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**FORAGE YIELD AND NUTRITIVE VALUE OF SPRING OATS
FOR VARIOUS CULTIVARS AND PLANTING DATES
AT THE MIDDLE MOUNTAIN AREA**

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Abstract

The experiment was carried out to determine the optimum cultivars and effects of planting date on growth, forage yield and nutritive value of spring sown oats (*Avena sativa* L.) at the middle mountainous area, Namwon, NLRI, Korea, 1998. The cultivars used in this study was Cayuse, Swan, Foothill, Cashel, Martlock and Winjardie, and the planting dates were 9, 14, 19, 24 and 29 March, and all the forages were harvested on 9 June. Swan among spring oats was the earliest heading type (21 May), and then Martlock (25 May), Winjardie (27 May), and Foothill was the latest (14 June). Dry matter yield was not significantly different ($P>0.05$) among six spring oats, except Martlock. Nutritive value was higher in late-maturing cultivars than those of early-maturing types. As the planting date was earlier, the heading date was shortened, and the forage yield was tended to increase. In conclusion, spring oats can be successfully produced by seeding of early March using early-maturing cultivars for more forage production, hay-making during late May, and planting of subsequent forages at the mountainous area in Korea.

Keyword : Spring oats, cultivar, planting date, forage yield, nutritive value.

Introduction

Forage oats (*Avena sativa* L.) is one of the main forage crops in Korea, it usually produce good quality forages in both spring and autumn season. Kim and Kim (1992) reported that the cultivar of spring oats was recommended early-maturing type for hay production, but middle- and late-maturing cultivars were better for soiling and grazing. Generally it has been recommended that spring oats be planted as early in the season as possible to maximize yields. The early seeding of spring cereals was an important factor for obtaining maximum yields on all soils, in Quebec, Canada (Rioux et al., 1986). Similar results were reported with spring oats in Ohio, USA (Gooding and Lafever, 1991), and in Suwon, Korea (Kim and Kim, 1992). The promising cultivar and harvesting date of spring oats were reported well by Kim and Kim (1994) at the plain area in Korea. However, little information is available on the optimum cultivar and planting date of spring oats at the middle mountainous area. The objectives of the study, therefore, were to determine the effects of cultivars and planting dates on growth, forage yield and nutritive value of spring oats at the middle mountain area in Korea.

Material and Methods

The experiment was conducted at the Namwon Branch Institute located at 450m above sea level, National Livestock Research Institute, RDA, Korea in 1998. In experiment 1, the six cultivars of oats (Cayuse, Swan, Foothill, Cashel, Martlock and Winjardie) were used, and the seeds were sown on 19 March, and harvested on 9 June. In experiment 2, the five planting dates of oats (9, 14, 19, 24 and 29 March) were treated with Swan cultivar, and the forages were harvested on 9 June. Two experiments were arranged as a randomized block design with three replications. The 150kg N, 120kg P₂O₅ and 120kg/ha K₂O were applied prior to

planting, and the seeds were broadcasted 150kg/ha of seeding amount. Plant height, heading date, dry matter (DM) yield, crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), and *in vitro* dry matter digestibility (IVDMD) were investigated.

Results and Discussion

The heading date, forage yield and nutritive value of spring oats as affected by cultivars are shown in Table 1. Swan among six cultivars was the earliest-maturing type, and then Martlock, Winjardie, and Cashel. Foothill was the latest, and the difference of heading date between the earliest 'Swan' and the latest 'Foothill' was 24 days. However, similar forage yield was obtained in all cultivars, and ranged from 8,842kg (Foothill) to 10,169kg/ha (Cashel), except Martlock (6,272kg).

The contents of CP of spring oats were higher in late-maturing types Cayuse (18.2%) and Foothill (16.8%) than those of early-maturing Swan (12.5%), Martlock (12.2%) and Winjardie (13.1%). The contents of ADF and NDF were high in Swan, the earliest maturing type. IVDMD was higher in Cayuse (74.2%) and Foothill (65.5%) of late-maturing type than those of early-maturing cultivar, Swan (54.9%), and so on.

As the results of the experiment, the early-maturing type of spring oats might be preferable in situation where hay-making is important because they produce higher DM content forage than mid- and late- maturing oats during the season of late May and early June, which represents the optimum month of hay-making in Korea (Kim and Kim, 1992, 1994). Also after harvest spring oats farmers can cultivate sorghum×sudangrass hybrid during June to September.

The heading date, DM yield and nutritive value of spring oats 'Swan' as affected by planting date are described in Table 2. The heading dates were delayed as the planting dates were delayed, and the difference of heading date between 9 March and 29 March of planting

date was 5 days. Forage yield tended to decrease as the planting dates were delayed, however, the contents of CP, ADF, NDF and IVDMD were not consistent among treatment. Therefore, early seeding of spring oats seems to be recommended for early harvest in late spring season.

In conclusion, seeding early-maturing cultivar (for example Swan) of spring oats by early March is strongly recommended for more forage production, hay-making, and subsequent forage planting, such as sorghum×sudangrass hybrid in late May.

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Table 1 - Heading date, forage yield, and nutritive value of spring oats as affected by cultivars.

Cultivar	Heading date	DM yield (kg/ha)	Nutritive value (dry wt., %)*			
			CP	ADF	NDF	IVDMD
Cayuse	11 June	9,010 ^a	18.2	32.2	53.2	74.2
Swan	21 May	8,908 ^a	12.5	39.9	68.1	54.9
Foothill	14 June	8,842 ^a	16.8	34.2	58.3	65.5
Cashel	4 June	10,169 ^a	11.1	31.6	57.5	63.4
Martlock	25 May	6,272 ^b	12.2	34.5	62.7	56.9
Winjardie	27 May	9,134 ^a	13.1	35.8	64.3	62.8

Value in row with different superscript letters is significantly different ($P<0.05$).

* The samples within three replications were mixed for chemical analysis

Table 2 – Heading date, forage yield, and nutritive value of spring oats ‘Swan’ as affected by planting dates.

Planting date	Heading date	DM yield (kg/ha)	Nutritive value (dry wt., %)*			
			CP	ADF	NDF	IVDMD
9 March	20 May	7,112a	11.5	34.2	60.7	65.8
14	22	7,030a	12.8	30.8	57.3	70.7
19	23	5,733c	11.8	32.2	60.0	71.2
24	23	6,508b	12.0	37.3	62.1	68.0
29	25	6,783b	13.8	29.7	54.5	73.6

Value in row with different superscript letters is significantly different ($P < 0.05$).

- The samples within three replications were mixed for chemical analysis