

DRY MATTER PRODUCTION AND NUTRITIVE VALUE OF WILD ALFALFA

C.N. Shin

Keimyung Junior College, Daemyung-dong, Namgu, Daegu, Korea

ABSTRACT

Alfalfa grows wild in some parts of Korea, but specific information is lacking as to its agronomic characteristics, nutritive value and dry matter production potential. The objective of this study was to evaluate the usefulness of wild alfalfa (*Medicago sativa* L) as a forage. Wild alfalfa and Vernal were field sown at Keongsan, Keongbuk in the spring of 1995. Emergence for Vernal was better than for wild alfalfa. It was observed that the flowering date of the wild alfalfa was delayed by 8 days. Regrowth of Vernal was better than that of the wild alfalfa at each harvesting. After the last harvesting date, September 22, there was no regrowth of the wild alfalfa, but regrowth of Vernal measured 37cm. Weed infestation in the wild alfalfa plots was higher than in the Vernal plots. The dry matter yields per hectare were significantly ($P<0.05$) higher for Vernal than for the wild alfalfa.

KEYWORDS

Wild alfalfa, agronomic characteristics, dry matter production, NDF, ADF, crude protein

INTRODUCTION

One of the great limitations of Korean forage production is the lack of a proper forage species adapted to Korean climate and environmental conditions. Most of our best forage crops were introduced from foreign countries. Korean lespedeza was introduced to the U.S. in 1919. Most of the annual lespedeza seed now produced in the U.S. is from Korean cultivars. Annual lespedezas are used widely for pasture and soil conservation (Hoveland and Donnelly, 1985).

All species in the genus *Medicago* are called Moksuk in Korean. Moksuk has been cultivated as a vegetable and for forage since the Yi Dynasty more than 1000 years ago (Kim, 1983). However there are no available research results to tell us if it was an important forage crop. Yoon (1995) and Kim et al. (1988) reported that wild alfalfa grows in Korea, but specific information is lacking as to its agronomic characteristics, nutritive value and dry matter production potential. At this point, it is necessary to evaluate wild alfalfa.

The objective of this study was to evaluate the usefulness of wild alfalfa as a forage. Specific objectives were: 1) to evaluate the agronomic characteristics, adaptation of climate, soil and disease resistance; 2) to determine dry matter production; and 3) to compare the chemical composition of wild alfalfa and Vernal.

METHODS

The experiment was carried out in 1995, at Keongsan, Keongbuk. A randomized block design was used, with cultivars as treatments. There were four replications and each plot size was 6m² (1.5m x 4m).

Vernal, one of the recommended cultivars of *Medicago sativa* in Korea was sown March 28 along with wild alfalfa. The seeding rate was 20kg per hectare. Nitrogen, in the form of urea, was applied at seeding time at the rate of 50kg of nitrogen per hectare. Phosphorus and potassium also were applied at the rate of 200kg and 100kg per hectare, respectively. Additional potassium was applied at the rate of 35kg per hectare after each cut.

Germination test conditions were as follows: Seeds were germinated on moistened filter paper in covered Petri-dishes at 20°C incubation.

Evaluations of emergence, regrowth, weed and disease resistance were made visually by giving numbers from 1-9, 1 being the worst and 9 the best. Plant heights were measured before the first cutting. Dry matter content of forage samples was determined by oven drying at 85°C for 48 hours. Samples for chemical analysis were oven dried at 65°C for 24 hours. Samples were ground so as to be able to pass through a one millimeter screen. Nitrogen content was determined by Kjeldahl analysis (AOAC, 1980). Neutral detergent fiber (NDF) and acid detergent fiber (ADF) were measured by the Goering and Van Soest method (1970).

RESULTS AND DISCUSSION

Agronomic characteristics. A summary of the agronomic characteristics appears in Table 1. Wild alfalfa seeds had a germination rate of 63% in the germination test and emergence for Vernal was better than for wild alfalfa. The first flowering dates, in the first cutting, were June 8 and June 17 for Vernal and wild alfalfa, respectively. Fifty percent flowering was observed June 19 for Vernal and June 27 for wild alfalfa. Vernal flowered 8 days earlier than wild alfalfa. The wild alfalfa flowers, had petals which were various shades of purple. Those of Vernal were also mainly purple, but there were quite a few yellows and some whites. The semi-spreading stems of the wild alfalfa reached a height of 69cm and the erect stems of the Vernal were 73cm in height at the first cut. Regrowth for wild alfalfa was poor and it was not as good as that of Vernal. After the last cutting in the fall (Sept.22), Vernal was about 37cm high before the first killing frost. Weed infestation of the wild alfalfa plots was higher than for Vernal plots, because there was no regrowth of the wild alfalfa after the last harvesting.

Dry matter production. A summary of the dry matter production appears in Table 2. The dry matter yields per hectare were significantly ($P<0.05$) higher with Vernal than with wild alfalfa. Vernal produced 7.5% more dry matter yield than wild alfalfa. The dry matter yields of the wild alfalfa per hectare decreased more than Vernal with advancing cutting frequency.

Chemical composition. Crude protein, NDF and ADF are shown in Table 3. They were not different in the first and second cuttings. However the CP content was slightly higher in the wild alfalfa in comparison to Vernal and NDF and ADF were lower in the third cut.

REFERENCES

- Association of Official Agricultural Chemists.** 1980. Official method of analysis(22th Ed.) Washington D.C.
- Goering, H.K., and P.J. Van Soest.** 1970. Forage fiber analysis. Agr. Handbook 397, ARS, USDA, Beltsville
- Hoveland, C.S. and E.D. Donnelly.** 1985. The lespedezas. Pages 132-135 in Heath et al. Forages 4th Ed. The Iowa State Univ. Press Ames, Iowa.
- Kim, H.S., S.J.Lee, H.S.Park and M.G.Kim.** 1988. Illustrated flora. Scientific Encyclopedia Chonghap press. PP 296-297.
- Kim, Y.J.** 1983. Importation of *Medicago denticulata* wild and cultural practices. Korean Grassl. Sci. **4(2)**:81-88.
- Yoon, I.S.** 1995. Principle of grassland science. Hyang Moon Sa, Seoul, Korea, PP 169.

Table 1

Agronomic characteristics of wild alfalfa and Vernal

Cultivars	Emergence	Flowering date	Plant height	Regrowth	Weed	Disease resistance
	—(1-9) ^x —		—cm—		—(1-9)—	
Wild alfalfa	7	June, 27	69	5	6	9
Vernal	9	June, 19	73	9	8	9

^x(1-9): 9 being the best and 1 the worst**Table 2**

Dry matter yield of wild alfalfa and Vernal

Cultivars	Dry matter yield				LSD(0.05)
	First cut	Second cut	Third cut	Total	
	----- kg/ha -----				
Wild alfalfa	6,130	4,729	1,550	12,409	721
Vernal	5,266	5,159	2,918	13,343	

Table 3

Crude protein(CP), neutral detergent fiber(NDF) and acid detergent fiber(ADF) content of the wild alfalfa and Vernal

Harvest	Wild alfalfa			Vernal		
	CP	NDF	ADF	CP	NDF	ADF
	-----%, DM basis-----					
First	20.0	50.9	33.7	20.9	50.0	33.6
Second	20.1	49.4	33.0	20.2	51.0	35.0
Third	22.0	47.1	29.2	18.8	53.8	36.0