh yield (kg/10a)		dry matter rate (%)		dry matter yield (kg/10a)	
		03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05
Sep. 25	15			2,556 b	2,518 b	29.9	33.5	751	840
	20	May 6	May 8	2,767 ab	2,704 ab	28.2	33.2	780	899
	25			2,978 a	2,995 a	27.7	33.9	825	1,017
mean				2,767	2,739 B	28.6	33.5	779	919
Oct. 5	15			2,689	3,316	29.8	32.2	777	1,064
	20	May 8	May 11	2,883	3,328	28.3	32.2	811	1,073
	25			3,250	3,444	27.5	31.3	872	1,071
mean				2,941	3,363 A	28.5	31.9	829	1,069
Oct. 15	15			2,711	2,074	29.9	30.9	772	642
	20	May 9	May 15	2,839	2,130	28.3	30.2	801	644
	25			2,867	2,483	27.7	30.6	800	760
mean				2,806	2,229 C	28.6	30.4	791	682

Duncan's multiple range test

03/04 : seeding date NS, seeding rate **, seeding date×seeding rate NS

04/05 : seeding date **, seeding rate *, seeding date×seeding rate NS

Table 3. Grain yield and yield component by seeding date and rate

seeding date	seeding rate (kg/10a)	stem length (cm)		panicle length (cm)		No. of panicle (per m ²)		No. of grain (per panicle)		1,000 grain weight (g)		grain yield. (kg/10a)	
		03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05
Sep. 25	15	77	67	16.2	17.2	822	678	33	37	34.2	35.2	524	427b
	20	79	64	16.0	16.7	981	724	31	34	35.1	35.4	531	457b
	25	78	64	15.8	16.0	1,049	860	30	34	34.3	35.4	571	518a
mean		78	65	16.0	16.6	951	754	31	35	34.5	35.3	542	467c
Oct. 5	15	73	72	15.0	16.5	1,083	1,019	27	34	35.1	36.5	541	648
	20	76	71	15.2	16.7	1,148	1,063	25	37	35.8	36.6	574	664
	25	77	69	15.1	15.9	1,293	1,118	24	34	34.7	36.6	607	718
mean		75	71	15.1	16.4	1,175	1,067	25	35	35.2	36.6	574	677a
Oct. 15	15	72	63	15.0	16.0	1,076	978	26	34	33.7	35.3	522	570
	20	72	62	14.9	16.3	1,156	1,009	25	35	33.7	36.2	564	579
	25	73	62	14.5	15.8	1,291	1,173	24	30	33.9	36.8	598	628
mean		72	62	14.8	16.0	1,174	1,056	25	33	33.8	36.1	561	592b

Duncan's multiple range test

03/04 : seeding date NS, seeding rate NS, seeding date×seeding rate NS

04/05 : seeding date **, seeding rate *, seeding date×seeding rate NS