Int.J.Curr.Microbiol.App.Sci (2018) *7*(8): 638-653

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 7 Number 08 (2018)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2018.708.069

Impact of Different N and K Fertigation Levels on Yield Attributes and Total Yield in Paprika (*Capsicum annuum* L.) under Drip Fertigation

D. Mounika*, M. Uma Devi, V. Praveen Rao, K. Avil Kumar and B. Neeraja Prabakar

Water Technology Centre, College of Agriculture, Professor Jayashankar Telangana State Agricultural University, Rajendranagar, Hyderabad - 500 030, India

**Corresponding author*

Keywords

Paprika (*capsicum annum* L.), Drip fertigation, Pan evaporimeter, Yield parameters, Fruit characters

Article Info

Accepted:
06 July 2018
Available Online:
10 August 2018

A B S T R A C T

A field experiment was conducted at Water Technology Centre, College farm, Rajendranagar, Hyderabad during *rabi*, 2014-15 to study the "Paprika (*Capsicum annuum* L.) response to fertigation levels of nitrogen and potassium". The experiment was conducted with variety Agnirekha in a randomized block design with three replications. The treatments were eleven, viz., soil application of 100 % N and K_2O with drip irrigation (T_1) and with furrow irrigation (T_2); drip Fertigation of 75% N+75%,100 % and 125 % K_2O (T_3, T_4, T_5, respectively); drip fertigation of 100% N +75%, 100% and 125% K_2O (T_6, T_7, T_8 respectively); drip fertigation of 125% N+75%, 100% and 125% K_2O (T_9,T_{10},T_{11} respectively). The 100% N and K levels were 250 N and 150 K_2O, kg ha^{-1}. Basal dose of 100 kg P_2O_5 ha^{-1} through single super phosphate was applied to all the treatments by soil application. N and K fertilizers for T_1 and T_2 were applied to soil in three equal splits at 10, 35 and 60 DAT and N and K fertigation was in 38 splits through urea and potassium nitrate. Drip irrigation was scheduled (T_1 to T_{11}, except T_2) once in 2 days based on daily data of USWB class 'A' pan evaporimeter and furrow irrigation (T_2) was at 1.0 IW/CPE ratio with 60 mm irrigation depth in furrows in between paired rows (80 cm/40 cm). The amount of total irrigation water applied was 6381 m^3 and 7483 m^3 in drip irrigation and furrow irrigation treatments respectively. The data on total fresh fruit yield (six pickings) (kg ha^{-1}), yield attributes of chilli fruit characterstics at different growth stages were recorded.

Introduction

Water and fertilizer are the two important inputs in agriculture and becoming scarce and costly over years. Their efficient use is basic for the survival of agriculture, due to shrinking land: man and water: man ratios, increasing fertilizer prices, hunting energy crisis, wide spread pollution and fast degradation of natural resources. Therefore, there is a need for technological options, which will help in sustaining the precious resources and maximizing crop production with least detrimental impact on the environment. The sustainability of any production system requires optimum utilization of resources like water, fertilizer or soil. Efficient use of water and fertilizers is highly critical to sustain the agricultural production, more particularly in the context of declining per capita land and

water availability, pollution and increasing cost of fertilizers. Fertigation is the application of water and fertilizers simultaneously to the crops only to the wetted root volume where the active roots are concentrated through micro irrigation systems *i.e.*, drip, microjets or micro sprinklers. Paprika (*Capsicum annuum L.*) is a less pungent widely used chilli variety and is an important vegetable cum condiment. It is also locally known as *Bajji mirchi*. It is used as an ingredient in a broad variety of dishes throughout the world. It is now gaining more importance in the global market because of its value added products like chilli powder, paste, oleoresin, capsanthin and capsaicin *etc*. India is a major producer, exporter and consumer of chilli with an area of 794 thousand hectares and production of 1304 thousand million tones with a productivity of 1.6 t ha^{-1} (Indian horticultural data base 2013). The world area and production of chilli is around 15 lakh ha and 70 lakh tonne respectively. Drip is the only option to replace the conventional irrigation method to achieve water-use efficiency. It keeps the soil moisture near to field capacity and also increases fertilizer use efficiency by avoiding losses through leaching, volatilization and fixing of nutrient in the soil (Narayan, 2004).

Materials and Methods

A field experiment was conducted at Water Technology Centre, College farm, Rajendranagar, Hyderabad during *rabi*, 2014-15 to study the "Paprika (*Capsicum annuum L.*) response to fertigation levels of nitrogen and potassium". The experiment was conducted with variety Agnirekha in a randomized block design with three replications. The treatments were eleven, viz., soil application of 100 % N and K_2O with drip irrigation (T_1) and with furrow irrigation (T_2);drip Fertigation of 75% N+75%,100 % and 125 % K_2O (T_3, T_4, T_5, respectively); drip fertigation of 100% N +75%, 100% and 125% K_2O (T_6, T_7, T_8 respectively); drip fertigation of 125% N+75%, 100% and 125% K_2O (T_9,T_{10},T_{11} respectively). The 100% N and K levels were 250 N and 150 K_2O, kg ha^{-1}. Basal dose of 100 kg P_2O_5 ha^{-1} through single super phosphate was applied to all the treatments by soil application. N and K fertilizers for T_1 and T_2 were applied to soil in three equal splits at 10, 35 and 60 DAT and N and K fertigation was in 38 splits through urea and potassium nitrate (six, four, four and 24 splits during vegetative stage *i.e.*, 12-32 DAT, flowering to fruit initiation stage *i.e.*, 35-46 DAT, fruit initiation to first picking *i.e.*, 49-60 DAT and first picking on wards from 63-143 DAT respectively) twice in a week at the rate of 18%, 14%, 20% and 48% of N and 14%, 16%, 22% and 48% of K_2O during these four growth stages, respectively. Drip irrigation was scheduled (T_1 to T_{11}, except T_2) once in 2 days based on daily data of USWB class 'A' pan evaporimeter and furrow irrigation (T_2) was at 1.0 IW/CPE ratio with 60 mm irrigation depth in furrows in between paired rows (80 cm/40 cm).

The experimental soil was sandy loam in texture, slightly alkaline in reaction, non-saline, low in available nitrogen, high in organic carbon, available phosphorus and potassium. The weekly mean relative humidity ranged from 47.6 % to 88.1 % with a overall mean of 64.4%. The number of sunshine hour's day^{-1} ranged from 3.3 to 9.9 hours with a mean of 6.8 hours day^{-1}. The wind speed varied from 1.0 km to 12.1 km $hour^{-1}$ with a mean of 6.8 hours day^{-1}. The E pan data varied from 2.0 to 5.6 mm with a mean of 3.8 mm. The total amount of rain fall during the crop growth period including nursery period was 324.5 mm, received in 21 days. The total E pan data during the crop growth period including nursery period was 742.7 mm.

The paprika variety Agnirekha from the company Syngenta was as variety crop. Plants

of this variety are vigorous, 60-100 cm height with strong lateral branches. The fruits are medium long, thick walled and uniform. Bearing is solitary. Average fruit length is 10-11 cm and around 1.5 cm in diameter.

Nursery

The seeds having 70 per cent germination was dibbled in lines on raised beds in the nursery. Before sowing, the nursery area was ploughed with tractor drawn cultivator till fine tilth was obtained. After completion of land preparation, nursery beds of 15 numbers were prepared. The total number of beds was 15. Each bed area was 1.8 m^2 (length= 2.0 m, width = 0.9 m). Total area of nursery beds was 27 m^2. Each bed received 250 g of neem cake, 0.5 kg of vermicompost, 3.5 kg of FYM and nearly 25 kg of red soil. After wards, all the beds were thoroughly drenched with copper oxy chloride (COC) @ (3 g L^{-1}). A day after nursery sowing was done after treating the seeds with acephate @ 1 g per 10 g seed. In each bed, width wise, ten rows were maintained. Eighty grams of seed was used. Approximately, 1300 seed were present in each ten grams seed pack. After sowing, all beds were covered with dried rice straw for a period of five days till germination was obtained.

Main field preparation and manures application

After collection of the initial soil samples, the main field was thoroughly ploughed thrice and leveled. The field received powdered neem cake @ 460 kg ha^{-1} mixed with *Trichoderma viridi* @ 3 kg ha^{-1} which was mixed in the field and leveling of the individual treatment plots was done. The drip lines were arranged for all the treatment plots and the drip system was checked for its flow rate. Every plot had five drip line laterals. The lateral spacing was 1.2 m. The flow rate was 2 lps (liters per second). A day before planting entire field was thoroughly wetted by using the drip irrigation system.

Transplanting

After pulling the 35 days old seedlings from nursery, they were dipped in a slurry prepared by mixing 0.5 kg *Trichoderma viridi* and 0.5 kg *Azospirillum* for one hour. Then they were transplanted on 6th September, 2014, adopting a spacing of 80 cm between the rows and 40 cm between plants (paired row). The plot size was 6 m x 7.2 m. In each plot, ten rows were made. Every row had 16 plants. Thus in total 160 plants per each treatment plot were maintained. Gap filling was done one week after transplanting with the reserved nursery.

Results and Discussion

Number of fruits $plant^{-1}$

Data on number of fruits of paprika at each picking *i.e.* at 57, 70, 90, 117, 138 and 160 DAT are presented in Table 1. The no. of fruits $plant^{-1}$ were significantly influenced by the treatments at all the stages of data recording except at during the first picking *i.e.* at 57 DAT. In general, the maximum no. of fruits were noticed at 90 DAT in case of fertigation treatments (T_3 to T_{11}) and at 70 DAT in case of soil application (T_1 and T_2) treatments. In general, with increase in N levels from 75% to 125%, the no. of fruits $plant^{-1}$ increased. At 75% and 100% N levels, increase in K levels from 75 to 125% resulted in increase in no. of fruits.

Number of fruits $plant^{-1}$ at 57 DAT (First picking)

It ranged from 11.07 to 12.30 $plant^{-1}$. The number of fruits $plant^{-1}$ during the first picking stage (57 DAT) was not significantly influenced by the treatments. However, the

maximum no. of fruits were noticed with drip Fertigation of 125% N and K followed by 125% N + 100 % K and 125% N + 75% K and the least in soil application of 100 % N and K with furrow irrigation (T_2).

Number of fruits plant^{-1} at 70 DAT (Second picking)

It ranged from 16.73 to 39.10 plant^{-1}. The highest no. of fruits were recorded Fertigation of 125% N + 75% K (T_9) which was on par with 125% N with 100% K (T_{10}) and 125% K (T_{11}) and 100% N with 125% K (T_8) and significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than all other treatments. However, fertigation of at 125% N recorded maximum no. of fruits at 75% K level, which got reduced with further increase in K levels. Fertigation of 100% N and K (T_7) (33.47) resulted in 39.5% increase in no. of fruits plant^{-1} compared to soil application of same levels of N and K under drip irrigation (T_1) (24.00). There was 43% increase in no. of fruits plant^{-1} by drip irrigation with 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (16.73) applied to soil.

Number of fruits plant^{-1} at 90 DAT (Third picking)

It ranged from 15.87 to 39.53 plant^{-1}. The highest no. of fruits were recorded in fertigation of 125% N and K (T_{11}) which was on par with 125% N with 75% K (T_9) and 100% K (T_{10}) and 100% N with 125% K (T_8) and significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil under furrow irrigation (T_2) which was significantly lower than all other treatments. However, at 125% N level, similar no. of fruits was noticed at all the K levels (75% to 125%). Fertigation of 100% N and K (T_7) (34.20) resulted in 69% increase in no. of fruits plant^{-1} compared to soil application of same levels of N and K with drip irrigation (T_1) (20.13). There was 26% increase in no. of fruits plant^{-1} by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels applied to soil (15.87).

Number of fruits plant^{-1} at 117 DAT (Fourth picking)

It ranged from 10.17 to 18.67 plant^{-1}. With increase in age, there was reduction in no. of fruits plant^{-1}. The highest no. of fruits were recorded with fertigation of 125% N and K (T_{11}) which was on par with 125% N with 100% K (T_{10}) and 75% K (T_9) and 100% N with 125% K (T_8) and significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil under furrow irrigation (T_2) which was significantly lower than all other treatments. Fertigation of 100% N and K (T_7) (16.17) resulted in 19.5% increase in no. of fruits plant^{-1} compared to soil application of same levels of N and K with drip irrigation (T_1) (13.53). There was 33% increase in no. of fruits plant^{-1} by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels applied to soil (10.17).

Number of fruits plant^{-1} at 138 DAT (Fifth picking)

It ranged from 5.33 to11.33 plant^{-1}. With increase in age, there was further reduction in no. of fruits plant^{-1}. The highest no. of fruits were recorded with fertigation of 125% N and K (T_{11}) which was on par with 125% N with 75% K (T_9) and 100% K (T_{10}) and 100% N with 125% K (T_8) and 100% K (T_7) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil under furrow irrigation (T_2)

which was significantly lower than all other treatments. Fertigation of 100% N and K (T_7) (9.53) resulted in 21.7 % increase in no. of fruits plant^{-1} compared to soil application of same levels of N and K with drip irrigation (T_1) (7.83). There was 46.9% increase in no. of fruits plant^{-1} by drip irrigation at 100% N and K applied to soil over to furrow irrigation (T_2) at same N and K levels applied to soil (5.33).

Number of fruits plant^{-1} at 160 DAT (Final, 6th picking)

It ranged from 3.17 to 7.80. With increase in age, there was great reduction in no. of fruits plant^{-1}. The highest no. of fruits were recorded with fertigation of 125% N and K (T_{11}) which was on par with 125% N with 75% K (T_9) and 100% K (T_{10}) and 100% N with 125% K (T_8) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil with furrow irrigation (T_2) which was significantly lower than all other treatments. Fertigation of 100% N and K (T_7) (6.17) resulted in 16.4 % increase in no. of fruits plant^{-1} over soil application of same levels of N and K under drip irrigation (T_1) (5.30). There was 67% increase in no. of fruits plant^{-1} by drip irrigation at 100% N and K applied to soil when compared to furrow irrigation (T_2) at same N and K levels apllied to soil (3.17).

The total number of fruits (sum of six pickings) ranged from 10.39 to 21.27 plant^{-1}. The highest no. of fruits were recorded in fertigation of 125% N + 125% K (T_{11}) which was on par with 125% N with 100% K_2O (T_{10}) and 75% K_2O (T_9) and was significantly higher over other treatments. Like the fruit length and width, in general higher number of fruits per plant was noticed with increase in N levels from 75% to 125%. At 100% and 75% N levels, with increase in K levels from 75% to 125% there was significant increase in number of fruits per plant. Whereas, at 125% N levels, all the K_2O levels were statistically on par. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than all other treatments. Fertigation of 100% N and K (T_7) (18.62) resulted in 35.41 % increase in no. of fruits plant^{-1} compared to soil application of same levels of N and K under drip irrigation (T_1) (13.75). There was 32.3% increase in no. of fruits plant^{-1} by drip irrigation with 100% N and K_2O applied to soil compared to furrow irrigation (T_2) at same N and K_2O levels (10.39) applied to soil.

The highest number of fruits plant^{-1} in fertigation with higher level of N and K could be due to vigour of plant, vegetative growth, increased number of branches and more number of leaves plant^{-1} and enhanced photosynthetic activity. Continuous availability of moisture and nutrients in root zone of fertigated treatments might have improved the availability of native and applied nutrients. This might have accelerated the synthesis of carbohydrates and its better translocation from sink to source that might have led to an improvement in yield and yield related attributes. The number of fruits plant $^{-1}$ increased gradually with the increase of nitrogen dose was reported by several scientists Bar *et al.,* 2001.

Fruit length (cm)

Data on mean fruit length of paprika at each picking *i.e*. at 57, 70, 90, 117, 138 and 160 DAT are presented in Table 2. Except at 57 DAT, the fruit length was significantly influenced by the treatments at all the stages of data recording. In general, the maximum fruit length was noticed at 138 DAT in all the treatments except in T_1 where at 117 DAT, the maximum fruit length was observed. In general, with increase in N fertigation levels from 75% to 125%, the mean length of fruit

increased. Within each level of N, increase in K levels showed increase in length of fruits.

Fruit length at 57 DAT (First picking)

It ranged from 2.157 to 2.273 cm. It was not significantly influenced by different treatments imposed at this stage. However, the highest fruit length was recorded in Fertigation of 125% N + 75% N (T_9) and the least in 100% N and K application to soil with furrow irrigation (T_2).

Fruit length at 70 DAT (Second picking)

It ranged from 2.21 to 3.51 cm. The highest fruit length was noticed with fertigation of 125 % N and K (T_{11}) which was on par with 125% N with different K levels (T_{10} and T_9), 100% N with 125% K (T_8) and was significantly higher than other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was on par with 100% N and K to soil under drip irrigation (T_1) and Fertigation of 75% N with 75% K (T_3) and 100% K (T_4)**.** Fertigation of 100% N and K (T_7) (2.76 cm) resulted in 22 % increase in length of fruits compared to soil application of same levels of N and K under drip irrigation (T_1) (2.14 cm). There was only 2.2% increase in length of fruits by drip irrigation at 100% N and K applied to soil (T_1) (2.26 cm) compared to furrow irrigation (T_2) at same N and K levels (2.21 cm)

Fruit length at 90 DAT (Third picking)

It ranged from 2.78 to 3.89 cm. The highest fruit length was noticed in 125 % N and K (T_{11}) application which was on par with 125% N with other K levels (T_{10} and T_9), 100% N with 125% (T_8) and 100% K (T_7) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil with furrow irrigation (T_2) which was significantly lower than rest of treatments. Fertigation of 100% N and K (T_7) (3.71 cm) resulted in 20.8 % increase in length of fruits[1] compared to soil application of same levels of N and K and drip irrigated (T_1) (3.07). There was 10.4% increase in length of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (2.78 cm).

Fruit length at 117 DAT (Fourth picking)

It ranged from 3.21 to 4.90 cm. The highest fruit length was noticed in 125 % N and K (T_{11}) application which was on par with 125% and 100% N with different K levels (T_6 to T_{10}) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than all other treatments. Fertigation of 100% N and K (T_7) (4.82 cm) resulted in 22.9 % increase in length of fruits when compared to soil application of same levels of N and K and drip irrigated (T_1) (3.92 cm). There was 22.1 % increase in length of fruits by drip irrigation at 100% N and K applied to soil when compared to furrow irrigation (T_2) at same N and K levels (3.21 cm).

Fruit length at 138 DAT (Fifth picking)

It ranged from 3.26 to 5.03 cm. It followed the same trend as that of fourth picking *i.e*. at 122 DAT. The highest fruit length was noticed in 125 % N and K (T_{11}) application which was on par with 125% and 100% N with different K levels (T6 to T_{10}), 75% N with 125% K (T_5) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than all other treatments. Fertigation of 100% N and K (T_7) (4.70 cm) resulted in 31.2 % increase in length of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (3.58 cm). There was 9.8 %

increase in length of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (3.26cm).

Fruit length at 160 DAT (Final, sixth picking)

It ranged from 2.63 to 4.02 cm. It followed the same trend as that of fourth and fifth picking. The highest fruit length was noticed in 125 % N and K (T_{11}) application which was on par with 125% and 100% N with different K levels (T_6 to T_{10}), 75% N with 125% K (T_5) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than all other treatments. Fertigation of 100% N and K (T_7) (3.83 cm) resulted in 14.3 % increase in length of fruits when compared to soil application of same levels of N and K and drip irrigated (T_1) (3.35 cm). There was 27.3 % increase in length of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (2.63 cm). The mean fruit length of paprika (mean of six pickings) ranged from 2.71 to 3.93 cm. The highest fruit length was noticed with fertigation of 125 % N and K_2O (T_{11}) which was on par with 125% N with different K_2O levels (T_{10} and T_9) and 100% N with 125% K_2O (T_8) and was significantly higher than other treatments.

In general higher fruit length was noticed with increase in N levels from 75% to 125%. Within each N level, with increase in K levels from 75% to 125% there was increase in fruit length. However, within each N level, K levels were statistically on par to each other. Soil application of 100% N and K and irrigated by drip (T_2) was observed to be on par with 75% N + 125% K_2O (T_3) and was significantly lower than other fertigated treatments and significantly higher than soil application of 100% N and K and irrigated by furrow method (T_2). Fertigation of 100% N and K (T_7) (3.68 cm) resulted in 20.26 % increase in length of fruits compared to soil application of same levels of N and K under drip irrigation (T_1) (3.06 cm). There was only 12.91% increase in length of fruits by drip irrigation at 100% N and K applied to soil (T_1) (3.06 cm) compared to furrow irrigation (T_2) at same N and K levels (2.71 cm)

Continuous availability of moisture and nutrients in root zone of fertigated treatments might have improved the availability of native and applied nutrients. This might have accelerated the synthesis of carbohydrates and its better translocation from sink to source that might have led to an improvement in yield and yield related attributes. Increase in fruit size with adequate K nutrition was reported by Bhuvaneswari *et al.,* (2013).

Fruit girth (cm)

Data on mean fruit girth of paprika at each picking *i.e*. at 57, 70, 90, 117, 138 and 160 DAT are presented in Table 3. The fruit width was significantly influenced by the treatments at all the stages of data recorded. In general, the maximum fruit girth was noticed at 117 DAT in all the treatments. In general, with increase in N levels from 75% to 125%, the mean girth of fruit increased. Within each level of N, increase in K levels showed increase in girth of fruits.

Fruit girth at 57 DAT (First picking)

It ranged from 0.95 to 1.98 cm. The highest fruit girth was noticed in 125 % N and K (T_{11}) application which was on par with 125% and 100% N with different K levels, 75% N with 125% K (T_{10} to T_5) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was on par

with 100% N and K to soil and drip irrigation (T_1). Fertigation of 100% N and K (T_7) (1.79 cm) resulted in 58.4 % increase in girth of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (1.13 cm). There was 18.9 % increase in width of fruits by drip irrigation at 100% N and K applied to soil (T_1) compared to furrow irrigation (T_2) at same N and K levels (0.95 cm).

Fruit girth at 70 DAT (Second picking)

It ranged from 2.34 to 4.40 cm. The highest fruit girth was noticed in 125 % N and K (T_{11}) application which was on par with 125% N with 100% (T_{10}) and 75% (T_9) K levels, 100% N with 125% K (T_8) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was on par with 100% N and K to soil and drip irrigation (T_1), 75% N with different levels of K (T_4 to T_6) and 100% N with 100% K (T_7). Fertigation of 100% N and K (T_7) (2.75 cm) resulted in 5.36 % increase in girth of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (2.61 cm). There was only 11.5 % increase in width of fruits by drip irrigation at 100% N and K applied to soil (T_1) (2.61 cm) compared to furrow irrigation (T_2) at same N and K levels (2.34 cm).

Fruit girth at 90 DAT (Third picking)

It ranged from 2.15 to 4.54 cm. The highest fruit girth was noticed in 125 % N and K (T_{11}) application which was on par with 125% N with other K levels (T_{10} and T_9), 100% N with 125% (T_8) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was on par with 75% N with different levels of K (T_4 to T_6) and significantly lower than other treatments. Fertigation of 100% N and K (T_7) (2.83 cm) resulted in 24.6 % increase in girth of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (2.27). There was 5.58 % increase in girth of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (2.15 cm).

Fruit girth at 117 DAT (Fourth picking)

It ranged from 2.97 to 6.55 cm. The highest fruit girth was noticed in 125 % N and K (T_{11}) application which was on par with 125% N with other levels of K (T_{10} and T_9) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was on par with 100% N and K with drip irrigation (T_1) and 75% N with 75% K (T_3) and significantly lower than other treatments.

Fertigation of 100% N and K (T_7) (4.97 cm) resulted in 40 % increase in width of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (3.55 cm). There was 19.5 % increase in girth of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (2.97 cm).

Fruit girth at 138 DAT (Fifth picking)

It ranged from 2.62 to 5.15 cm. It followed the same trend as that of fourth picking *i.e*. at 117 DAT. The highest fruit girth was noticed in 125 % N and K (T_{11}) application which was on par with 125% N with other K levels (T_{10} and T_9) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was on par with 100% N and K with drip irrigation (T_1) and 75% N with different K levels (T_3 to T_5) and significantly lower than other treatments.

Table.1 Effect of N and K fertigation on paprika number of fruits plant^{-1} at 57, 70, 90, 117, 138 and 160 DAT (final harvest) during *rabi* 2014-2015

Treatments*		Number of fruits plant^{-1}						
		57 DAT	70 DAT	90 DAT	117 DAT	138 DAT	160 DAT	Total
T1	Soil application of 100 % N and K + drip irrigation	11.70	24.00	20.13	13.53	7.83	5.30	13.75
T2	Soil application of 100 % N and K + furrow irrigation	11.07	16.73	15.87	10.17	5.33	3.17	10.39
T3	Fertigation of 75 % N + 75 % K	11.50	25.57	25.57	13.67	7.80	5.63	14.96
T4	Fertigation of 75 % N+ 100 % K	11.57	27.67	28.80	13.83	7.90	5.73	15.92
T5	Fertigaion of 75 % N + 125 % K	11.73	29.87	29.90	15.33	8.10	6.03	16.83
T6	Fertigation of 100 % N + 75 % K	11.77	30.10	32.77	15.50	8.14	6.30	17.43
T7	Fertigation of 100 % N+ 100 % K	12.17	33.47	34.20	16.17	9.53	6.17	18.62
T8	Fertigaion of 100 % N + 125 % K	12.20	37.43	39.03	17.03	10.10	6.87	20.44
T9	Fertigation of 125 % N + 75 % K	12.23	39.10	39.23	17.17	10.63	7.07	20.91
T10	Fertigation of 125 % N+ 100 % K	12.27	38.33	39.17	18.20	10.37	7.00	20.89
T11	Fertigaion of 125 % N + 125 % K	12.30	37.97	39.53	18.67	11.33	7.80	21.27
	SEm±	0.58	0.98	0.71	0.67	0.61	0.34	0.25
	C.D (P=0.05)	1.72	2.90	2.10	1.98	1.80	1.01	0.75

Table.2 Effect of N and K fertigation on mean fruit length of paprika at 57, 70, 90, 117, 138 and 160 DAT (final harvest) during *rabi* 2014-2015

Treatments*		Mean fruit length (cm)						
		57 DAT	70 DAT	90 DAT	117 DAT	138 DAT	160 DAT	Over all mean
T1	Soil application of 100 % N and K + drip irrigation	2.17	2.26	3.07	3.92	3.58	3.35	3.06
T2	Soil application of 100 % N and K + furrow irrigation	2.16	2.21	2.78	3.21	3.26	2.63	2.71
T3	Fertigation of 75 % N + 75 % K	2.18	2.43	3.15	3.59	3.93	3.38	3.11
T4	Fertigation of 75 % N+ 100 % K	2.21	2.64	3.16	4.05	4.37	3.44	3.31
T5	Fertigaion of 75 % N + 125 % K	2.23	2.70	3.23	4.35	4.58	3.70	3.46
T6	Fertigation of 100 % N + 75 % K	2.25	2.70	3.51	4.73	4.62	3.74	3.59
T7	Fertigation of 100 % N+ 100 % K	2.26	2.76	3.71	4.82	4.70	3.83	3.68
T8	Fertigaion of 100 % N + 125 % K	2.27	3.14	3.76	4.85	4.73	3.88	3.77
T9	Fertigation of 125 % N + 75 % K	2.27	3.16	3.83	4.89	4.88	3.99	3.84
T10	Fertigation of 125 % N+ 100 % K	2.27	3.45	3.89	4.89	5.03	3.99	3.92
T11	Fertigaion of 125 % N + 125 % K	2.27	3.51	3.89	4.90	5.02	4.02	3.93
	SEm±	0.04	0.15	0.08	0.10	0.15	0.22	0.05
	C.D (P=0.05)	NS	0.43	0.23	0.30	0.45	0.65	0.16

***75 % N = 187.5 kg N ha^{-1}, 100 % N = 250 kg N ha^{-1}, 125 % N = 312.5 kg N ha^{-1}, 75 % K = 112.5 kg K_2O ha^{-1}, 100 % K = 150 kg K_2O ha^{-1}, 125 % K = 187.5 kg K_2O ha^{-1},**

Table.3 Effect of N and K fertigation on mean fruit girth (cm) of paprika at 57, 70, 90, 117, 138 and 160 DAT (final harvest) during *rabi* 2014-2015

Treatments*		Mean fruit girth (cm)						
		57 DAT	70 DAT	90 DAT	117 DAT	138 DAT	160 DAT	Over all mean
T1	Soil application of 100 % N and K + drip irrigation	1.13	2.61	2.27	3.55	2.74	2.67	2.49
T2	Soil application of 100 % N and K + furrow irrigation	0.95	2.34	2.15	2.97	2.62	2.30	2.22
T3	Fertigation of 75 % N + 75 % K	1.36	2.61	2.59	3.57	2.83	2.59	2.59
T4	Fertigation of 75 % N+ 100 % K	1.65	2.67	2.63	4.36	2.96	3.08	2.89
T5	Fertigaion of 75 % N + 125 % K	1.74	2.72	2.62	4.36	3.06	3.00	2.92
T6	Fertigation of 100 % N + 75 % K	1.75	2.75	2.77	4.50	3.66	4.09	3.25
T7	Fertigation of 100 % N+ 100 % K	1.79	2.75	2.83	4.97	3.77	4.11	3.37
T8	Fertigaion of 100 % N + 125 % K	1.82	4.00	4.07	5.41	4.35	4.31	3.99
T9	Fertigation of 125 % N + 75 % K	1.88	4.06	4.09	6.26	4.67	4.31	4.21
T10	Fertigation of 125 % N+ 100 % K	1.98	4.40	4.47	6.30	4.89	4.35	4.40
T11	Fertigaion of 125 % N + 125 % K	1.98	4.40	4.54	6.55	5.15	4.97	4.60
	SEm±	0.11	0.20	0.19	0.29	0.24	0.19	0.08
	C.D (P=0.05)	0.33	0.58	0.56	0.86	0.72	0.56	0.22

Table.4 Effect of N and K fertigation on mean fruit weight (g) of paprika at 57, 70, 90, 117, 138 and 160 DAT (final harvest) during *rabi* 2014-2015

Treatments*		Mean fruit weight (g)						
		57 DAT	70 DAT	90 DAT	117 DAT	138 DAT	160 DAT	Over all mean
T1	Soil application of 100 % N and K + drip irrigation	4.60	4.57	5.77	7.23	6.37	4.30	5.47
T2	Soil application of 100 % N and K + furrow irrigation	4.07	4.13	4.87	6.27	5.63	3.70	4.78
T3	Fertigation of 75 % N + 75 % K	4.97	4.60	5.90	7.30	6.33	4.10	5.53
T4	Fertigation of 75 % N+ 100 % K	5.90	4.77	6.43	7.70	6.40	4.33	5.92
T5	Fertigaion of 75 % N + 125 % K	6.27	5.27	6.57	7.57	6.43	4.37	6.08
T6	Fertigation of 100 % N + 75 % K	6.50	4.73	6.77	7.77	6.50	4.47	6.12
T7	Fertigation of 100 % N+ 100 % K	6.67	4.97	7.60	8.33	6.57	4.73	6.48
T8	Fertigaion of 100 % N + 125 % K	6.63	5.30	8.00	8.27	6.57	4.83	6.60
T9	Fertigation of 125 % N + 75 % K	6.97	5.37	8.50	8.67	6.73	4.97	6.87
T10	Fertigation of 125 % N+ 100 % K	6.73	5.47	8.33	8.93	6.67	5.13	6.88
T11	Fertigaion of 125 % N + 125 % K	6.93	5.40	8.43	8.60	6.80	5.00	6.86
	SEm±	0.34	0.14	0.19	0.28	0.16	0.11	0.10
	C.D (P=0.05)	1.01	0.42	0.56	0.83	0.47	0.34	0.30

***75 % N = 187.5 kg N ha^{-1}, 100 % N = 250 kg N ha^{-1}, 125 % N = 312.5 kg N ha^{-1}, 75 % K = 112.5 kg K_2O ha^{-1}, 100 % K = 150 kg K_2O ha^{-1}, 125 % K = 187.5 kg K_2O ha^{-1},**

Table.5 Effect of N and K fertigation on paprika total fresh fruit yield (five pickings) red fruit yield (6th picking), total fresh fruit yield (green + red) (kg ha^{-1}) during *rabi* 2014-2015

Treatments*		Green fruit yield	Red fruit yield	Total fruit yield
T1	Soil application of 100 % N and K + drip irrigation	14117	889	15005
T2	Soil application of 100 % N and K + furrow irrigation	7371	2240	9611
T3	Fertigation of 75 % N + 75 % K	16937	1313	18250
T4	Fertigation of 75 % N+ 100 % K	13251	3937	17188
T5	Fertigaion of 75 % N + 125 % K	10710	1873	12584
T6	Fertigation of 100 % N + 75 % K	14262	3866	18128
T7	Fertigation of 100 % N+ 100 % K	14354	3276	17630
T8	Fertigaion of 100 % N + 125 % K	12950	4239	17189
T9	Fertigation of 125 % N + 75 % K	20663	1413	22076
T10	Fertigation of 125 % N+ 100 % K	14174	6547	20721
T11	Fertigaion of 125 % N + 125 % K	19495	1326	20822
	SEm±	863	891	1279
	C.D (P=0.05)	2546	2630	3772

***75 % N = 187.5 kg N ha^{-1}, 100 % N = 250 kg N ha^{-1}, 125 % N = 312.5 kg N ha^{-1}, 75 % K = 112.5 kg K_2O ha^{-1}, 100 % K = 150 kg K_2O ha^{-1}, 125 % K = 187.5 kg K_2O ha^{-1},**

Fertigation of 100% N and K (T_7) (3.77 cm) resulted in 37.9 % increase in girth of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (2.74 cm). There was 4.58 % increase in width of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (2.62cm).

Fruit girth at 160 DAT (Final, sixth picking)

It ranged from 2.30 to 4.97 cm. The highest fruit girth was noticed in 125 % N and K (T_{11}) application which was significantly higher over all other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was on par with 100% N and K with drip irrigation (T_1) and 75% N with 75% K (T_3) and was significantly lower than all other treatments. Fertigation of 100% N and K (T_7) (4.11 cm) resulted in 53.9 % increase in girth of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (2.67 cm). There was 16 % increase in length of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (2.30 cm).

The mean fruit girth of paprika (mean of six pickings) ranged from 2.22 to 4.60 cm. The highest fruit girth was noticed with fertigation of 125 % N and K_2O (T_{11}) which was on par with 125% N with 100 K_2O levels (T_{10}) and was significantly higher than other treatments. Similar to fruit girth, in general higher fruit girth was noticed with increase in N levels from 75% to 125%. Within each N level, with increase in K levels from 75% to 125% there was increase in fruit girth. Within each N level, 75% and 100% K_2O levels were statistically on par to each other. Soil application of 100% N and K and irrigated by

drip (T_2) was observed to be on par with 75% N + 125% K_2O (T_3) and was significantly lower than other fertigated treatments and significantly higher than soil application of 100% N and K and irrigated by furrow method (T_2). Fertigation of 100% N and K (T_7) (3.37 cm) resulted in 35.4 % increase in girth of fruits compared to soil application of same levels of N and K under drip irrigation (T_1) (2.49 cm). There was 12.16% increase in girth of fruits by drip irrigation at 100% N and K applied to soil (T_1) (2.49 cm) compared to furrow irrigation (T_2) at same N and K_2O levels (2.22 cm).

This increase in fruit circumference could well be attributed to the increased rate of photosynthesis which could have further led to the partitioning of assimilates. Many characters of the fruit like cell size, lactiferous canals, intercellular spaces, etc., in different tissues of the fruit contribute to the increase in length, width and weight (Gupta *et al.,* 2009).

Fruit weight (g fruit^{-1})

Data on mean fruit weight of paprika at each picking *i.e.* at 57, 70, 90, 117, 138 and 160 DAT are presented in Table 4. The fruit width was significantly influenced by the treatments at all the stages of data recording. In general, the maximum fruit weight was noticed at 117 DAT in all the treatments. In general, with increase in N levels from 75% to 125%, the mean width of fruit increased.

Mean fruit weight at 57 DAT (First picking)

It ranged from 4.07 to 6.97 g fruit^{-1}. The highest fruit weight was noticed in 125 % N + 75% K (T_9) application which was on par with 125% and 100% N with different K levels, 75% N with 125% K (T_{11}, T_{10} to T_5) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was on par with 100% N and K to soil and drip irrigation (T_1) and 75% N + 75% K (T_3). Fertigation of 100% N and K (T_7) (6.67 g fruit^{-1}) resulted in 45 % increase in width of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (4.6 g fruit^{-1}). There was 13% increase in weight of fruits by drip irrigation at 100% N and K applied to soil (T_1) compared to furrow irrigation (T_2) at same N and K levels (4.07 g fruit^{-1}).

Mean fruit weight at 70 DAT (Second picking)

It ranged from 4.13 to 5.47 g fruit^{-1}. The highest fruit weight was noticed in 125 % N + 100% K (T_{10}) application which was on par with 125% N with other K levels (T_{11} and T_9), 100% N with 125% K (T_8), 75% N + 125% K (T_5) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than other treatments. Application of 100% N and drip irrigation treatment (T_1) (4.57 g fruit^{-1}) was found to be on par with fertigation of 75% N with 75% K (T_3) and 100% K(T_4) and 100% N with 75% K (T_6) and 100% K (T_7). Fertigation of 100% N and K (T_7) (4.97 g fruit^{-1}) resulted in 8.8 % increase in weight of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (4.57 g fruit^{-1}). There was 10% increase in weight of fruits by drip irrigation at 100% N and K applied to soil (T_1) compared to furrow irrigation (T_2) at same N and K levels (4.13 g fruit^{-1}).

Mean fruit weight at 90 DAT (Third picking)

It ranged from 4.87 to 8.50 g fruit^{-1}. The highest fruit weight was noticed in 125 % N + 75% K (T_9) application which was on par

with 125% N with other K levels (T_{11} and T_{10}), 100% N with 125% (T_8) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than other treatments. Application of 100% N and drip irrigation treatment (T_1) (5.77 g fruit^{-1}) was found to be on par with fertigation of 75% N with 75% K (T_3). Fertigation of 100% N and K (T_7) (7.60 g fruit^{-1}) resulted in 31.7 % increase in weight of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (5.77 g fruit^{-1}). There was 18.4% increase in weight of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (4.87 g fruit^{-1}).

Mean fruit weight at 117 DAT (Fourth picking)

It ranged from 6.27 to 8.93 g fruit^{-1}. The highest fruit weight was noticed in 125 % N + 100% K (T10) application which was on par with 125% N with other levels of K (T_9, T_{11}), 100% N with 100% K (T_7) and 125% K (T_8) and was significantly higher over other treatments. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than other treatments.

Application of 100% N and drip irrigation treatment (T_1) (7.23 g fruit^{-1}) was found to be on par with fertigation of 75% N with all K levels (T_3, T_5, T_4) and 100% N with 75% K(T_6). Fertigation of 100% N and K (T_7) (8.33 g fruit^{-1}) resulted in 15.3 % increase in weight of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (7.23 g fruit^{-1}). There was 15.2 % increase in weight of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (6.27 g fruit^{-1}).

Mean fruit weight at 138 DAT (Fifth picking)

It ranged from 5.63 to 6.80 g fruit^{-1}. The highest fruit weight was noticed in 125 % N and K (T_{10}) application which was on par with 125% N, 100% N with other levels of K and 75% N with 125% and 100% K. The lowest was recorded in 100% N and K application to soil and furrow irrigation (T_2) which was significantly lower than other treatments. Application of 100% N and drip irrigation treatment (T_1) (6.37 g fruit^{-1}) was found to be on par with fertigation of 75% N and K (T_3). Fertigation of 100% N and K (T_7) (6.57 g fruit^{-1}) resulted in 3 % increase in weight of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (6.37 g fruit^{-1}). There was 13 % increase in weight of fruits by drip irrigation at 100% N and K applied to soil compared to furrow irrigation (T_2) at same N and K levels (5.63 g fruit^{-1}).

Mean fruit weight at 160 DAT (Final, sixth picking)

It ranged from 3.70 to 5.13 g fruit^{-1}. The highest fruit weight was noticed in 125 % N and K (T_{10}) application which was on par with 125% N with other levels of K (T_{11}, T_9) and 100% N with 125% K (T_8). The lowest was recorded in 100% N and K application to soil and furrow irrigation (T2) which was significantly lower than other treatments.

Application of 100% N and drip irrigation treatment (T_1) (4.30 g fruit^{-1}) was found to be on par with fertigation of 75% N with 100% (T_4) and 125% K (T_5). Fertigation of 100% N and K (T_7) (4.73 g fruit^{-1}) resulted in 10 % increase in weight of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (4.30 g fruit^{-1}). There was 16.2 % increase in weight of fruits by drip irrigation at 100% N and K applied to soil

compared to furrow irrigation (T_2) at same N and K levels (3.70 g fruit^{-1}).

The mean fruit weight (sum of six pickings) ranged from 4.78 to 6.88 g fruit^{-1}. The highest fruit weight was noticed in 125 % N + 100 % K_2O (T_{10}) application which was on par with 125% N + 75% K_2O (T_9), 125% N + 125% K_2O (T_{11}) and 100% N + 125% K_2O (T_8) and was significantly higher over other treatments. In general higher mean weight fruit^{-1} was noticed with increase in N levels from 75% to 125%. Within each N level, with increase in K levels from 75% to 125% there was increase in fruit weight. Within each N level, 125% and 100% K_2O levels were statistically on par to each other and significantly higher over 75% K_2O level.

Significantly the lowest weight of fruit was recorded in 100% N and K application to soil and furrow irrigation (T_2). Fertigation of 100% N and K (T_7) (6.48 g fruit^{-1}) resulted in 18.4 % increase in weight of fruits compared to soil application of same levels of N and K and drip irrigated (T_1) (5.47 g fruit^{-1}). There was 14.4 % increase in weight of fruits by drip irrigation at 100% N and K applied to soil (T_1) compared to furrow irrigation (T_2) at same N and K levels (4.78 g fruit^{-1}).

Many characters of the fruit like cell size, lactiferous canals, intercellular spaces, etc., in different tissues of the fruit contribute and adequate supply of nutrients to the increase in weight (Malik *et al.*, 2011).

Fresh fruit yield (kg ha^{-1})

The data on green fruit yield (sum of five pickings), red fruit yield (6th picking) and total fresh fruit yield (green + red fruits) are presented in Table 5. The green, red and total fresh fruit yield of paprika was found to be significantly influenced by different N and K fertigation levels imposed.

Green fruit yield

The total green fruit yield ranged from 7371 to 20663 kg ha^{-1}. Among different combinations of N and K fertigation levels, the highest green fruit yield was recorded by fertigation at 125% N + 75 % K level (T_9) (20,663 kg ha^{-1}) which was on par with 125 % N + 125 % K (19,495 kg ha^{-1}) and significantly higher over all other treatments. It was noticed that even at lower N levels i.e. at 75 % and 100% N also, K level at 75% K was found to be better than 100 % or 125 % K levels. Increase in K level beyond 75 % resulted in decrease in green fruit yield. It was further noticed that 1.67 % increase in green fruit yield was observed when fertilizers were applied through Fertigation (T_7) (14,354 kg ha^{-1}) compared to soil application T_1 (14,117 kg ha^{-1}). The advantage of drip irrigation (T_1) was reflected in recording twice the yield of surface irrigation (T_2). The corresponding yields were 14,117 and 7,371 kg ha^{-1} respectively.

Red fruit yield

The red fruit yield ranged from 889 to 6547 kg ha^{-1}. The highest red fruit yield was noticed at 125 % N + 100 % K (T_{10}) fertigation which was on par with 100% N + 125 % K (T_8) and significantly higher over other treatments. Drip fertigation 100 % N with different doses of K ranging from 75 % to 125 % recorded on par red fruit yield.

Soil application of fertilizers with drip irrigation (T_1) recorded the significantly lowest red fruits yield. Soil application of 100 % N and K under furrow irrigation (T_2) recorded nearly 2.5 times more red fruits yield compared to drip irrigation. Application of 100 % N and K by fertigation (T_7) recorded nearly 3.68 times more red fruit yield compared to application of same dose of N and K through soil application (T_1).

Total fresh fruit yield (green + red fruits) (kg ha^{-1})

The total fresh fruit yield ranged from 9611 to 22,076 kg ha^{-1}. The highest total fresh fruit yield was recorded with drip fertigation of 125 % N + 75% K (T_9) which was on par with 125 % N + 125 % K (T_{11}) (20,822 kg ha^{-1}) and 125 % N + 100 % K (T_{10}) (20,721 kg ha^{-1}). The lowest yield was recorded with soil application of 100 % N and K and furrow irrigation (T_2) (9611) which was on par with fertigation with 75% N + 125 % K (T_5) (12584 kg ha^{-1}). At same level of N, increase in K level from 75 % to 100 or 125 % decrease in total yield was observed indicating 75 % K level was sufficient for the paprika crop under the present experimental soil conditions. However, among N levels, the response was positive up to 125% N. Application of 100 % N and K applied through fertigation (T_7) resulted in 17% increase in yield compared to same level of N and K applied to soil conventionally and irrigation by drip (T_1). The same level of 100 % N and K soil application with drip irrigation treatment (T_1) has recorded 56 % higher total fresh paprika fruit yield (15,005 kg ha^{-1}) compared to soil application of same dose of N and K with furrow method (T_2) irrigation (9611 kg ha^{-1}).

In any crop, the yield could be the result of various growth and yield attributing traits. The aim of any applied research is to maximize the yield. The 125% N has resulted in improved growth vigour of the plant through physiological modifications favourably. Higher amount of nitrogen availability results in promotion of better carbohydrates utilization to form more protoplasm and cells (Pandey *et al.*, 2013). Application of nutrients by fertigation at frequent intervals during different growth stages leads to its availability readily in the vicinity of the root zone resulting in more efficient utilization of applied nutrients than soil application method.

The result of the present study revealed that the yield and yield attributes at different pickings of chilli were enhanced by the combined effect of drip fertigation at N and K up to 125%+75% level (312.5-112.5 kg N - K_2O ha^{-1}), applied in 38 splits at weekly interval to paprika from emergence to fruit maturing stage. Among the methods of irrigation tested, drip was found to be more suitable for paprika cultivation followed by furrow method of irrigation. Taking in to consideration of economics, it is suggested to eliminate phosphorus from fertigation programme and go for fertigation of only N and K up to 125% through urea and potassium nitrate and better to go for soil application of phosphorus fertilizer as single basal dose to make the fertigation programme of paprika as more economically viable.

References

Bar-Tal, A., Aloni, B., Karni, L and Rosenberg, R. 2001. Nitrogen nutrition of greenhouse pepper. *Journal of Horticultural Science*. 36: 1525-1529.

Bhuvaneswari, G., Sivaranjani, R., Reet, S and Ramakrishnan, K. 2013. Application of nitrogen and potassium efficiency on the growth and yield of chilli (*Capsicum annuum* L). *International Journal of Current Microbiology and Applied Science.* 2(12): 329-337.

Gupta, A.J., Chattoo, M. A and Bhat, F. N. 2009. Techno-economic evaluation of drip irrigation and fertigation practices in capsicum under Kashmir conditions, *Vegetable Science*. 36 (9): 309-314.

Malik, A. A., Chattoo, M., Sheemar, G and Rashid, R. 2011. Growth, yield and fruit quality of sweet pepper hybrid SH-SP-5 (*Capsicum annuum* L.) as affected by

integration of inorganic fertilizers and organic manures (FYM). *Journal of Agricultural Technology*. 7(4): 1037-1048.

Pandey, A.K., Singh, A.K., Kumar and Singh, S.K. 2013. Effect of drip irrigation, spacing and nitrogen Fertigation on productivity of chilli. (*Capsicum annuum L.*). *Environment and Ecology*, 31 (1): 139-142.

How to cite this article:

Mounika, D., M. Uma Devi, V. Praveen Rao, K. Avil Kumar and Neeraja Prabakar, B. 2018. Impact of Different N and K Fertigation Levels on Yield Attributes and Total Yield in Paprika (*Capsicum annuum* L.) under Drip Fertigation. *Int.J.Curr.Microbiol.App.Sci.* 7(08): 638-653. doi: https://doi.org/10.20546/ijcmas.2018.708.069