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Comparative study on yield and yield components of psyllium *Plantago ovata* varieties in Balochistan

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Abstract
A research trail was carried out to check the comparative yield and yield components of three blond psyllium (*Plantago ovata* Forsk.) genotypes namely Variety-1 Plantago amplexicaulis, Variety-2 Ispaghol and Variety-3 Plantago coronopus in Balochistan. The highest grain yield (1250) kg/ha was recorded from 120 plant density by the variety-1 (Plantago amplexicaulis), followed by 1160 grain yield kg/ha was produced from 89 plants density by variety-2 (Ispaghol) whereas the lowest (780) grain yield kg/ha was recorded from 62 plant density by variety-3 (Plantago coronopus). The different parameters studied during investigation like plant height, Plant density, Spike length, number of tillers, total dry matter and grain yield were undertaken. The results considered that the variety-1 Plantago amplexicaulis gave 7% to 37% more yield and income than other varieties.

Keywords: Balochistan, comparative yield, yield components, *Plantago ovate* varieties

Introduction
Plantago ovata - Psyllium plant belongs to Plantaginaceae family and hence seeds are in dry and grow well in arid climatic condition. The genus *Plant ago* comprises of 200 species, of which 10 occur in India. *Plantago ovata* is an annual herb, which attains a height of 30 – 45 cm under cultivation. *Plantago ovata* is a 119- to 130-day crop that responds well to cool, dry weather. (*P. psyliium* L.) are the two annual species that have originated from arid and semi-arid zones and are used widely in traditional and industrial pharmacology (Patel *et al*., 1996) [11].

The coating of the seed provides the husk on mechanical milling. The seeds and husk are used for medicinal purpose. Helps in reducing risk of heart attack by decreasing serum cholesterol through proper excretion of bile acids. Consumed daily with water/milk after the meals to reduce constipation, fat and calories. The seed of Isphgol contains mucilage (10-12%), fatty oil (5%) and large quantities of albuminous mater which is a pharmacologically inactive glucoside (Chevallier, A., 1996) [7].

Psyllium seeds are harvested in the month of April and May. *Plantago Ovata* is the cultivated and economically important species in the monotypic genus *Plantago.* Moisture is deficient which has a moderate water requirement, is given 5 to 6 light irrigations. The fields are generally irrigated prior to seeding to achieve ideal soil moisture, to enhance seed soil contact, and to avoid burying the seed too deeply as a result of later irrigations or rainfall. Maximum germination occurs at a seeding depth of 6 mm (1/4 in). Seed is broadcast at 5.5 to 8.25 kg/hectare. Industrially used as basic stabilizer in ice-cream, sizing in chocolate, seed mucilage are also used in cosmetics. Psyllium seed husks are mainly used to treat constipation. It increases the passage to the bowel content through formation of bond water. The mucilage contents forms bond with water and hence creates a surface of mucous membrane, forming a sticky masses, which are not easily distributed. Hence this avoids watery outlet during Diarrhea and dysentery. The content has cellulose fiber, which is responsible for decreasing the absorption of cholesterol into the blood stream. The fiber content reduces the release of dietary sugar from the digestive tract into the blood stream, thus assisting in the stabilization of blood sugar level.

Ethno botanical or traditional Used in herbal systems of India and China to treat diarrhea, hemorrhoids, bladder problems, Diverticular diseases, Urinary disorder, Coronary heart diseases and high blood pressure. The seeds contain 18.8% protein, 19% fiber, 10-20% oil, adenine aucubin, choline mucilage, and plantenolic and succinic acid (Duke 1985) [9]. When plants turned yellow and spikes turned brown, they were harvested (Najafi & Moghadam, 2002) [10].

Shortage of water in arid and semi-arid parts of this region where annual precipitation is less than 220mm with almost no rainfall during the summer is a prominent limiting factor of crop production. In regions where water scarcity is the principal limiting factor for cultivation, farmers are interested in growing crops that are able to adapt to drought conditions (Muchow, 1989, Bannayan *et al*., 2008) [5, 9]. Aim of study to check the comparative yield and yield components of three varieties of blond psyllium (*Plantago ovata* Forsk.) and check the performance of *plantago ovata* varieties in the environment of Quetta Balochistan Pakistan.

Materials and Methods

This study was carried out on three blond psyllium (*Plantago ovata* Forsk.) genotypes namely Variety-1 Plantago amplexicaulis, Variety-2 Ispaghol and Variety-3 Plantago coronopus in Balochistan during rabbi season 2010- 2011. Each variety was replicated three time in randomized complete block design. The plot size was 8m x 10m = 80 m^2 in each treatment. Seed @ 5kg/ha was applied. Healthy Seeds of 3 *Plantago ovate* F varieties obtained from National Agricultural Research Centre Islamabad. Seeds of varieties were sown in the depth of 2 to 3 cm of soil level using broadcasting method. Limited irrigation was applied at vegetative growth and at heading stage. Weed control process was implemented in the mechanical way with the aid of hands. Data were recorded at the time of maturity in terms of Plant height, Number of tillers/plant, Plant Density, Spike length while the Total dry matter and grain yield was at harvesting time. All observations were analyzed by using the Fisher's analysis of variance techniques and difference among varieties means were compared by using the LSD test at $p<0.05$ (Steel and Torrie, 1984) [15].

Table 1: Comparative study on yield and yield components of psyllium (*Plantago ovata*) varieties

Treatments	Plant height(cm)	Number of tillers/plant	Plant Density	Spike length (cm)	TDM Kg/ha	Grain yield kg/ha
Variety-1 Plantago amplexicaulis	34 A	32 A	120 A	4	3280 A	1250 A
Variety-2 Local Ispaghol	31 A	21 AB	89 AB	4	3020 A	1160 A
Variety-3 Plantago coronopus	15 B	12 B	62 B	3	2240 B	780 B
	*	**	*	NS	*	*

Results and Discussion

Plant height: The data presented in table-1 indicated that maximum (34 cm) plant height was produced by variety-1 (Plantago amplexicaulis) whereas minimum (15 cm) plant height was given by the variety-3 (Plantago coronopus). Differences in genetic makeup of varieties may have been the cause of these differences and significant differences among the varieties regarding plant height have also been reported by Chohan *et al.* (2004) [6] and Hussain *et al.* (2005) [8].

Number of tillers/plant: The results illustrated in table-1 that Maximum (32) Number of tillers/plant was observed in variety-1 (Plantago amplexicaulis) whereas minimum (12) Number of tillers/plant was produced by variety-3 (Plantago coronopus). The variety produced significantly higher number of tillers m-2 than all other varieties having number of tillers m-2, number of leaves, leaf area per plant and number of tillers m-2 reported by Chohan *et al.* (2004) and Hussain *et al.* (2005) respectively.

Plant Density: The table-1 revealed that maximum (120) plant density was obtained by variety-1 (Plantago amplexicaulis) whereas minimum (62) plant density was produced by variety-3 (Isphgol). Wajid *et al*., 2004) showed that plant population had significant effect on yield components. This result agree with those given by Najafi and Moghadam (2002) who revealed that with increase in the plant density (number of plants m-2) seed yield increased. Asgharipoor (2002) [3] also reported that higher seed rate produced more plants per square meter than lower seed rate in blond psyllium and that resulted in higher seed and biological yield. Plant population may affect the maximum availability and utilization of these factors. Therefore, it is necessary to determine the optimum density of plant population per unit area for obtaining maximum yields (Baloch *et al*., 2002) [4].

Spike length: The data pertaining to spike length are illustrated in table-1 that Maximum (4) Spike length (cm**)** was recoded from both varieties-1, 2 (Plantago amplexicaulis and Isphgol) whereas minimum (3) Spike length (cm**)** was obtained in variety-3 (Plantago coronopus). The effect of plant density on spike length was not significant. The results are confirmed by Najafi and Moghadam (2002) [10] reported that plant density had no significant effect on spike length in blond psyllium.

Total dry matter kg/ha: The data explain in table-1 indicated that Maximum (3280) total dry matter yield kg/ha was produced by variety-1(Plantago amplexicaulis) whereas minimum (2240) total dry matter yield kg/ha was obtained in variety-3 (Plantago coronopus). Amanullah *et al.* (2004) [1] stated that higher yields of fodder in oat cultivars can be possibly attributed to their greater leaf area, responsible for more photosynthetic activities, having high capacity to store assimilative products of photosynthesis.

Grain yield kg/ha: Grain yield (GY) results showed that maximum GY was recorded as 1250kg/ha from variety-1(Plantago amplexicaulis) whereas minimum GY was recorded as 780kg/ha from variety-3 (Plantago coronopus).Variety is another important factor contributing to yield. For every climate, there are varieties of different crops. Dasneepal and Raychaudhuri (2003) [7] and Lal *et al*. (1999) found significant differences in yields components of different blond psyllium varieties. Other studies (Angadi *et al*., 2003; Carr *et al*., 2003; Taj *et al*., 2003. Wajid *et al*., 2004) [14] showed that plant population had significant effect on yield components. The reduction of crop yield components by increasing plant population was due to greater inter-plant competition for incident light, soil nutrition and soil water in high plant density than low plant density (Sangoil, 2000) [12]. Randhawa *et al*. (1978) demonstrated that increase in seed yield by increasing seed rate in blond psyllium was due to the greater number of spikes per half meter length of row. There was a significant effect of plant density on seed yield. Plant density increased and seed yield increased. Plant density of

160 plants m-2 had the highest seed and biological yield and plant density of 80 plants m-2 had the lowest seed and biological yield. Therefore, this density may be the best for *Plantago ovata*. Increase in seed with increase in the plant density attributed to the greater number of plants per square meter in higher density. Our results agree with those given by Najafi and Moghadam (2002) [10] who revealed that as plant density increased, yield increased.

Conclusion

It was conclude from the present results that the variety-1 (Plantago amplexicaulis) gave the better performance in yield and yield attributes. It was also noted that the variety-1 Plantago amplexicaulis gave 7% to 37% more yield than other varieties. Therefore it is recommended that the variety-1 (Plantago amplexicaulis) is best for environment of Balochistan.

References

1. Amanullah PS, Zada K, Perveen S. Growth characters and productivity of oat varieties at Peshawar, Sarhad J. Agric. 2004; 20:5-10.
2. Angadi SV, Cutforth HW, McConkey BG, Gan Y. Yield adjustment by canola grown at different plant populations under semiarid conditions. Crop Sci. 2003; 43:1358-66.
3. Asgharipoor MR. Effect of sowing date and seed rate on yield and quality of blond psyllium (*Plantago ovata*). *M.S. Thesis*, Ferdowsi University of Mashhad, Iran. 2002.
4. Baloch AW, Soomro AM, Javed MA, Ahmed M, Bughio HR, Bughio MS *et al*. Optimum plant density for high yield in rice (*Oryza sativa* L.). Asian J Pl Sci. 2002; 1:25-7.
5. Bannayan M, Nadjafi F, Azizi M, Tabrizi L, Rastgoo M. Yield and seed quality of Plantago ovata and Nigella sativa under different irrigation treatments. Ind. Crops Prod. 2008; 27:11-16.
6. Chohan MSM, Naeem M, Khan AH, Kainth R, Sarwar M. Forage yield performance of different varieties of oat. Int J Agric Biol. 2004; 6:751-752.
7. Chevallier A. The encyclopedia of medicinal plants. Dorling Kindersley, London, 1996, 336.
8. Dasneepal M, Raychaudhuri SS. Estimation of genetic variability in *Plantago ovata* cultivars. Biologia Plantarum. 2003; 47:458-62.
9. Duke JA, Ayensu ES. Medicinal plants of China, Reference Publications, Inc., Algonac, 1985; 1-2:705.
10. Hussain A, Khan S, Bashir M, Hassan Z. Influence of environment on yield related traits of exotic oats cultivars. Sarhad J Agric. 2005; 21:209-213.
11. Muchow R. Comparative productivity of maize, sorghum and pearl millet in a semi arid tropical environment. II. Effect of water deficit. Field Crops Res. 1989; 20:207-219.
12. Najafi F, Moghadam PR. Effect of irrigation regimes and plant density on yield and agronomic characteristics of blond psyllium *(Plantago ovata*). J Agric Sci Technol. 2002; 16:59-65.
13. Patel BS, Patel JC, Sadaria SG. Response of blond psyllium (Plantago ovata) to irrigation and phosphorus. Indian J Agron. 1996; 41:311-314.
14. Randhawa GS, Sahota TS, Baines DS, Mahajan VP. The effect of sowing date, seed rate and nitrogen fertilizer on the growth and yield of blond psyllium (*Plantago ovata*). J Agric Sci Cambridge. 1978; 90:341-3.
15. Sangoil L. Understanding plant density effects on maize growth and development: An important issue to maximize grain yield. Ciência Rural. 2000; 31:159-68.
16. Wajid A, Hussian A, Ahmad A, Goheer A, Ibrahim RM, Mussaddique M. Effect of sowing date and plant population on biomass, grain yield and yield components of wheat. Int. J Agric Biol. 2004; 6:1003-5.
17. Steel RGD, Torrie JH. Principles and procedure of statistics. McGraw-Hill Book Company. New York. 1984.