Evaluation of Seed and Forage Yield of *Lathyrus sativus* L. in China and Ethiopia

Y. P. Wu
Lanzhou University, China

Yanrong Wang
Lanzhou University, China

J. Hanson
International Livestock Research Institute, Ethiopia

Z. B. Nan
Lanzhou University, China

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Y.P. Wu[1], *Y.R. Wang*[1], *J. Hanson*[2], *and Z.B. Nan*[1]
[1] *College of Pastoral Agriculture Science and Technology, Lanzhou University, China;* [2] *International Livestock Research Institute, Ethiopia E-mail: yrwang@lzu.edu.cn*

Key words: *Lathyrus sativus*, seed yield, forage yield, genetic and environmental interaction, China, Ethiopia

Introduction Grass pea is an important grain crop in both Ethiopia and China due to its tolerance to drought. The seed yield of grass pea is usually stable due to its tolerance to adverse environments, but it is influenced by genotype and environment (Hanbury *et al*., 1999). Detailed information on diversity in seed and forage yield due to genotypic differences is urgently required to efficiently utilize the genetic potential of forage grasspea collections for crop improvement through selection or hybridization.

Materials and methods Fifty accessions obtained from ICARDA were sown by hand in two environments in Yuzhong China (CHN) and Debre Zeit Ethiopia (ETH) in a completely random block design with 3 replicates to assess environmental effects. Plot size was 3.5x2.0 m; spacing between rows and plants was 30 cm and spacing between plots and blocks was 1 and 1.5 m, respectively. The depth of sowing was about 5 cm. Fertilizer (phosphate and urea, 787 kg/ha^2) and water (3000 t/ha^2) was applied before sowing. Plant density per plot was a maximum of 84 plants. At seed maturity, 1 m^2 quadrants were harvested per plot and seed (SY) and dry forage yield (FY) weighed.

Results Seed and forage yield were significantly affected by environment and genotype (Table 1). Most accessions achieved higher seed and forage yield in ETH; the average seed yield was 0.96 t/ha and the average forage yield was 1.48 t/ha in ETH with 0.82 t/ha and 0.50 t/ha respectively in CHN (Figure 1, 2). Considerable variation in seed and forage yield, ranging from 0.39 to 1.55 t/ha and from 0.30 to 2.17 t/ha respectively, was observed among the 50 accessions. This implies high genetic diversity and potential for selection among these materials. Accessions in quadrants Ⅱ, especially accession 5360, performed well in seed yield in China and Ethiopia, implying broad adaptability and high potential for further development (Figure 1, 2). Accessions 5340, 5351 and 5360, showed both a high forage and seed yield and have potential to be used as a dual purpose crop for both food and feed in China (Figure 1), and 5335, 5316 and 5360 in Ethiopia (Figure 2).

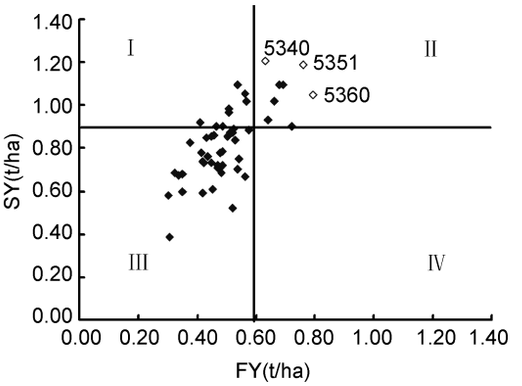

Figure 1 *Seed and forage yield in China.*

Table 1 *Analysis of variance of SY and FY for a two-site evaluation of 50 grasspea accessions.*

Source	P(SY)	P(FY)
Environment	<0.000****	<0.000****
Genotype	0.030*	<0.000****
G×E	0.252	0.0007***
CV%	32.78	24.92

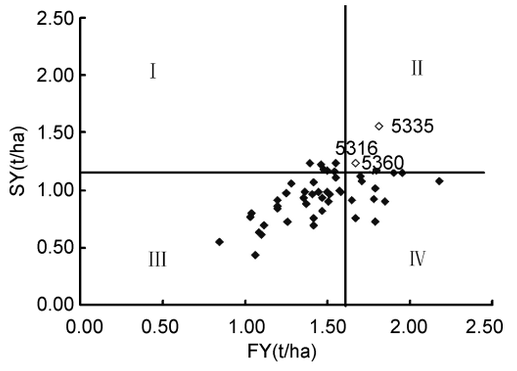

Figure 2 *Seed and forage yield in Ethiopia.*

Conclusions One accession (5360) with broad adaptability for seed yield and five accessions (5340, 5351, 5360, 5335 and 5316) with good seed and forage yield have potential for future breeding and crop improvement. Further work should be done to collect more information on them, such as toxin content and biotic and abiotic stress tolerance to identify the best accessions for use in grasspea breeding programs for food and feed.

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Reference

Hanbury, C.D., K.H.M. Siddique, N.W. Galwey & P.S. Cocks (1999). Genotype-environment interaction for seed yield and ODAP concentration of *Lathyrus sativus* L. and *L. cicera* L. in Mediterranean-type environments. *Euphytica*, 110, 45-60.