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Performance of safed musli (*Chlorophytum borivilianum* L) under different intercropping systems

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Abstract

A field experiment was conducted for three consequent years, 2017-18, 2018-19 and 2019-20 at the research farm of Nagarjun Medicinal Plants Garden, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola to study the effect of intercropping in safed musli (*Chlorophytum borivilianum*). Cereal crops viz., sorghum, bajra, maize and pigeon pea were intercropped with safed musli. The experiment conducted in randomized block design with eight treatments (T1 - Safed Musli + Sorghum (3:1), T2- Safed Musli + Sorghum (3:2), T3- Safed Musli + Maize (3:1), T4- Safed Musli + Maize (3:2), T5 - Safed Musli + Pearl Millet (3:1), T6- Safed Musli + Pearl Millet (3:2), T7- Safed Musli + Pigeon pea (3:1) and T8- Sole Safed Musli) and three replications. Results of three years' experiments showed that intercropping of pigeon pea with safed musli were advantageous in terms of overall yield, monetary advantage and economic return. The most appropriate combinations to realize the maximum advantage from intercropping were (Safed musli + Pigeon pea 3:1) without significantly reducing the root yield of musli.

Keywords: Safed musli, intercropping, yield, pigeon pea, NMR, B:C ratio

Introduction

Safed musli botanically known as *Chlorophytum borivilianum* is a perennial important root herb belonging to the family Liliaceae. The roots of safed musli have great medicinal value due to saponin content and it is used extensively in Ayurvedic medicines (Wankhade *et al.*, 2004). In the ayurvedic literature, safed musli is celebrated as a 'Divya Aushad' (Divine Medicine) with unparalleled medicinal properties. It is widely distributed in India, particularly in the valley of Himalaya, Satpuda, Vindhya, Aravalli and in the parts of Rajasthan, Gujarat and Maharashtra (Gore *et al.*, 2018). The economic part of the herb is root and is well known tonic and very popular aphrodisiac agent, with no side effects (Desale, 2013) [2]. Tribals in central India use leaves of this herb for vegetable purpose (Prajapati *et al.*, 2003) [7]. The species of *Chlorophytum borivilianum* contains more saponin and good yielding potentials as compared to other species of Safed musli and therefore having commercial value. It is also called as herbal viagra. Due to its vast demand it is very costly and become a hot cake among medicinal plants (Wankhade *et al.*, 2014) [10]. Nutritive tonic made from these roots is used to improve general sexual weakness. Safed musli has natural oil, which is excellent manure for good and robust health and ideal for mother hood (Desale, 2013) [2]. It is observed that safed musli grows under semishade condition are luxurious (Patel *et al.*, 2009) [6]. Looking to this, it was decided to study the different intercropping systems which can give the shade effect to the safed musli.

Diversification of crops with intercropping can give higher yield than sole crops (Mandal *et al.*, 1986) [4]. The main concept of intercropping is to increasing total productivity per unit area and time, as well as equitable and judicious utilization of land resources and inputs. One of the main reasons for getting higher yields from intercropping systems are mainly due to the component crops are able to use face natural resources than grown separately (Willey and Rao, 1979) [11]. A careful selection of crops having different growth habits can reduce the mutual competition to a considerable extent. Hence, choice of component crops in intercropping needs to be suitably maneuvered to harvest the synergism among them towards efficient utilization of resource base and to increase overall productivity (Mandal *et al.*, 1986) [4].

Material and Methods

The field experiment was conducted at Nagarjun Medicinal Plants Garden Dr. PDKV Akola during kharif season 2017-18, 2018-19 and 2019-2020.

Experiment was laid in Randomized Block Design with three replications and eight treatments. FYM @ 20 t ha⁻¹ was applied common for all treatments.

Treatment details

- T1 - Safed musli + Sorghum (3:1) row proportion
 T2 - Safed musli+ Sorghum (3:2) row proportion,
 T3 - Safed musli + Maize (3:1) row proportion
 T4 - Safed musli + Maize (3:2) row proportion,
 T5 - Safed Musli + Pearl Millet (3:1) row proportion
 T6 - Safed Musli + Pearl Millet (3:2) row proportion
 T7- Safed Musli + Pigeon pea (3:1) row proportion
 T8- Sole Safed Musli

Statistical comparison was worked out based on Randomized block design (Panse and Sukhatme, 1967) [5]. The three years pooled data is discussed in the present paper.

Results and Discussion

The pooled data on number of roots/plant, root length, girth of root, fresh and dry root yield, saponin content, GMR, NMR, B:C ratio as influenced by different intercropping systems were recorded and presented in Table 1 to 2.

Yield contributing characters

Number of roots/plant

Number of roots/plant (9.82) was observed higher in T₈ (Sole safed musli) which was at par with other treatments except T₁ (Safed musli + Sorghum 3:1) showed minimum number of roots. These results are in close agreement with Wankhade *et al.*, (2004) [9] and Anonymous (2015) [1].

Root length

T₇ (Safed musli + Pigeon pea 3:1) recorded highest root length/plant (7.25 cm) which was at par with all other treatments.

Root girth

Higher girth of root (7.13 mm) was recorded in T₇ (Safed musli + Pigeon pea 3:1) which were at par with T₁, T₂ and T₈.

whereas T₆ showed lower root girth (6.01 mm). These results are in conformity with findings of studies on safed musli + Pigeon pea intercropping conducted at Akola Anonymous 2015 [1] and Shivankar, 2015 [8].

Fresh root yield

T₇ (Safed musli + Pigeon pea 3:1) recorded highest fresh root yield per plant (12.47 g) which was at par with T₄ and T₁ whereas, lowest observed in T₂. Higher fresh root yield (2668.55 kg/ha) was recorded in T₈ (Sole Safed musli) which was at par with T₇, T₅, T₃ and T₁ whereas minimum was observed in T₂ (1859.67 kg/ha).

Dry root yield

Maximum dry root yield per plant was observed in T₇ (Safed musli + Pigeon pea 3:1) i.e. 2.92 g which was at par with T₄ and T₁ whereas, minimum observed in T₆.

T₃ (Safed musli + Maize 3:1) recorded highest dry root yield (527.44 kg/ha) which was at par with T₇ and T₈ whereas, minimum dry root weight was observed in T₆ (392.00 kg/ha). This might be due to favorable partial shade effect which recorded in better crop growth and ultimately the root yield. These results are supported by the findings of Wankhade *et al.*, (2004) [9].

Saponin content

Maximum saponin content (8.96%) was recorded in T₇ (Safed musli + Pigeon pea 3:1) followed by T₃ and T₈ whereas, minimum was recorded in T₆. Intercropping of Safed musli with Pigeon pea resulted in better root quality in terms of saponin which is the active ingredient might be due to proper utilization of solar light with balanced nutrition resulted in better synthesis of secondary metabolites and ultimately the root quality with good yield (Wankhade *et al.*, 2004) [9].

Economics

Significantly higher GMR (Rs. 6,29,458/ha), NMR (Rs. 5,04,974/ha) and B:C ratio (4.82) was recorded in T₇ (Safed musli + Pigeon pea 3:1).

Table 1: Effect of different intercropping systems on number of roots/plant, root length/plant, girth of roots, fresh and dry root wt./ plant and fresh root wt.(kg/ha) of Safed Musli

Treatment	No. of roots/plant	Root length/ plant (cm)	Girth of roots (mm)	Fresh root wt./plant (g)	Dry root wt. /plant (g)	Fresh root wt. (kg/ha)
T1 – Safed Musli + Sorghum (3:1)	8.44	6.64	6.57	10.97	2.61	2411.00
T2- Safed Musli + Sorghum (3:2)	8.68	6.48	6.68	9.91	2.47	1859.67
T3- Safed Musli + Maize (3:1)	9.48	6.87	6.40	10.19	2.32	2365.78
T4- Safed Musli + Maize (3:2)	9.18	6.84	6.28	11.00	2.64	2003.22
T5 – Safed Musli + Pearl Millet (3:1)	9.16	6.48	6.18	10.48	2.31	2379.22
T6- Safed Musli + Pearl Millet (3:2)	8.57	6.48	6.01	10.67	2.06	2076.00
T7- Safed Musli + Pigeon pea (3:1)	9.62	7.25	7.13	12.47	2.92	2588.55
T8- Sole Safed Musli	9.82	6.91	6.87	10.74	2.34	2668.55
SE m (±)	0.41	0.27	0.22	0.53	0.12	165.67
CD at 5%	1.24	0.82	0.67	1.62	0.35	508.33

Table 2: Effect of different intercropping systems on dry root wt.(Kg/ha), saponin content and economics of Safed Musli

Treatment	Dry root wt. (Kg/ha)	Saponin Content (%)	GMR(Rs/ha)	NMR(Rs/ha)	B:C Ratio
T1 – Safed Musli + Sorghum (3:1)	474.00	8.39	542984	425559	4.62
T2- Safed Musli + Sorghum (3:2)	397.78	8.50	469123	364484	4.48
T3- Safed Musli + Maize (3:1)	527.44	8.75	609736	491461	4.49
T4- Safed Musli + Maize (3:2)	406.89	8.61	477854	371854	4.51
T5 – Safed Musli + Pearl Millet (3:1)	452.89	8.38	519605	402281	4.09
T6- Safed Musli + Pearl Millet (3:2)	392.00	8.30	461870	357389	4.09
T7- Safed Musli + Pigeon pea (3:1)	525.89	8.96	629457	504974	4.82
T8- Sole Safed Musli	523.11	8.75	597604	459604	4.00
SE m (±)	29.00	0.024	28301	31508.67	-
CD at 5%	91.00	0.074	85602.67	96942.67	-

Conclusion

Thus study indicated that T₇ (Safed musli + Pigeon pea 3:1) recorded significantly higher average root length, girth, GMR, NMR and B:C ratio. It can be concluded that inter cropping with pigeon pea (3:1) help to increase the yield of Safed musli and net profit.

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References

1. Anonymous. Annual Progress Report of AICRP on Medicinal and Aromatic plants and Betelvine submitted on RRC Meeting held on 2014-2015. Dr. PDKV, Akola 2015.
2. Desale Praneta. Safed Musli. Herbal Viagra for Male Impotence. J of Medicinal Plants Studies 2013;1(3):91-97.
3. Gore YD, Wankhade SG, Wanjari SS, Patke NK, Konde NM. Effect of safed musli + pigeonpea intercropping system on root quality of safed musli. Int. J Curr Microbiol App. Sci. 2018;7(4):1862-1865.
4. Mandal BK, Dasgupta S, Ray PK. Yield of wheat mustard and chickpea grown as sole and intercrops with four moisture regimes. Indian J agric. Sci. 1986;56(8):577-583.
5. Panse VG, Sukatme PV. Statistical methods for Agricultural Workers. Indian Council of Agricultural Research, New Delhi 1967, 354.
6. Patel DH, Patel MA, Sriram S, Parmar JR. Inter cropping safed musli (*Chlorophytum borivilianum*) Internat. J agric. Sci 2009;5(2):595-596.
7. Prajapati ND, Purohit SS, Kumar T. Ahandbook of Medicinal Plants. Agribios (India) 2003, 553.
8. Shivankar PR. Fertility status under safed musli +pigeonpea intercropping system M.Sc. Thesis (Unpub.) Dr. Panjabbrao Deshmukh Krishi Vidyapeeth, Akola 2015.
9. Wankhade SG, Khode PP, Partude JT. Effect of organic manure and fertilizer on the yield and quality of safed musli, PKV. Res. J. 2004;28(1):111-112.
10. Wankhade SG, Wanjari SS, Yogita Gore, Pravin Deshmukh, Prakash Ghatol. Effect of Safed Musli + Pigeonpea Intercropping System on Yield and Micronutrient Availability in Soil. PKV Res. J 2014;38(1):35-41.
11. Willey RW, Rao MR. A competitive ratio for quantifying competition between intercrops. Expl. Agric., 1979;16:105-117.