

Brief Research Report

Evaluation of Different Varieties of Pea under Agro-Climatic Conditions of Gilgit-Baltistan

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ABSTRACT

Introduction

Pea (*Pisum sativum* L.) is an important crop which is used both as food and fodder purpose. Peas are highly nutritious; pea is used both as vegetable and pulse.

Materials and Methods

Five pea varieties were evaluated for their performance at mountain agricultural research centre (MARC), Juglote, Gilgit during 2017. The varieties are climax, pasan, rondo, meteor and green feast.

Results

Differences among plant heights of pea varieties were significant with maximum plant height of 85.25 cm noted in plots of variety climax, while the minimum plant height of 45.75 cm was recorded in plots of variety rondo. Number of branches per plant of the different varieties ranged significantly from a minimum of 2.15 (green feast) to a maximum of 4.00 (meteor). Average number of pods per plant varied significantly between 10.84 and 13.71. Maximum pods per plant were found from variety climax (13.71) followed by green feast (13.58). Maximum pod length of 7.90 cm was recorded for variety Rondo, followed by variety green feast with pod length of 5.80 cm, while the minimum of 5.220 cm was recorded for the variety meteor. Maximum pod weight 26.29 kg per plot was obtained from variety climax, followed by 21.75 kg per plot from variety green feast, the minimum pods weight was recorded for variety meteor 16.20 kg per plot. Difference in pods yield of the five varieties were significant, with a maximum pods yield of 3585 kg per hectare recorded for variety climax, followed by 3545 kg per hectare for cultivar green feast and minimum of 2491 kg per hectare noted for variety rondo.

Conclusion

Therefore, variety climax being the highest yielder can be recommended to the pea growers of Gilgit-Baltistan for commercial cultivation.

Keywords

Evaluation, Pea, Varieties, Yield, pod, Gilgit, Baltistan.

INTRODUCTION

Pea is grown throughout the world for diverse uses as food and fodder. Well drained clay loam or silt loam soil with a pH range of 6-7.5 is better for pea, but it does not tolerate excessive acidity. Peas are highly nutritious and are a rich source of digestible protein (27.8%) along with carbohydrates (42.65%), minerals (calcium, phosphorus), vitamins, dietary fibers, antioxidant and sugars (5.67

g/100g) edible portion.¹ Pea is used both as vegetable and pulse. It can also be used in soups, canned, processed or dehydrated and can be consumed during offseason.

In Pakistan, the pea is an important crop, which plays a major role in the farmer's economy. It is the most common crop and enjoys a great commercial demand due to its nutritive value. It is cultivated during winter in plains and during summer in high-

lands.² It represents about 40% of the total trade in pulses. In 2011-2012, the crop was grown over an area of 15.8 thousand hectares with 105 thousand tonnes production of green pea and average yield was 166 mounds ha⁻¹.³ In Pakistan, it is cultivated under an extensive range of agricultural regions, but the average yield per hectare is very low as compared to its potential and yield obtained in many other countries.

As compared to many other countries, the average yield of pea crop is very low in Pakistan which may be attributed due to the non-adoption of improved varieties. Santalla et al⁴ have also reported that variability in old, unimproved varieties needs to be determined in order to create useful genetic variation for broadening the narrow genetic base of commercial cultivars and for making efficient use of available resources. The other factors like non-usage of recommended agronomic practices, application of improper fertilizer doses; diseases and harvesting losses also play an important role in yield reduction. According to Khan et al⁵ the main hurdle in the way of increasing per hectare pea production is the weed competition. Sometimes season long crop-weed competitions reduce the green pod yield by up to 45-55%.⁶ In addition to these, environmental factor such as rainfall also affects yield. McPhee and Muehlbauer have also reported that seed yield in pea is highly dependent on the environment and is particularly responsive to the amount and distribution of precipitation received during the growing season. Gupta et al⁷ have also reported that seed yield in pea is highly dependent on environment and is particularly responsive to the amount and distribution of precipitation received during the growing season⁸ have also reported about existence of considerable amount of genetic variability in pea. Keeping all these issues in view, present research work was designed to evaluate the available material for yield other agronomic traits under agro-climatic conditions of Gilgit-Baltistan. Based on our findings, high yielding variety will be recommended for the commercial cultivation of pea in Gilgit-Baltistan.

MATERIALS AND METHODS

The present investigation was carried out at experimental farm MARC Juglote Gilgit during 2017 to evaluate the suitable variety for the commercial cultivation of pea in Gilgit-Baltistan (Table 1). The experimental plot was laid out in randomized complete block design with four replications. The varieties used were climax, pasan, rondo, meteor and green feast. The seeds were sown on 1st week of March in a well-prepared bed size of 5 x 3 m². Row to row and plant to plant spacing was maintained at 45 x 20 cm. All the standard agronomic practices were followed throughout the growing season and recommended a dose of fertilizer was applied for the better nourishment of plants. The data were recorded during the mid of May and five plants were randomly selected for taking data. Observations were recorded on the basis of plant height, number of branches plant⁻¹, number of pods plant⁻¹, pods length, pods weight, and pods yield kg ha⁻¹. The recorded data were subjected to the analysis of variance technique and the significant means were subsequently separated by the lysergic acid diethylamide (LSD) test Steel and Torrie (1984). The material required for trial was collected from vegetable program National

Agricultural Research Center (NARC), Islamabad.

Table 1. Physicochemical Properties of the Experimental Soil at MARC, Juglote, Gilgit

Parameter	Value
pH	7.84
Electrical Conductivity (EC)	0.45
Organic Matter (OM)	0.12
Nitrogen	0.09
P ₂ O ₅	1.23
K ₂ O	85.60
Lime Content	5.74
Texture Class	Silt Loam

RESULTS AND DISCUSSION

Plants Height

Statistical analysis of the data revealed that differences in plants height were significant (Table 2). Maximum plants height (85.25 cm) was attained by the plants of variety climax (85.25 cm) followed by green feast (82.54 cm), while the minimum was recorded in rondo (45.75 cm). This variation in plant height could be due to variation in the genetic make-up of different varieties. Environmental conditions caused variation in the hormonal balance and cell division rate that result in changes in the plant height of the different varieties. The results of this study are in agreement with Srivastava et al.⁹ Million also reported that significant variability existed for the traits studied in field pea genotypes and plant height is among those traits having positive and greater influence. Similar differences in plant height among different pea cultivars were reported by Gentry.¹⁰

Table 2. Evaluation of Different Pea Cultivars Under Agro-Climatic Conditions of Gilgit-Baltistan

Treatment	Plant height (cm)	No of branches plant ⁻¹	No of pods	Pod length (cm)	Pod weight (kg plot ⁻¹)	Pod yield (kg ha ⁻¹)
Climax	85.25 ^a	3.00 ^{ab}	13.71 ^a	5.230 ^b	26.29 ^a	3585 ^a
Pasan	62.00 ^{bc}	2.50 ^{ab}	10.84 ^{ab}	5.500 ^b	21.53 ^{ab}	2667 ^{ab}
Rondo	45.75 ^c	2.75 ^{ab}	11.41 ^{ab}	7.900 ^a	16.72 ^{bc}	2491 ^b
Meteor	77.50 ^{ab}	4.00 ^a	8.89 ^b	5.220 ^b	16.20 ^c	2673 ^b
Green feast	82.54 ^a	2.15 ^b	13.58 ^a	5.800 ^b	21.75 ^{ab}	3545 ^a
LSD 0.05	17.84	1.71	3.934	1.205	5.188	755.7

Number of Branches

Statistical analysis of the data showed that differences in a number of branches per plant of different varieties were statistically significant (Table 2). Maximum of 4.00 branches plant⁻¹ was recorded for variety Meteor, followed by 3.00 branches plant⁻¹ for variety climax was recorded. Minimum of 2.15 branches plant⁻¹ was recorded for variety green feast. More flowering in some varieties with more number of branches is an indication of more vegetative growth due to climatic conditions. It was observed

that some varieties had determined type growth and their plants bloomed and exhaust simultaneously, hence they have fewer branches.

Number of Pods

Statistical analysis of the data revealed that differences in a number of pods were significant (Table 2). A maximum number of pods 13.71 was recorded for variety Climax followed by variety green feast with 13.58 pods plant⁻¹, while the minimum number of pods of 8.89 were recorded for variety meteor. This variation in number of pods also be attributed to variation in genetic make-up and adaptability of these varieties to different environmental conditions. Significant differences for varieties with respect to the number of pods per plant were also reported by Kumar et al, Singh et al, and Chadha et al.¹¹⁻¹³

Pod Length

Statistical analysis of the data revealed that differences in the length of pods were significant (Table 2). Maximum pod length of 7.900 cm was recorded for variety Rondo, followed by variety Green feast with 5.800 cm, while minimum pod length of 5.220 cm was recorded for variety Meteor. This variation in length of pods also is attributed to variation in genetic make-up and adoptability of these varieties to different environmental conditions. Similar findings were also observed by Ashraf et al.¹⁴

Pod Weight

Statistical analysis of the data showed that differences in pod weight of the different varieties were significant (Table 2). Variety Climax ranked first maximum pod weight of 26.29 kg plot⁻¹, variety Green feast with 21.75 kg plot⁻¹ stood second. Variety Meteor produced the minimum pod weight (16.20 kg plot⁻¹). A higher number of pods plot⁻¹ is attributed to the higher pods weight. These results are in conformation with those of Kokhar et al, Hatam & Amanullah, Hussain & Badshah.¹⁵⁻¹⁷

Fresh Pod Yield

Statistical analysis of the data revealed that differences in fresh pod yield of the different varieties were significant (Table 2). Maximum fresh pod yield of 3585 kg ha⁻¹ was recorded for variety Climax followed by variety Green feast with 3545 kg ha⁻¹. Minimum fresh pod yield of 2491 kg ha⁻¹ was recorded for the variety Rondo, followed by 2667 kg ha⁻¹ for the variety Pasan. The result could be due to the fact that Climax gave more plant height (85.25 cm), a number of pods (13.71) and pods weight (26.29 kg plot⁻¹) as compared to other varieties of pea. Yield is determined by many factors such as soil, climate, and agronomic conditions. Crop with vigorous vegetative growth produces higher yield as it has a higher number of leaves which means more photosynthesis and ultimately results in more yield. Makasheva, Bhutia et al, Ihsan et al¹¹ Amjad, and Anjum.¹⁸⁻²¹

IRB APPROVAL

Approved by the institution Review board of MARC for conducting the research trial at MARC, Juglote Gilgit-Baltistan.

CONCLUSION

It can be concluded that the variety climax was found to be superior in terms of plant height (85.25 cm), a number of pods per plant (13.71), pod weight per plot (26.29 kg) and pod yield (3585 kg ha⁻¹). The climax had the highest yield compared to the other varieties, hence it can be recommended to farmers for the commercial cultivation in both single and multiple cropping system of Gilgit-Baltistan.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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