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The XXI International Grassland Congress / VIII International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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Fractions of crude protein in soybean ecotypes and cultivars

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Key words: soybean cultivars, wild soybean, crude protein, fraction, concentration

Introduction Some temperate grasses and legumes had been tested for CP fractions (Elizalde et al., 1999). The objective of this experiment was to analyze and compare the CP fractions in forages of soybean cultivars and wild soybean ecotypes as affected by maturity.

Materials and methods The experiment was conducted on a sandy loam soil with pH 7.3. Three wild soybean ecotypes (designated as HLW-18, SDW-12 and FJW-9) and two soybean cultivars (LDS-9 and QHS-31) were planted. The plants were sampled every 10 days starting from 40 days post planting. CP in samples was fractionated and analyzed according to Krishnamoorthy et al. (1982). The five fractions were classified as Fraction A is nonprotein nitrogen (NPN), B is true protein and C is unavailable true protein. Fraction B is further divided into three fractions (B1, B2 and B3). B1 is soluble in phosphate-borate buffer, B2 is insoluble in buffer but soluble in neutral detergent, and B3 is insoluble in buffer and in neutral detergent, but is soluble in acid detergent. Data were analyzed using the GLM procedures of SAS.

Results and discussion The regression equations for wild soybean ecotypes and soybean cultivars to predict CP concentration and CP fractions were showed in Table 1. CP concentration, Soluble CP, Fraction A, Fraction B1 and Fraction C in soybean cultivars averaged across sampling dates were all higher than wild soybean ecotypes ($p < 0.05$), but Fraction B2 and Fraction B3 in soybean cultivars were lower than in wild soybean ecotypes. CP concentration decreased with delay of sampling dates for soybean cultivars and wild soybean ecotypes. Soluble CP, Fraction A and Fraction B1 in soybean cultivars was increasing with delay of sampling dates, while those of wild soybean ecotypes were decreasing. The trend of Fraction B2 and Fraction B3 changes were different for soybean cultivars and wild soybean ecotypes. Fraction C was increased with delay of sampling dates both in soybean cultivars and wild soybean ecotypes.

Table 1 Regression equations for wild soybean ecotypes and soybean cultivars to predict crude protein (CP) composition on days starting from 40 days after planting (DAP).

CP fraction	Cultivars or ecotypes	Composition equation	Slope significance	R ²
CP,	Soybean cultivars	Y=28.8-0.075 x Day	a	0.88
% DM	Wild soybean ecotypes	Y=27.1-0.172 x Day	b	0.93
Soluble CP %	Soybean cultivars	Y=31.2+0.206 x Day	a	0.79
CP	Wild soybean ecotypes	Y=36.1-0.107 x Day	b	0.76
Fraction A,	Soybean cultivars	Y=20.3+0.134 x Day	a	0.87
% CP	Wild soybean ecotypes	Y=25.8-0.077 x Day	b	0.93
Fraction B1,	Soybean cultivars	Y=10.9+0.072 x Day	a	0.91
% CP	Wild soybean ecotypes	Y=10.2-0.03 x Day	b	0.92
Fraction B2,	Soybean cultivars	Y=48.3-0.109 x Day	a	0.86
% CP	Wild soybean ecotypes	Y=51.5-0.032 x Day	b	0.67
Fraction B3,	Soybean cultivars	Y=11.3-0.017 x Day	a	0.91
% CP	Wild soybean ecotypes	Y=16.5+0.0166 x Day	d	0.84
Fraction C,	Soybean cultivars	Y=2.1+0.125x Day	a	0.83
% CP	Wild soybean ecotypes	Y=1.2+0.101x Day	b	0.93

Conclusions The experiment showed that CP concentration and fractions in soybean cultivars were different from wild soybean ecotypes. The difference was due to the larger proportion of high-quality grain in soybean cultivars and different growth and development stages.

References

- Elizalde, J.C., N.R. Merchen, and D.B. Faulkner. 1999. Fractionation of fiber and crude protein content in fresh forages during spring growth. *J. Anim. Sci.* 77:476-484.
- Krishnamoorthy, U., T.V. Muscato, C.J. Sniffen, and P.J. Van Soest. 1982. Nitrogen fractions in selected feedstuffs. *J. Dairy Sci.* 65:217-225.