



## Research Paper

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# Effect of organic nutrients on growth and yield of vegetable cowpea

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**ABSTRACT :** An investigation was carried out to find out the effect of organic nutrients in vegetable cowpea [*Vigna unguiculata* (L) Walp.] var. Ankur Gomathi during season I (Jan-April 2012) and season II (Aug-Nov 2012) at the Department of Horticulture, Faculty of Agriculture, Annamalai University. The results indicated that plant height, was favourably enhanced by the treatment of FYM @ 25 t ha<sup>-1</sup> + neem cake @ 5 t ha<sup>-1</sup> + panchagavya 3 %, whereas number of branches per plant, was favourably enhanced by the treatment FYM @ 25 t ha<sup>-1</sup> + vermicompost @ 5 t ha<sup>-1</sup> + panchagavya 3%. The yield per ha showed that FYM @ 25 t ha<sup>-1</sup> + vermicompost @ 5 t ha<sup>-1</sup> + panchagavya 3 % recorded highest yield of 6.75 t ha<sup>-1</sup> in season I and 6.22 t ha<sup>-1</sup> in season II as compared to 3.64 t ha<sup>-1</sup> and 3.59 t ha<sup>-1</sup> in the control during season I and season II, respectively. Thus the FYM @ 25 t ha<sup>-1</sup> + vermicompost @ 5 t ha<sup>-1</sup> + panchagavya 3 % was observed to be best treatment in both the seasons.

**KEY WORDS :** Vermicompost, Panchagavya, FYM, Growth, Yield, Cowpea

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The cowpea [*Vigna unguiculata* (L.) Walp] is an important food legume in the tropics and sub-tropics of Asia, Central and South America and part of Southern Europe and United states of America. Africa is considered to be the centre of origin for cowpea (Singh and Ntare, 1985). It can be consumed in both fresh and dried form. The young leaves, immature pods and peas are used as vegetables, while snacks and main meal dishes are prepared from the dried grains. All the plant parts that are used for food are nutritious, providing seed protein (25%), vitamins (thiamine, riboflavin and niacin) and minerals.

Among the various technologies to boost up the productivity, nutrient management assesses greater significance in maximizing the yield of the crop. Balanced use of chemical fertilizers alone will not able to sustain high productivity due to emergence of multi – nutritional deficiencies besides, indiscriminate and continuous application of chemical fertilizers and pesticides render the soil life less. Hence, a shift back to our traditional organic farming by the use of organic manures is the need of the hour to attain sustenance in production system. Hence the present study will help to find out the dosage of organic nutrients to be supplied to vegetable cowpea, in order to increase the

growth and yield. In this background, the present study was carried out with the objective to study the effect of soil and foliar application of organic nutrients on growth and yield of vegetable cowpea.

## RESEARCH METHODS

An investigation was carried out in the vegetable field unit, Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar to study the response of vegetable cowpea to combined application of panchagavya, seaweed extract and farmyard manure during season I (January - April) 2012 and season II (Aug.-Nov.) 2012. The seeds of bush type vegetable cowpea [*Vigna unguiculata* (L.) walp] var. Ankur Gomathi was used for the trial.

Design adopted was Randomized Block design with fifteen treatments and three replications. Treatments were T<sub>1</sub> - Absolute control, T<sub>2</sub> - FYM @ 25 t ha<sup>-1</sup>, T<sub>3</sub> - vermicompost @ 5 t ha<sup>-1</sup>, T<sub>4</sub> - Neem cake @ 5t ha<sup>-1</sup>, T<sub>5</sub> - FYM @ 25 t ha<sup>-1</sup> + panchagavya @ 3%, T<sub>6</sub> - vermicompost @ 5 t ha<sup>-1</sup> + panchagavya @ 3%, T<sub>7</sub> - Neem cake @ 5 t ha<sup>-1</sup> + panchagavya @ 3%, T<sub>8</sub> - FYM @ 25 t ha<sup>-1</sup> + sea weed extract @ 3%, T<sub>9</sub> - vermicompost @ 5 t ha<sup>-1</sup> + seaweed extract @ 3%, T<sub>10</sub> - Neem cake @ 5 t ha<sup>-1</sup> + seaweed extract @ 3%, T<sub>11</sub> - FYM @ 25 t ha<sup>-1</sup>

<sup>1</sup> + vermicompost @ 5 t ha<sup>-1</sup> + panchagavya @ 3%, T<sub>12</sub> - FYM @ 25 t ha<sup>-1</sup> + Neem cake @ 5 t ha<sup>-1</sup> + panchagavya @ 3%, T<sub>13</sub> - FYM @ 25 t ha<sup>-1</sup> + vermicompost @ 5 t ha<sup>-1</sup> + seaweed extract @ 3%, T<sub>14</sub> - FYM @ 25 t ha<sup>-1</sup> + Neem cake @ 5 t ha<sup>-1</sup> + seaweed extract @ 3%, T<sub>15</sub> - Recommended dose of NPK @ 70: 25: 25 kg ha<sup>-1</sup>.

Observations were recorded on ten tagged plants in each replication for all characters studied. The height of plant was measured at the time of last harvest from ground level to the tip of the plant and expressed in centimeter. The total number of branches arising from the main stem at the time of harvest was recorded and expressed in number. The total cumulative yield per plot was arrived at from each picking and these values were computed to one hectare and expressed in kg ha<sup>-1</sup>.

## RESEARCH FINDINGS AND DISCUSSION

The data relating to the effect of organic nutrient on plant height in season I and season II are given in Table 1. The mean performance of plant height was considerably higher in season I (46.10 cm) than in season II (43.20 cm).

The data recorded on number of branches per plant in season I and season II are furnished in Table 2. The treatment T<sub>11</sub> (5.20), followed by T<sub>12</sub> (4.47) and T<sub>13</sub> (4.20) had the maximum number of branches per plant in season I while, minimum number of branches per plant (3.13) were recorded in the treatment T<sub>1</sub>. Five treatments exceeded the general mean (3.77). In season II, maximum number of branches per plant was recorded in treatment T<sub>11</sub> (4.47) followed by T<sub>12</sub> (4.27) and T<sub>13</sub> (3.93), while the least number of branches per plant were

observed in the treatment T<sub>1</sub>. Five treatment of season II were higher than the general mean (3.51).

The data pertaining to the pod yield per ha are presented in Table 3. In season I, maximum pod yield per hectare was observed in the treatment T<sub>11</sub> (6.75 t) followed by T<sub>12</sub> (5.85 t) and T<sub>13</sub> (5.80 t). The minimum pod yield per hectare (3.64 t) was recorded in the treatment T<sub>1</sub> control. In season II, maximum pod yield per hectare was observed in the treatment T<sub>11</sub> (6.22 t) followed by T<sub>12</sub> (5.87 t) and T<sub>13</sub> (5.63 t). The minimum pod yield per hectare was recorded T<sub>1</sub> (3.59 t).

Organic manures improve the soil physical conditions and promote microbial and soil organic matter, which in turn produces organic acids, which inhibits enzymes, particularly IAA oxidase resulting in enhancing the promotive effect of auxin – IAA which has direct effect on plant growth (Leopold, 1974). The increase in plant height with an increase in the level of organic nutrients was, however, recorded in both the seasons. The results of the present study are in close agreement with the results of Singh (1985), Chandran (1987), Joy *et al.* (1991). The more number of branches and leaves due to application of organic manures may be attributed to the fact that FYM possesses optimum C : N ratio, which on decomposition readily release nitrogen in the easily available form of nutrient ions such as ammonium and nitrate.

The enhancement of yield per hectare may be attributed to the favorable effect of FYM in combination with vermicompost and panchagavya on the growth attributes, vigorous growth of the plant with higher number of branches and leaves might have triggered the photosynthetic activity

**Table 1 : Effect of organic inputs on plant height (cm) in vegetable cowpea**

Treatments	Plant height (cm)	
	Season I	Season II
T <sub>1</sub> - Absolute control	40.67	39.47
T <sub>2</sub> - FYM @ 25 t ha <sup>-1</sup>	41.27	39.60
T <sub>3</sub> - Vermicompost @ 5 t ha <sup>-1</sup>	41.91	40.87
T <sub>4</sub> - Neem cake @ 5 t ha <sup>-1</sup>	43.13	41.93
T <sub>5</sub> - FYM @ 25 t ha <sup>-1</sup> + panchagavya @ 3%	43.60	42.60
T <sub>6</sub> - Vermicompost @ 5 t ha <sup>-1</sup> + panchagavya @ 3%	44.47	43.47
T <sub>7</sub> - Neem cake @ 5 t ha <sup>-1</sup> + panchagavya @ 3%	41.87	40.87
T <sub>8</sub> - FYM @ 25 t ha <sup>-1</sup> + sea weed extract @ 3%	42.80	41.73
T <sub>9</sub> - Vermicompost @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	48.33	47.01
T <sub>10</sub> - Neem cake @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	48.11	48.00
T <sub>11</sub> - FYM @ 25 t ha <sup>-1</sup> + vermicompost @ 5 t ha <sup>-1</sup> + panchagavya @ 3%	53.66	53.67
T <sub>12</sub> - FYM @ 25 t ha <sup>-1</sup> + neem cake @ 5 t ha <sup>-1</sup> + panchagavya @ 3%	54.76	54.01
T <sub>13</sub> - FYM @ 25 t ha <sup>-1</sup> + vermicompost @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	52.44	52.83
T <sub>14</sub> - FYM @ 25 t ha <sup>-1</sup> + neem cake @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	50.22	50.11
T <sub>15</sub> - Recommended dose of NPK @ 25:60:60 kg ha <sup>-1</sup>	44.33	42.07
Mean	46.10	43.20
S.E.±	1.14	1.27
C.D. (P=0.05)	2.34	2.61

resulting in higher assimilation of nutrients.

Further higher yields due to application of vermicompost may be attributed to the high level of nutrients along with growth stimulating substances excreted by earthworms into their casts. Tomati and Galli (1988) emphasized the influence of microbial, hormone like substances on the plant metabolism,

growth and development by vermicompost.

Further, soil applied FYM, vermicompost and neem cake might have acted as nutrient sources resulting in highest uptake of nutrients by plants. This might have resulted in higher photosynthetic activity and higher accumulation of reserved photosynthates, which might have enhanced the

Treatments	Number of branches per plant	
	Season I	Season II
T <sub>1</sub> - Absolute control	3.13	3.07
T <sub>2</sub> - FYM @ 25 t ha <sup>-1</sup>	3.67	3.20
T <sub>3</sub> - Vermicompost @ 5 t ha <sup>-1</sup>	3.47	3.20
T <sub>4</sub> - Neem cake @ 5 t ha <sup>-1</sup>	3.33	3.13
T <sub>5</sub> - FYM @ 25 t ha <sup>-1</sup> + Panchagavya @ 3%	3.60	3.60
T <sub>6</sub> - Vermicompost @ 5 t ha <sup>-1</sup> + Panchagavya @ 3%	3.27	3.13
T <sub>7</sub> - Neem cake @ 5 t ha <sup>-1</sup> + Panchagavya @ 3%	4.10	3.73
T <sub>8</sub> - FYM @ 25 t ha <sup>-1</sup> + sea weed extract @ 3%	3.67	3.47
T <sub>9</sub> - Vermicompost @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	3.47	3.83
T <sub>10</sub> - Neem cake @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	3.47	3.27
T <sub>11</sub> - FYM @ 25 t ha <sup>-1</sup> + vermicompost @ 5 t ha <sup>-1</sup> + Panchagavya @ 3%	5.20	4.47
T <sub>12</sub> - FYM @ 25 t ha <sup>-1</sup> + neem cake @ 5 t ha <sup>-1</sup> + Panchagavya @ 3%	4.47	4.27
T <sub>13</sub> - FYM @ 25 t ha <sup>-1</sup> + vermicompost @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	4.20	3.93
T <sub>14</sub> - FYM @ 25 t ha <sup>-1</sup> + neem cake @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	3.47	3.13
T <sub>15</sub> - Recommended dose of NPK @ 25:60:60 kg ha <sup>-1</sup>	4.07	3.73
Mean	3.77	3.51
S.E.+	0.34	0.34
C.D. (P=0.05)	0.71	0.71

Treatments	Yield per hectare (t)	
	Season I	Season II
T <sub>1</sub> - Absolute control	3.64	3.59
T <sub>2</sub> - FYM @ 25 t ha <sup>-1</sup>	4.94	4.82
T <sub>3</sub> - Vermicompost @ 5 t ha <sup>-1</sup>	4.24	4.16
T <sub>4</sub> - Neem cake @ 5 t ha <sup>-1</sup>	4.49	4.47
T <sub>5</sub> - FYM @ 25 t ha <sup>-1</sup> + Panchagavya @ 3%	4.44	4.39
T <sub>6</sub> - Vermicompost @ 5 t ha <sup>-1</sup> + Panchagavya @ 3%	3.88	3.87
T <sub>7</sub> - Neem cake @ 5 t ha <sup>-1</sup> + Panchagavya @ 3%	3.75	4.39
T <sub>8</sub> - FYM @ 25 t ha <sup>-1</sup> + sea weed extract @ 3%	4.33	4.29
T <sub>9</sub> - Vermicompost @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	4.37	4.24
T <sub>10</sub> - Neem cake @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	4.63	4.58
T <sub>11</sub> - FYM @ 25 t ha <sup>-1</sup> + vermicompost @ 5 t ha <sup>-1</sup> + Panchagavya @ 3%	6.75	6.22
T <sub>12</sub> - FYM @ 25 t ha <sup>-1</sup> + neem cake @ 5 t ha <sup>-1</sup> + Panchagavya @ 3%	5.85	5.87
T <sub>13</sub> - FYM @ 25 t ha <sup>-1</sup> + vermicompost @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	5.80	5.63
T <sub>14</sub> - FYM @ 25 t ha <sup>-1</sup> + neem cake @ 5 t ha <sup>-1</sup> + sea weed extract @ 3%	5.11	5.08
T <sub>15</sub> - Recommended dose of NPK @ 25:60:60 kg ha <sup>-1</sup>	4.47	4.39
Mean	4.71	4.66
S.E.+	0.16	0.40
C.D. (P=0.05)	0.33	0.82

flowering, fruit development and ultimately the yield.

The favourable effect of FYM and vermicompost on yield attributes have been reported by Rajasekar *et al.* (1995), Senthilkumar and Sekar (1998), Sharma and Bhalla (1995), Barani and Anburani (2001), Akande *et al.* (2006) in okra.

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