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## Yield and yield parameters as influenced by various sources of water soluble fertilizers on chilli hybrid (*Capsicum annuum* L.)

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**ABSTRACT :** An investigation was conducted to study the effect of water soluble fertilizers on yield parameters of chilli hybrid (*Capsicum annuum* L.) was carried out during 2015-2016 in the Pudukuraipettai village at Virudhachalam Taluk in Cuddalore district. Foliar feeding of water soluble fertilizers NPK viz., 19:19:19, 18:18:18, 13:40:13 were given at 0.5 and 1.0 per cent concentration with 5 sprays each starting from 30 DAT at 15 days interval along with 100 and 75 per cent recommended dose of NPK (120:80:80 kg ha<sup>-1</sup>), formed thirteen treatments in chilli hybrid. The experimental plots were laid out in Randomized Block Design and replicated thrice. The results obtained showed that 100% RDF + WSF 1.0% NPK @ 13:40:13 recorded the highest number fruits per plant, fruit length, fruit girth, fruit weight, yield per plant and yield per hectare.

**KEY WORDS :** Chilli, Inorganic fertilizers, Water soluble fertilizers, Yield parameters

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Foliar spray is the modern method of fertilizer in vegetable crops due to nature of heavy feeder of nutrients (Vibhute, 1998). An application of nutrients through foliar spray has several advantages in supplementing the nutritional requirement of crops. Foliar nutrition is designed to eliminate the problems like fixation and immobilization of nutrients. This method of nutrient application plays an important role in supplying the nutrients to the plants, by improving overall crop health. Foliar fertilizers have different ratios of N, P and K, is highly water soluble and so amenable for foliar nutrition (Jeybal *et al.*, 1998). Foliar feeding has been widely used and accepted as an essential part of crop production, especially on horticulture crops (Pace Gray, 1982). Water soluble fertilizers are fertilizers that can be dissolved in water and leached out of the soil easily. It is easy to control the precise amount of nutrients available to plants.

Water soluble fertilizers are advantageously utilized for foliar feeding and fertigation, thus, helping in precision agriculture. Water soluble fertilizers also play an important role in preventing the flower and fruit drop and improves crop yield and quality (Sendhil Valavan and Kumaresan, 2006).

Chilli hybrid having high yield potential, requires uninterrupted supply of nutrients both during vegetative and reproductive phase of growth. In order to improve the efficiency of the fertilizer, the nutrients are applied through foliage. Foliar nutrition is designed to eliminate the above problems particularly with respect to macro nutrients. Now-a-day's application of N, P and K in different ratios through foliar sprays is the modern method of fertilization in vegetable crops due to the nature of heavy feeder nutrients (Chaurasia *et al.*, 2005). Hence, the present investigation was undertaken to study the

effect of various forms of water soluble fertilizers on yield and yield parameters of chilli hybrid.

## RESEARCH METHODS

A field experiment was carried out at Pudhukuraipettai village of Virudhachalam taluk in Cuddalore district, Tamil Nadu to study the effect of water soluble fertilizers on growth of chilli hybrid 'Sierra. Seeds of chilli hybrid Sierra were sown and raised in protrays (98 cells) and they were maintained under the protected structure (Green house) to get healthy seedlings. The seedlings of forty five days were transplanted in a plot size of 2m x 2m at spacing of 75x 60 cm. The experiment was laid out in Randomized Block Design and replicated thrice. The treatments consisted of application of two levels of inorganic fertilizer (100 % and 75% recommended dose fertilizers @ 120:80:80 kg NPK ha<sup>-1</sup>) The inorganic fertilizers were applied in the form of urea, superphosphate and muriate of potash as per the treatments. N was applied in 4 split doses, first dose was given as a basal application and the remaining N was given in 3 equal splits, at 30 days interval (30, 60 and 90 DAT). The full dose of phosphorus and potassium were applied as basal application at the time of transplanting.

Water soluble fertilizers *viz.*, NPK at 19:19:19, 18:18:18 and 13:40:13 were given in two concentrations of 0.5 per cent and 1 per cent as five sprays, starting from 30 days after transplanting at 15 days interval at

30, 60 and 90 DAT. The required quantity of manures and fertilizers were applied as per the treatment. Five plants were selected at random from the sampling area and tagged for recording biometrical observation. The observations on various yield parameters *viz.*, days to 50 per cent flowering, number flowers per plant, fruit length, fruit girth, fruit weight, number of fruits per plants, yield per plant, yield per plot and yield per hectare were recorded and statistically analysed as given by Panse and Sukhatme (1978).

## RESEARCH FINDINGS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under following heads :

### Yield parameters :

In the present study, application of various levels of water soluble fertilizers significantly influenced the yield and yield parameters.

Application of various levels of foliar application of water soluble fertilizers significantly influenced the fruit length with regard to various treatments that tested. The highest fruit length was recorded in T<sub>13</sub> (16.21 cm) which received 100% recommended dose of fertilizer + WSF 1.0% NPK @ 13:40:13 and the least (8.15 cm) was recorded in 100 per cent recommended dose of fertilizers. With regard to fruit girth the highest value (5.45 cm) was recorded by the application of 100 per cent recommended dose of fertilizer with 1 per cent NPK

**Table 1 : Influence of water soluble fertilizers on yield and yield parameters in chilli hybrid**

Treatments	No. of fruits plant <sup>-1</sup>	Fruit length (cm)	Fruit girth (cm)	Fruit weight (g)	Fruit yield plant <sup>-1</sup> (g)	Fruit yield ha <sup>-1</sup> (t)
T <sub>1</sub> - 120:80:80 kg NPK ha <sup>-1</sup> (RDF)	75.80	8.15	2.28	3.91	299.41	6.73
T <sub>2</sub> - 75% RDF + 0.5% (NPK @ 19:19:19)	79.94	10.35	2.32	4.4	309.37	6.96
T <sub>3</sub> - 75% RDF + 1.0% (NPK @ 19:19:19)	81.35	12.13	2.41	5.25	324.59	7.30
T <sub>4</sub> - 75% RDF + 0.5% (NPK @ 18:18:18)	83.02	10.59	3.05	6.37	332.08	7.47
T <sub>5</sub> - 75% RDF + 1.0% (NPK @ 18:18:18)	86.45	11.02	3.21	7.12	370.01	8.32
T <sub>6</sub> - 75% RDF + 0.5% (NPK @ 13:40:13)	89.15	14.15	4.37	10.19	539.36	12.13
T <sub>7</sub> - 75% RDF + 1.0% (NPK @ 13:40:13)	91.35	14.21	4.48	10.22	570.02	12.80
T <sub>8</sub> - 100% RDF + 0.5% (NPK @ 19:19:19)	88.25	12.48	3.82	10.05	628.34	14.13
T <sub>9</sub> - 100% RDF + 1.0% (NPK @ 19:19:19)	90.14	12.55	4.94	10.21	667.04	15.00
T <sub>10</sub> - 100% RDF + 0.5% (NPK @ 18:18:18)	96.10	14.56	5.16	10.52	736.24	16.50
T <sub>11</sub> - 100% RDF + 1.0% (NPK @ 18:18:18)	92.24	13.27	5.07	10.41	705.64	15.87
T <sub>12</sub> - 100% RDF + 0.5% (NPK @ 13:40:13)	98.25	15.35	5.31	11.53	816.45	18.37
T <sub>13</sub> - 100% RDF + 1.0% (NPK @ 13:40:13)	101.12	16.21	5.45	12.12	854.46	19.22
S.E.±	1.03	0.36	0.06	0.15	14.50	0.58
C.D. (P=0.05)	2.14	0.74	0.14	0.31	30.05	1.21

(13:40:13), followed by 0.5 per cent (NPK 13:40:13) along with 100 per cent recommended dose of NPK. The least fruit girth was recorded in T<sub>1</sub> (2.28 cm) (Table 1).

The water soluble fertilizer used as foliar spray contains all the major nutrients which played an important role for increasing the fruit length and fruit girth. Nutrient application at successive stages through foliar spray might have resulted in more translocation of surplus food in the fruits from stem and leaves which accelerated the formation and development of bigger sized fruits. Similar result was also reported Vitkar *et al.* (2007) in chilli. The reason for increased fruit characters might be due to readily available N due to the application of N, P and K may also be the prime factor for the increased fruit length and fruit girth in companied application of water soluble fertilizers and inorganic fertilizers by Babitha (2015) in brinjal.

In the present study, application of various levels of inorganic and water soluble fertilizers significantly influenced the fruit weight per plant. Among the various treatments that tested the highest fruit weight per plant was recorded in T<sub>13</sub> (12.12 g) which received 100% recommended dose of fertilizer + WSF 1.0% NPK @ 13:40:13 and the least was recorded in 100 per cent recommended dose of fertilizers in T<sub>1</sub> (3.91g). Foliar application of added N, P and K increased fruit weight when compared to control in the present study. The increase in fruit weight might be due to the better utilization of photosynthates for reproductive growth instead of rapid development of vegetative growth and the partitioning efficiency *viz.*, increased allocation of photosynthates towards the economic part. Similar findings of increased fruit weight due to foliar application of nutrients was reported by Singh and Mukherjee (2000) in chilli.

#### Crop yield :

The results of the present study clearly indicates that, application of various levels of inorganic and water soluble fertilizers significantly influenced the fruit yield. Among the various treatments that tested the highest fruit yield per plant (854.46 g) and per hectare (19.22 t) was recorded in T<sub>13</sub> which received 100% recommended dose of fertilizer + WSF 1.0% NPK @ 13:40:13 and the least fruit yield per plant (299.41 g) and per hectare (6.73 t) was recorded in the treatment T<sub>1</sub> that received 100 per cent recommended dose of fertilizers alone.

The increase in fruit yield in the best treatment could be due to the overall additive effect of NPK applied through foliar nutrition as a supplemental dose on various growths, physiological, yield parameters and uptake of nutrients, finally resulted in higher fruit yield. These findings gain support from the results of Palaniappan *et al.* (1999) in chilli and Karapakam *et al.* (2004) in brinjal who found that foliar application of water soluble fertilizers increased the total yield. In the present investigation among the two different levels of inorganic fertilizers (75% and 100% recommended dose of fertilizer) and two levels of water soluble fertilizers (0.5% and 1.0%), it was noticed that application of higher levels of nutrients *i.e.* 100 per cent recommended dose of fertilizer and 1 per cent water soluble fertilizer recorded the highest growth and yield parameters. The results of the present investigation are in conformance with the findings of Deepadevi and Shanthi (2009) in chilli.

#### Conclusion :

Among the different grades of water soluble fertilizers, foliar application of 5 sprays of NPK (13:40:13) along with recommended dose fertilizer (120:80:80) recorded the fruits per plant with the highest fruit weight and yield. Thus, foliar application of sprays NPK (13:40:13) along with the recommended dose of 120:80:80 kg NPK ha<sup>-1</sup> is found to be highly beneficial for maximizing the yield of chilli hybrid Sierra.

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