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RESEARCH PAPER

Effect of canopy relative humidity on growth and yield of pigeonpea + kalmegh intercropping system

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Abstract : A field experiment was conducted at Nagarjun Medicinal Garden, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during 2009-10 to determine suitable row proportion for pigeonpea + kalmegh intercropping system. Effect of weather parameter such as canopy relative humidity on growth and yield of pigeonpea and kalmegh was studied. Further, canopy relative humidity showed decreasing pattern with the advancement in age of the crop. In pigeonpea maximum morning canopy relative humidity was observed with 2:1 row proportions, however evening canopy relative humidity was maximum with 2:2 row proportion. Dry matter and grain yield of pigeonpea showed positive and negative correlation with morning and evening canopy relative humidity, respectively. While herbage yield, seed yield and andrographoloide yield of kalmegh reported negative and positive correlation with morning and evening canopy relative humidity, respectively.

Key Words : Kalmegh, Intercropping, Relative humidity, Correlation

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INTRODUCTION

Kalmegh (*Andrographis paniculata* Wall. ex Nees) belong to family Acanthaceae, is an important annual medicinal herb widely distributed in plains throughout India and Shrilanka (Patra *et al.,* 2004). It consists of 40 species out of which 21 are in India. It is referred by different vernacular names like Charayetah, Kiryat, Mahatita, Bhuneemb and Kalmegh in different group of people in India (Amminuddin *et al.,* 1997). Medicinal plants have higher demand and high value in the market and are quite suitable to our soils and weather conditions. Indian farmers have been looking for some better alternative to diversify from traditional agriculture due to gradual reduction in profitability owing to decline in productivity, increased incidence of disease and pest in traditional crops. Contingent upon their hardy nature and higher returns, medicinal plants' inclusion in cropping system is a better option. Pigeonpea being a predominantly rainfed crop of this region can be grown as component crop with kalmegh. On this line an experiment was conducted to assess the suitable row proportion for pigeonpea + kalmegh intercropping system and the impact of climate on productivity of this system. Intercropping is a potentially beneficial system, shows

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substantial yield advantages over sole cropping and reduces risk (Singh *et al.,* 1992). These advantages can be achieved not by means of costly inputs but by simple expedient of growing crop together (Willey, 1979).

MATERIAL AND METHODS

A field experiment was conducted at Nagarjun Medicinal Garden, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, during 2009-10, so as to assess row proportion for pigeonpea + kalmegh intercropping system. The soil of experimental field was medium black, low in available nitrogen (150 kg/ha), phosphorus (24 kg/ha) and rich in potash (365 kg/ha) with pH 7.6.

The experiment was laid out in Randomized Block Design with four replications. The six treatments which include four intercropping row proportions (1:1, 2:1, 2:2 and 4:2 of pigeonpea and kalmegh) and sole crop of pigeonpea and kalmegh. Both the crops were sown at 45 cm row spacing and other packages were followed as per crop need and recommendations. The growth observations, yield attributes and yield of both crops were recorded at periodical intervals. The relative humidity of crop canopy was recorded at morning and evening at various growth stages with Digital TH meter (Digital thermohygrometer). The relative humidity was correlated with dry matter, yield of pigeonpea and kalmegh and also andrographoloide yield. The andrographoloide content from kalmegh was estimated with Soxhlet apparatus, by using solvents such as methanol, Petroleum ether and Chloroform.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Canopy relative humidity:

Pigeonpea :

Data depicted in Table 1 indicated that the canopy relative humidity was maximum in early growth stages

Table 1 : Canopy relative humidity (%) of pigeonpea as influenced by various row proportions

Treatments	Sowing to seedling stage		Seedling to branching stage		Branching stage to flower initiation		Flower initiation to pod initiation		Pod initiation to grain development	
	At morning	At evening	At morning	At evening	At morning	At evening	At morning	At evening	At morning	At evening
Pigeonpea : kalmegh (1:1)	48.25	53.00	43.00	49.25	38.00	46.50	34.75	42.25	32.00	38.25
Pigeonpea : kalmegh (2:1)	50.50	52.25	45.25	49.00	39.50	47.25	35.00	42.75	30.50	38.75
Pigeonpea : kalmegh (2:2)	49.25	57.25	44.00	51.00	39.75	49.75	33.50	44.75	28.25	39.75
Pigeonpea : kalmegh (4:2)	47.75	54.75	44.50	51.75	41.00	49.50	35.25	45.50	28.75	40.50
Sole pigeonpea	50.25	49.50	45.00	48.75	40.50	48.00	35.50	44.25	30.50	39.25
S.E.±	2.02	3.35	1.09	1.58	1.25	0.95	1.14	0.89	1.59	0.92
C.D. (P=0.05)	NS	NS	NS	NS	NS	2.92	NS	2.73	NS	NS
Mean	49.20	53.35	44.35	49.95	39.75	48.20	34.80	43.90	30.00	39.30

NS= Non-significant

Table 2: Canopy relative humidity (%) of kalmegh as influenced by various row proportions

Treatments	Sowing to seedling stage		Seedling to branching stage		Branching stage to flower initiation		Flower initiation to pod initiation		Pod initiation to grain development	
	At morning	At evening	At morning	At evening	At morning	At evening	At morning	At evening	At morning	At evening
Pigeonpea : kalmegh (1:1)	49.25	52.75	43.50	49.50	38.00	46.50	34.50	42.50	31.50	38.25
Pigeonpea : kalmegh (2:1)	52.75	50.25	46.25	48.25	41.00	46.50	36.00	42.50	32.00	38.25
Pigeonpea : kalmegh (2:2)	52.25	57.50	45.75	51.00	39.50	49.50	34.50	44.25	28.75	39.50
Pigeonpea : kalmegh (4:2)	50.50	51.25	46.50	49.75	43.25	49.00	34.25	44.00	29.00	39.00
Sole kalmegh	48.00	54.75	44.50	50.00	40.75	48.25	36.00	43.25	29.25	38.25
S.E.±	1.53	3.85	0.77	1.22	1.87	1.08	1.41	0.99	1.86	1.15
C.D. (P=0.05)	4.7	NS	2.38	NS	NS	NS	NS	NS	NS	NS
Mean	50.55	53.30	45.30	49.70	40.50	47.95	35.05	43.30	30.10	38.65

NS= Non-significant

Table 3 : Correlation of dry matter (DM) and grain yield (GY) of pigeonpea with relative humidity

	DM	GY	RHI	RHII
DM	1			
GY	0.47142*	1		
RHI	0.32094	0.36279	1	
RHII	-0.24885	0.08734	-0.20409	1

* indicate significance of value at P=0.05

Table 4 : Correlation of herbage yield (HY), grain yield (GY) and andrographoloide yield (AY) of kalmegh with relative humidity

	HY	SY	AY	RHI	RHII
HY	1				
SY	0.93128**	1			
AY	0.99702**	0.93730**	1		
RHI	-0.25983	-0.21268	-0.23519	1	
RHII	0.14258	0.15823	0.16610	-0.05817	1

** indicate significance of value at P=0.01

and reduced thereafter with the advancement in the age of crop. Among the different row proportions maximum morning canopy relative humidity was observed with 2:1 row proportions, however evening canopy relative humidity was maximum with 2:2 row proportion during most of the crop growth phases.

Kalmegh :

Data depicted in Table 2 indicated that the morning canopy relative humidity was maximum in 2:1 row proportion from sowing to seedling stage and thereafter it was maximum with 4:2 row proportion during seedling to flower initiation stage. The morning canopy relative humidity during flower initiation to pod initiation and pod initiation to grain development was maximum in 2;1 row proportion.

The relative humidity recorded at evening hours was maximum with 2:2 row proportion at all the crop growth stages. This indicated that the 2:2 row proportion was appropriate to maintain maximum relative humidity, which might have useful for better growth and development of kalmegh.

Correlation studies :

Pigeonpea:

The dry matter and grain yield of pigeonpea was correlated with RHI and RHII (morning and evening canopy relative humidity) (Table 3) which indicated that the dry matter of pigeonpea was negatively correlated with evening relative humidity. The grain yield was more positively and significantly correlated with dry matter production.

Kalmegh :

Highly significant and positive correlation was observed with seed yield and herbage yield (Table 4). The andrographoloide yield was positively correlated with herbage and seed yield. It shows that there is a positive relationship of andrographoloide yield with total dry matter accumulation. Similar results were recorded by Patel *et al*. (2000) in pigeonpea crop.

Conclusion:

Intercropping of kalmegh and pigeonpea with different row proportion was found to be more efficient to utilize relative humidity which was reflected to produce maximum biological and seed yield. Thus it can be inferred that the 2:2 row proportion was appropriate to maintain maximum relative humidity, which might have useful for better growth and development of kalmegh.

REFERENCES

Amminuddin, R.D. and Girach, D. Wasiuddin (1997). Medicinal potential of *Andrographis paniculata* (Bhuineem) a less known medicinal plant in Unani Medicine, *Hamdard Medicus*, **4** : 48-55.

Patel, N.R., Mehta, A.N. and Shekh, A.M. (2000). Weather factors influencing phenology and yield of pigeonpea (*Cajanus cajan*). *J. Agrometeorology,* **2** (1) : 21-29.

Patra, D.D., Chattopadhyay, A., Singh, A.K., Tomar, V.K.S., Singh, A.,Mishra, H.O., Alam, M. and Khanuja, S.P.S. (2004).

Agrotechnology of Kalmegh (*A. paniculata*). *J. Med. & Aro. Pl. Sci.*, **26**: 534-537.

Singh, S.B., Singh, B.N. and Maurya, M.L. (1992). Comparative performance of mixed and intercropping systems with different winter crops under diara land condition. *Indian J. Agron*., **37** (1) : 40-43.

Willey, R.W. (1979). Intercropping, its importance and research needs. I. competition and yield advantages. *Field Crops Abstracts*., **32** (1): 1-10.