ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 06, pp.33741-33743, June, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

REVIEW ARTICLE

IMPACT OF MANURES AND FERTILIZERS ON GROWTH AND DEVELOPMENT OF SHOOT AND ROOT OF ASHWAGANDHA

[1,*]Mayank Kumar, [2]Dr. Kaushal Kumar and [3]Arjun Patel

[1]Research Scholar, Department of Soil Conservation and Water Management, C.S.A.U.A and Technology Kanpur, India
[2]Associate. Professor, Department of Soil, Conservation and Water, Management, C.S.A.U.A and Technology Kanpur, India
[3]Department of Soil science and Agricultural chemistry, N.D.U.A and Technology Kumarganj Faizabad

ARTICLE INFO

Article History:
Received 21st March, 2016
Received in revised form
28th April, 2016
Accepted 15th May, 2016
Published online 30th June, 2016

Key words:

Development,
Impact,
Fertilizers,
Manures.

ABSTRACT

Background Glaucoma is diagnosed by presence of "classical triad"- characteristic feature of visual field defects, morphological changes in optic disc (cupping) and raised intraocular pressure (IOP). Several studies related to blood pressure and ocular perfusion pressure (OPP) implicated vascular risk factors in the pathogenesis of glaucoma yet abnormal autoregulation in glaucoma is not fully clear. The most common method of evaluating autoregulatory function is through provocation like isometric head up tilt testing, which put the vascular system under stress and evoke an autoregulatory response maintaining normal ocular perfusion, a failure to this is indicative of disturbed auto regulation. Materials and methods The study subjects of age between 45-65 years of either sex comprised of 20 patients with Primary open angle glaucoma (IOP >21mmhg) (group II) and 20 age and sex matched healthy controls (group I). Blood Pressure and Mean OPP was recorded at rest and immediately after relaese, then after 5minutes. MOPP was calculated as MOPP=2/3MAP – IOP. Results Mean basal MAP in group II was significantly higher (104.73 ±1.45) (p=0.001) as compared to group I. The findings showed highly significant low values of basal MOPP (p<0.000) in group II (POAG) compared to control group. During handgrip test the value of MAP was significantly higher and MOPP was significantly low (P<0.000) in group II. The significant high value of MAP (p<0.000) and low MOPP in group II during recovery period indicated delayed recovery due to sympatho-vagal imbalance. Conclusion Basal values of MAP and MOPP and changes observed during isometric exercise (stress test) and during recovery period indicated ocular vascular alterations and abnormal autoregulatory mechanism in POAG patients as compared to healthy controls.

Citation: Mayank Kumar, Dr. Kaushal Kumar and Arjun Patel, 2016. "Impact of manures and fertilizers on growth and development of shoot and root of Ashwagandha", *International Journal of Current Research*, 8, (06), 33741-33743.

INTRODUCTION

Ashwagandha is a hardy and drought tolerant plant. It grows well in dry and sub-tropical regions. Madhya Pradesh, Gujarat, Haryana, Maharashtra, Punjab, Rajasthan and Uttar Pradesh are the main producing states of this crop in the country. In Madhya Pradesh alone it is cultivated in more than 5000 ha. The estimated production of its roots in India is more than 1500 ton, while the annual requirement is about 7000 ton necessitating increase in its cultivation for higher production. Steroidal alkaloids and lactones in a class of constituents called with anolides are the major active principles of *W. somnifera* roots. It cultivated over an area of 10,780 ha with a production of 8,429 tonnes in India. While the annual demand increase from 7,028 tonnes (2001-02) to 9,127 tonnes (2004-05) necessitating increase in its cultivation for higher production.

****Corresponding author: Mayank Kumar,***
Research Scholar, Department of Soil Conservation and Water Management, C.S.A.U.A and Technology Kanpur, India.

Research methodology

The study was conducted in Chandra Shekhar Azad university of agriculture and technology Kanpur Uttar Pradesh during the year 2013-2014 the present investigation was conduct to study

the "Impact of manures and fertilizers on growth and development of shoot and root of Ashwagandha" to promote the use of organic inputs for better yield and quality produce in response poor area. The data was taken by different measures like Randomized block design and Factorial.

RESULTS

A field experiment carried out from August 2013 to April 2014 with sandy loam soil at field No. A-4 of Research Farm, Department of Soil Conservation & Water Management /Forestry, Chandra Sekhar Azad University of Agriculture & Technology, Kanpur to study the "Impact of manures and fertilizers on growth and development of shoot and root of Ashwagandha"

Leaf fresh weight (g plant^{-1})

The leaf fresh weight (g plant^{-1}) in Ashwagandha was significantly influenced by fertility levels and moisture conservation practices levels at different stages of crop growth. The leaf fresh weight registered a progressive increase from 60 to 90 DAS and maximum increase in leaf fresh weight was recorded between 90 to 120 DAS however from 120 DAS to harvest it decrease under all the fertility levels. The application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1}under treatment F_4 recorded highest leaf fresh weight (47.93 g) at harvest stage followed by treatment F_5 FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} (45.73 g). The minimum leaf fresh weight was recorded in treatment F_1 of control (37.03 g) under fertility levels. Among moisture conservation practices the highest leaf fresh weight was recorded under treatment M_3 of organic mulch (46.16 g) followed by M_2 of hoeing and weeding (42.52 g) while lowest leaf fresh weight was recorded with M_1 of control (39.29 g) at harvest stage. Leaf dry weight (g plant^{-1}) At all the successive stage, leaf dry weight of Ashwagandha was significantly influenced by fertility levels and moisture conservation practices at different stages of crop growth. The leaf dry weight registered a progressive increase from 60 to 120 DAS after which there was a steep decrease in dry weight of leaves up to harvest under all fertility levels.

At harvest, the leaf dry weight was significantly affected by fertility levels and moisture conservation practices. The application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1}in treatment F_5 recorded the highest leaf dry weight (7.72 g) at harvest stage followed by F_4 of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}(7.43 g). The minimum leaf dry weight was recorded under F_1 of control (5.82 g) under fertility levels. Among the moisture conservation practices the highest leaf dry weight was recorded with treatment M_3 of organic mulch (7.32 g) followed by M_2 of hoeing and weeding (6.83 g) while lowest leaf dry weight was recorded under M_1 of control (6.18 g) at harvest stage.

Shoot fresh weight (g plant^{-1})

The shoot fresh weight of Ashwagandha was remarkably varied with fertility levels and moisture conservation practices at different stages of crop growth

The shoot fresh weight significantly influenced by fertility levels and moisture conservation practices at the stages. While the shoot fresh weight registered a progressive increase from 60 to 120 DAS afterward there was a steep decrease in shoot fresh weight at harvest under different fertility levels.

Finally, the shoot fresh weight was significantly affected by fertility levels and moisture conservation practices. In F_5 when we apply FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1} recorded the highest shoot fresh weight (30.05g) at harvest stage followed by F_4 of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} (24.13 g) while minimum shoot fresh weight was recorded in F_1 of control (20.02 g). In context to moisture conservation practices the highest shoot fresh weight was recorded in M_3 with organic mulch (24.38 g) followed by M_2 of hoeing and weeding (23.70g). The lowest shoot fresh weight was recorded in M_1 of control (22.04 g) at harvest stage.

Shoot dry weight (g plant^{-1})

The shoot dry weight of Ashwagandha was significantly influenced by different fertility levels and moisture conservation practices at different stages of crop growth The shoot dry weight registered a progressive increase from 60 to 120 DAS thereafter drastically decrease in shoot dry weight at harvest under different fertility levels. In F_5 treatment the application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1} recorded the highest shoot dry weight (13.05 g) at harvest stage followed treatment F_4 in FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} (9.50 g) while minimum shoot dry weight was recorded in $F_1$with control (8.26 g) among all fertility levels. Among the moisture conservation practices the highest shoot dry weight was recorded in M_3 treatment of organic mulch (10.18 g) followed by M_2 of hoeing and weeding (9.84 g). The lowest shoot dry weight was recorded with treatment M_1 of control (9.27 g) at harvest stage.

Root length per plant (cm)

The root length plant^{-1}of Ashwagandha was significantly differed by fertility levels and moisture conservation practices at different stages of crop growth All the stages of crop growth, the root length plant^{-1} significantly influenced by fertility levels and moisture conservation practices. The application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1} recorded in treatment F_4 of the highest root length plant^{-1} (18.13 cm) at harvest stage followed by treatment F_3 of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} (17.63 cm). The minimum root length plant^{-1} was recorded with control treatment F_1 of (11.08 cm) under fertility levels.Among the moisture conservation practices the highest root length plant^{-1} was recorded under treatment M_3 of organic mulch (15.76 cm) followed by M_2 hoeing and weeding (15.10 cm). The lowest root length plant^{-1} was recorded in treatment M_1 of control (14.00 cm) at harvest stage.

Root girth per plant (cm)

The root girth plant^{-1}of Ashwagandha was significantly enhanced with fertility levels and moisture conservation

practices at different stages of crop growth. At all the stage, the root girth plant^{-1} significantly influenced by fertility levels and moisture conservation practices. The application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1}+ azotobactor @ 2 kg ha^{-1} under treatment F_4 recorded the highest root girth plant^{-1} (2.87 cm) at harvest stage followed by treatment F_3 of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} (2.84 cm). The minimum root girth plant^{-1} was recorded with F_1 of traditional practices control (2.69 cm) under fertility levels. Among the moisture conservation practices the highest root girth plant^{-1} was recorded treatment M_3 of organic mulch (3.31 cm) followed by M_2 of hoeing and weeding (3.13 cm) while lowest root girth plant^{-1} was recorded under M_1 of control (2.92 cm) at harvest stage.

Root yield (q ha^{-1})

Fresh root yield (q ha^{-1})

The fresh root yield of Ashwagandha was significantly influenced by fertility levels and moisture conservation practices levels at different stages of crop growth . The application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1} recorded F_5 the highest fresh root yield (29.53 q ha^{-1}) at harvest stage followed by F_4 application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} (22.28 q ha^{-1}) while minimum fresh root yield was recorded with F_1 of control (9.66 q ha^{-1}) under fertility levels. Among the moisture conservation practices the highest fresh root yield was recorded in M_3 treatment of organic mulch (20.63 q ha^{-1}) followed by M_2 of hoeing and weeding (19.14 q ha^{-1}). The lowest fresh root yield was recorded M_1 of control (17.55 q ha^{-1}) at harvest stage.

Interaction effect of fertility levels and moisture conservation practices on fresh weight of roots (q ha^{-1})

Fertility levels	Moisture conservation practices			Mean
	M_1	M_2	M_3	
F_1	7.80	9.42	11.75	9.65
F_2	15.40	18.60	22.05	18.68
F_3	18.00	21.25	24.65	21.30
F_4	18.40	23.50	26.15	22.68
F_5	22.15	30.60	35.70	29.48
F_6	11.00	13.80	17.90	14.23
Mean	15.45	19.52	23.03	
S.E± (D)	0.30			
C.D(P= 0.05)	0.61			

The mean fresh root yield was significantly differed under fertility levels and moisture conservation practices. The maximum and significantly higher fresh root yield were obtained in association of application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor@ 2 kg ha^{-1} along with organic mulch (F_5 M_3) (35.28 q ha^{-1}) followed by application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1} along with hoeing and weeding (F_5 M_2) (30.35q ha^{-1}) while minimum fresh root yield was recorded under over all control (F_1 M_1) (7.84 q ha^{-1}).

Dry root yield (q ha^{-1})

The dry root yield of Ashwagandha was significantly differed by fertility levels and moisture conservation practices at different stages of crop growth (Table The application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1} recorded treatment of F_5 the highest dry root yield (9.45 q ha^{-1}) at harvest stage followed by treatment F_4 application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} (7.24 q ha^{-1}) while minimum dry root yield was recorded with F_1 treatment control (3.10 q ha^{-1}) under fertility levels.

Conclusion

The experimental results revealed that application of FYM @ 10 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + PSB @ 2 kg ha^{-1} + azotobactor @ 2 kg ha^{-1} of treatment F_5 recorded highest root yield and gave more Total Income, Net Returns and B: C Ratio while lowest Total Income, Net Returns and B : C Ratio were recorded with treatment of F_1 control under fertility level

REFERENCES

Behera, B. Mohanty, S.K. Singh, G.S. and Senapati, P.C. 2006. Effect of moisture conservation practices and fertilizer application on performance on rainfed groundnut. *Indian J. of Soil Conservation*, 39: (1), 49-51.

Gajbhiye, R.P. and Deshmukh, S.B. 2010. Root production and seed yield of ashwagandha as influenced by organic manures and biofertilizers. *J. Medicinal and Aromatic Plant Sci*., 32:4, 358-361.

Kubsad, V.S., Palled, Y.B. and Mansur, C.P. 2009. Productivity quality and economics of rainfed Ashwgandha (*Withania somnifera*) as influenced by spacing and fertiliaer levels. *Indian J. Agron.,* 54(4): 449-453

Kumar, N., Kumar, V. and Singh, M.C. 2012. Response of bio organic nutrition on growth yield and quality of Ashwagandha *(Withania somnifera)*. *Hort. Flora Research Spectrum*, 1:(3), 208-214.

Maheshwari, S.K., Sharma, R.K. and Gangrade, S.K. 2000. Response of Ashwagandha (*Withania somnifera*) to organic manures and fertilizers in a shallow black soil under rainfed condition. *Indian J. Agron*., 45(1): 214-216

Meena K. and Upadhyay, G. 2012. Effect of spacing organic manures and time of transplanting on growth and yield of ashwagandha MKK Publication, Kolkata, *India Environment and Ecology,* 30, (4), 1272-1275.

****