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Comparison of productivity among alfalfa varieties with different fall dormancy

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Key words alfalfa, dry matter, fall dormancy, variety, productivity

Introduction Alfalfa is one of the most widely grown perennial forage crops in China and worldwide, due to its wide adaptation, yield potential and high nutritive value. Fall dormancy (FD) is one of the most important traits in alfalfa (*Medicago sativa* L.) grown in northern climates. Dry matter production of varieties with different FD levels is needed for predicting the yield potential. The objective of this research was to compare the yields of selected alfalfa varieties with different FD from foreign countries and domestic regions in China, and consequently to evaluate their yield traits including annual and individual cutting DM yields of different FD class alfalfa. The results will provide scientific data for selecting suitable alfalfa varieties and extending their use in Henan Province, China.

Materials and methods This research was undertaken for four consecutive years (2002-2005) with five cuts per year to identify and compare the variability in dry matter (DM) yields of 42 alfalfa varieties with FD classes ranging from 2 to 9 in Henan Province, China. All data were analyzed with one-way ANOVA and Duncan multiple comparisons by the general linear model procedure of SAS V.6.12 software (SAS Institute, 1996).

Results and discussion The DM yield in alfalfa differed among the four production years for all FD classes. The annual herbage yields in 2004 or 2005 were higher than those in 2002 or 2003. Climatic conditions (rainfall and mean daily air temperature) for growth showed a significant effect on the annual dry-matter yield, especially in 2003. The yield in 2004 was similar to that in 2005. The varieties at FD class 2 (dormant) and class 4 (semi-dormant) produced the greatest DM yield, which were significantly higher than non-dormant varieties of FD classes 7-9. However, there were no differences in DM yields of varieties among FD classes 3, 5, 6, 7, 8 and 9. No significant correlation between FD classes and DM yields, but notable differences in DM yields among the varieties with identical FD class were found, suggesting that the FD should not be used as the main index of introducing forage varieties into temperate regions such as central China. For all varieties, DM yield for the first cut was the highest, reduced gradually for the subsequent cuts, and was the lowest for the final cut each year, indicating the larger influence of growing seasons than that of the FD class. In central China such as Henan Province, the growth conditions from March to May were suitable for plant growth and resulted in the highest herbage yield for most varieties in the first cutting. However, growth period at the second and the third cutting time was shorter than that of the first one, which will begin to bloom about 28 days, (comments: not clear, re-writing is needed) and was cut monthly from May to June, so their yields were lower than that of the first one. The herbage yields difference in the fifth cutting was a reflection of the FD of the different alfalfa varieties.

Conclusions There was a significant varietal difference in yields within FD class, so we should pay more attention to those varieties with high yield instead of a particular FD class. Significant or highly significant differences were also indicated in yields among the five cutting times of each year.