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Meta Analysis in Yield and Yield Parameter Influencing Factor

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Abstract

Millets were grown at four different spacing , soil and agronomic practices with viz., 30 cm x 10 cm, 20 cm x 10 cm, 20 cm x 5 cm and10 cm x 5 cm.The pooled results of the experiment shows that Among the different spacing, plants grown at 20 cm x 10 cm recorded significantly higher number of tillers hill^{-1} (14.43), number of productive tillers hill^{-1} (12.19), test weight (3.48 g), panicle length (16.26 cm), panicle weight (4.38 g) and grain yield (2227 kg ha-^{1})(Nandini *et al*.,2019), straw yield (4349 kg ha-^{1}), as compared to other planting density number of tillers hill^{-1} (11.55), number of productive tillers hill^{-1} (9.76), test weight (3.26 g), panicle length (14.29 cm), panicle weight (3.79 g) and grain yield (1941 kg ha^{-1}), straw yield (3919 kg ha^{-1}) as compared to other factors. The combined effect was recorded significantly higher yield parameters as compared to the agronomic factors.

Introduction

In India, Andhra Pradesh (4,79,000 ha), Karnataka (2,32,000 ha) and Tamilnadu (20,000 ha) are the millet growing states contributing about 90 per cent of the total area under cultivation. Andhra Pradesh is a major millet growing state contributing about 79 per cent of the total area. However, the productivity of millet found to be very low as compared to that of other crop due to the lack of suitable factors, as well as production packages. Crop production yield is greatly affected by climatic factors (rainfall and temperature), soil factors and cultural practices (e.g. sowing date, seed rate, plant spacing, sowing methods, weeding and harvesting methods). Among the various management factors contributing to yield and development millet, non-monetary inputs like time of sowing, row spacing and selection of variety play vital role in increasing crop productivity of yield.

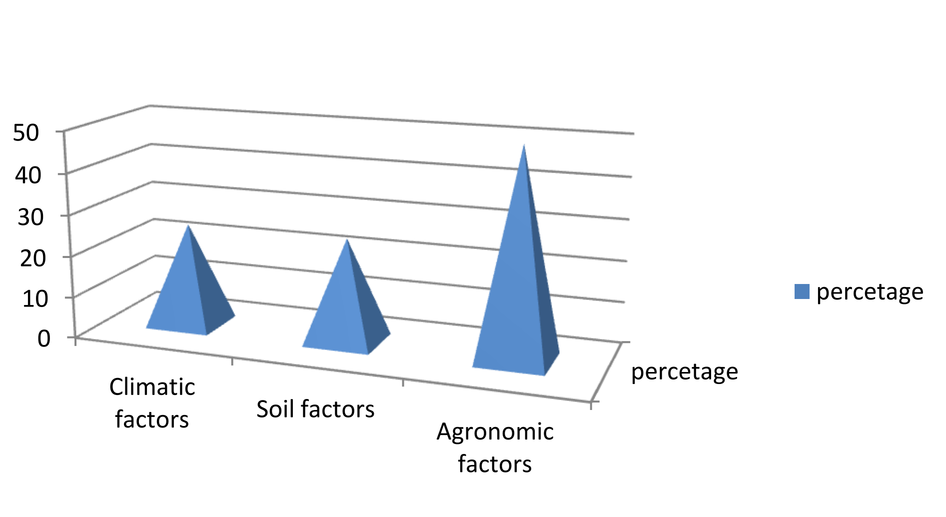
Millets are a group of highly variable small- seeded grass, widely grown around the world as cereal or grain crops for human food and animal fodder. In recent years, there has been an increasing recognition of the importance of millets as a substitute for major cereal crops. Millets have the potentiality of contributing to increased food production both in developing and developed countries. Millets are known for their climate-resilient features including adaptation to a wide range of ecological conditions, less irrigational requirements, better growth and productivity in low nutrient input conditions, less reliance on synthetic fertilizers, and minimum vulnerability to environmental stresses (Kole *et al*., 2015). Also, millets are nutritionally superior to other major cereals as they are rich in dietary fibers, resistant starches, vitamins, essential amino acids, storage proteins and other bioactive compounds (Amadou *et al*., 2013). These attributes have made millets a crop of choice for cultivation in arid and semi-arid regions of the world; however, the less attempt has been made to study the climate-resilient features of millets compared to other major cereals. Among millets, its wild progenitor, green are extensively studied since they are considered as models for studying the traits related to C4 photosynthesis, stress biology, and bioenergy characteristics (Muthamilarasan and Prasad, 2015). Cultivation of plants with desirable density has positive effect on crop yield components, so that the suitable yield will be achieved by optimum plant density (Ullah *et al.*, 2005). The optimum plant population which exerts near maximum pressure to exploit environmental resources to the fullest extent there by leading to higher yield of crop. However, maintenance of optimum planting density is always a big problem to the farmers and they maintain substandard plant density, results in high weeds infestation, poor radiation use efficiency and low yield, while dense plant population on the other hand may cause lodging, poor light penetration in the canopy, reduce photosynthesis due to shading of lower leaves and drastically reduce the yield (Pradhan and Mishra, 1994). The investigation on this aspect has clearly indicated that the population density in millet needs to be adjusted as per sowing time, prevailing agro climatic conditions. Thus there is a need to work out optimum population density by adjusting inter and intra-row spacing in relation to sowing time and other agronomic factors.

Discussion

Anonymous.,1976 the millet results revealed that grain yield and straw yield was significantly influenced by different spacing. Among the four spacings, plants grown with 20 cm× 10 cm spacing recorded significantly higher grain yield and straw yield (2,227 and 4,349 kg ha^{-1}, respectively) followed by 30 cm × 5 cm (1,953 kg ha^{-1} and 3,986 kg ha^{-1}, Harvest Index recorded non-significant with different spacing. The higher grain yield in 20 cm × 10 cm may be attributed to higher yield components viz., number of productive tillers (12.19 $hill^{-1}$ at harvest), panicle length, panicle weight and test weight (16.26 cm, 4.38 g and 3.48 g, respectively). In millets have also reported a functional relationship in grain yield with various yield attributes of millet. Among the millets recorded significantly higher grain yield and straw yield (1941.34, 3918.57 kg ha^{-1},respectively) followed by spacing (1886.09 and 3866.15 kg ha^{-1}respectively) and local (1827.95 and 3763.66 kg ha^{-1}, respectively) . This increase in grain yield may be due to increase in yield parameters like number of productive tillers (9.76 $hill^{-1}$) at harvest, panicle weight (3.79 g), panicle length (14.29 cm) and test weight (3.26 g) followed.

The results of this present investigation are in conformation with the findings of Khafi *et al.*, (2000) in pearl millet, The low yield in other varieties is due to decreased yield attributes. The grain yield of millet due to interaction effects of spacing and genotype wound significant and significantly higher grain and straw yield (2295 and 4441 kg ha^{-1}, respectively) was recorded with the interaction of 20 cm × 10 cm which was found to be on par with other

Fig 1.Yield impact Percentage



and a positive relationship between spacing and genotype existed for higher grain yield mainly because, it recorded higher yield parameters such as higher productive tillers (13.08) at harvest, panicle length (17.12 cm), panicle weight (4.62 g) and test weight (3.54 g) than other interaction effects . The harvest index was significantly higher (0.34) with the interaction of 20 cm × 10 cm which was followed , The lower harvest index was recorded due to interaction of 10 cm×5cm + Local (0.32). The increase in Stover yield with closer spacing was mainly due to vertically expansion of plants with higher growth and dry matter production resulted agronomic factors (Fig.1.)in higher Stover yield.

Conclusion

From the Meta analysis yield is influenced by climatic factors, soil factors and cultural practices. Here 25% Climatic factors involved then soil factors 25% influenced and compared to these two factors cultural practices of Agronomic factors 50% provide impact for yield and yield parameters impact development.

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