

Evaluation of forage production in the mixed cropping of Golsefid and Maragheh vetch cultivars as winter crop under cold dryland conditions

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Received: October 2017 - Accepted: June 2019 - DOI: 10.22092/aj.2019.115908.1201

Extended Abstract

Alizadeh, Kh., Shahbazi, S., Evaluation of forage production in the mixed cropping of Golsefid and Maragheh vetch cultivars as winter crop under cold dryland conditions

Applied Research in Field Crops Vol 32, No. 01, 2019- Page: 19-20: 123-134(in Persian)

Introduction

Drylands occupy about 6.2 million ha of the area of Iran. They are mainly used for wheat and food legume production. However, the rainfed cultivation of forage crops is carried out on only 120 thousand ha of dryland farms, which comprise less than 2 % of the total arable drylands in Iran. Considerable variation has been reported in herbage and grain yields of the improved cultivars of vetches (*Vicia* spp.) under rainfed conditions. Mixed cropping of cereals with forage legumes can improve the quantity and quality of fodder compared to sole cropping of cereal plants (Alizadeh & da Silva, 2013). There is no published research to evaluate the agronomic performance of different vetch cultivars in the mixed cropping under cold dryland conditions. This research was conducted to compare different mixing ratios of two vetch species (*Vicia pannonica* Crantz and *Vicia villosa* subsp. *varia* (Host) Corb.) under cold dryland condition of Maragheh.

Materials and Methods

This research was conducted as randomized complete blocks design with three replications during two growing seasons (2015-2017) at the main station of dryland agricultural research institute of Maragheh. The treatments included pure stands of smooth vetch (cv. Maragheh) and Hungarian vetch (cv. Golsefid) along with replacement series of their mixed cropping at seed rate of 10 % Comparison of means and estimation of land equivalent ratios were conducted using dry forage yield.

Results and Discussion

Environmental conditions were different during the two years of this experiment. The amount of precipitation in the growing year of 2015-2016 from sowing till harvest was 435 mm at Maragheh research station which showed a 27 % decrease from the long-term average. Data related to temperature showed that the temperature in the growing year was 5.6 °C which was 0.3 °C higher than the average long

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term. The total number of non-freezing days was 119 days, which was 11 days less than the long-term average. In the 2016-2017 cropping year, precipitation amount was 263.9 mm which was 39.2 % less than the previous cropping year. Average temperature in the second year of the experiments was 4.1 °C which showed a 1.5 °C decrease compared to the first year of the experiment. The total number of days with freezing temperature was 132 days in the second year which showed a 13-day increase from the first year. Therefore, the environmental condition of the experiment was adverse in the second year. Combined analysis of variance showed significant differences between treatments regarding fresh forage yield and there was significant treatment × year interaction regarding both dry and fresh forage yields. Golsefid as a winter type vetch produced 1953 (kg/ha) dry biomass over the two years. Pure stands of cv. Maragheh were completely damaged from cold and freezing during the second year. This was expected for Maragheh as *Vicia dasycarpa* is not a cold tolerant vetch and may sustain damage during winter and under severe cold conditions (Alizadeh *et al.*, 2013). However, Maragheh at different mixtures was able to successfully pass winter in the both years of the experiment. The highest dry biomass (2889 kg/ha) was obtained from the mixture of 70% Golsefid and 30% Maragheh in the first year. However, the highest land equivalent ratio (1.34) was obtained from 60% Golsefid and 40% Maragheh in their mixed cropping.

Conclusion

It was concluded that the mixed cropping of Golsefid and Maragheh cultivars were superior than their pure stands in terms of forage yield production. According to our results, the mixture of 60% Golsefid and 40% Maragheh can be advisable for Maragheh cold drylands and other similar growing conditions.

Keywords: Rainfed, autumn planting, *Vicia panonica*, *Vicia dasycarpa*

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