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|Research Article|

Effect of Time and Length of Detopping on Grain and Fodder Yield of Maize in Telangana

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Abstract- A field experiment was conducted at Agricultural Research Station, Karimnagar for two consecutive years i.e.Rabi 2013-14 & 2014-15in RBD in two sub-experiments to find out the effect of de-topping on maize grain yield in red sandy loam soils. The initial soil status indicated of high available N, P, and K (613.9, 62.8, 436 kg/ha respectively). The first sub-experiment was conducted with 7 treatments (Stages of De-topping i.e T1 - 14 Days after tasseling (DAT), T2 - 19 DAT, T3 - 24 DAT, T4 - 29 DAT, T5 - 34 DA7, T6 - 40 DAT & Control -Without De-topping) and with 6 treatments in second sub-experiment (Length of De-topping i.e T1 - The fifth node above the cob, T2 - The fourth node above the cob, T3 - The third node above the cob, T4 - The second node above the cob, T5- One node above the cob & T6- Control (Without De-topping). Significantly higher grain yield was recorded with control (no stopping) and it was on par with detopping (by leaving five leaves above the cob) at 40 days after tasseling and an additional green fodder yield of 1.96 t/ha is obtained. Detopping by leaving two, three, and four leaves above the cob placement resulted in 22, 18 & 17% yield loss respectively as compared to the control.

Keywords: cob, stopping, fodder yield, grain yield, maize, tassel

1. Introduction

Maize (Zea Mays L.) is an important cereal crop that occupies a prominent position in global agriculture. It is the third most important cereal in the world and India, next to wheat and rice in respect to area and productivity. Maize is widely grown in India due to wider adaptability and about 55% of produced maize grain currently is used for food purposes, 14% for livestock feed, 18% for poultry feed, 12% for starch, and 1% for seed. Being a C4 plant it has the best physiological efficiency and highest productivity potential among the cereals. This crop is known to be very responsive to inputs (fertilizer, seed, water macro or micro-nutrients etc.) and better crop management (Manju Bhargavi et al., 2017). Some of the farmers are practicing detopping in maize to avoid lodging problems in fertile soils especially in areas like coastal districts. Detopping refers to nipping or the removal of terminal portion from the uppermost node to improve the yield through greater functioning of remaining leaves by arresting unnecessary growth, decreasing mutual shading of leaves, enhancing light interception, increasing nutrient uptake, decreasing competition between the tassel and cob for available plant nutrients, diverting plant nutrients to the reproductive part which aids in better source-sink relationship and better cob development (Esechie and Al-Alawi, 2002). Maize tassel removal may affect light penetration in the canopy, especially if the crop is a C4 plant that needs high light requirements. Tassel removal may increase the seed yield and seed quality. Interaction of defoliation and tassel removal may also affect assimilate distribution between

Table 1. Effect of time of detopping on yield of maize crop during Rabi 2013–14 & 2014–15.

Treat-ment	Grain yield (kg/ha)		Cob yield (kg/ha)		Cob length (cm)		Cob girth (cm)		Kernel rows / ear		No of kernels /row		1000 grain weight (g)		Shelling %		Green fodder yield t/ha)	
Deto-pping at	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year
15 DAT	7062	5657	8927	7122	19.7	16.7	18.6	16.5	14.0	14.0	34.3	30.0	398.0	323.0	80.6	79.0	5.7	5.4
20 DAT	7142	5804	8984	7193	20.0	17.1	18.8	17.1	14.0	16.0	34.6	31.0	418.0	348.0	78.9	79.9	6.1	5.6
25 DAT	8083	6290	9950	7722	20.3	17.4	18.4	16.9	14.0	16.0	36.1	31.0	413.0	343.0	81.0	80.4	6.2	6.0
30 DAT	8130	6536	9867	7944	20.4	16.2	18.5	16.9	14.0	16.0	36.0	31.0	428.0	344.0	81.7	82.0	6.9	6.4
35 DA T	8258	6745	10180	8178	21.5	17.5	19.1	17.5	14.0	16.0	36.5	33.0	359.0	341.0	81.1	82.5	6.9	6.4
40 DAT	9451	8486	11326	9750	22.3	18.6	18.6	17.7	16.0	16.0	37.4	39.0	403.0	364.0	83.3	85.9	7.3	6.6
Control	10265	8642	12556	10063	22.2	20.9	19.1	17.8	16.0	16.0	38.1	39.0	407.0	386.0	82.0	85.6	-	-
SEm	530	436	569	464	0.8	0.8	0.3	0.4	0.5	0.4	1.5	1.4	21.5	0.4	2.0	1.9	-	-
C.D.	1588	1306	1705	1391	NS	2.4	NS	NS	NS	NS	NS	4.2	NS	NS	NS	NS	-	-

reproductive and vegetative organs. Maize grain yield yield attributes significantly reduced at 15 days after 50% Silking compared to 15 days after 50% Silking (Shewangizaw Woldeamlak et al., 2006). Maize grain yield obtained in De-topping condition is on par with sole maize yield (Saha et al., 2001). In de-topped treatment just above the cob had the lowest grain yield observed compared to 2 or 3 leaves above the cob or sole (SK Roy and PK Biswas,1992). Nowadays fodder is the main constraint in particularly during rabi season. Among non-legumes fodders, maize is good source of starch, neutral detergent fibre (38-41%), acid detergent fibres (23-25%), lipid (5% oils), crude-protein (8-10%), hence considered as energy efficient crop for livestocks. In maize growing areas, the de-topped Maize is one of the alternative sources of fodder, which may be used as green fodder. Hence, the present study was carried out with an objective to study the effect of de-topping on maize yield.

2. MATERIALS AND METHODS

This experiment was conducted at Agricultural Research Station, Karimnagar during Rabi 2013-14 & 2014-15 in red sandy loam soils. The initial soil status indicated of high available N, P, K (613.9, 62.8, 436 kg/ha respectively). The experiment was carried out in Randomized block design in two sub experiments with four replications. The first sub-experiment was conducted with 7 treatments (Stages of De-topping i.e T1 - 14 Days after tasseling (DAT), T2 - 19 DAT, T3 - 24 DAT, T4 - 29 DAT, T5 - 34 DA7, T6 - 40 DAT & Control -Without De-topping) and with 6 treatments in second sub-experiment (Length of De-topping i.e T1 - The fifth node above the cob, T2 - The fourth node above the cob, T3 - The third node above the cob, T4 - The second node above the cob, T5- One node above the cob & T6- Control (Without De-topping). Flowering was observed from 60 to 65 DAS and treatments were imposed as per the schedule. Proper management practices like nutrient management (240:80:80 NPK Kg/ha), weed management by herbicides and need-based plant protection were taken up and irrigated at7-10 days intervals.

3. RESULTS AND DISCUSSION

Experiment 1: The experiment on different stages of stopping in maize indicated that during rabi 2013-14, the significantly highest grain yield was obtained with Control (i.e without dropping) (10265 kg/ha) which was on par to stopping at 40 DAT (9451 kg/ha) and were followed by stopping at 25 DAT, 30 DAT and 35 DAT which were significantly on par to each other. However, significantly lowest grain yields were observed at stopping at 15 and 20 DAT. Nonsignificant differences were observed for yield contributing characters. The detopping of maize at 25/30/35 DAT resulted in 19.6 to 21.3% decrease in grain yield as compared to control (Without stopping). The advantage of detoppingwas yield of green fodder ranged from 5.4-7.3 t/ha. The detopping at 40 DATon par with control (without detopping) showed a decrease in grain yield by 8 % over control, while detopping at 15/20 DAT resulted 30-31 % decrease in grain yield over control. In the second year i.e. during rabi 2014-15 same trend as that of rabi 2013-14 was repeated. The highest grain yield was obtained by Control (i.e without stopping) (8642kg/ha) followed by stopping at

40 DAT (8486kg/ha) (Table 1). Nonsignificant differences were noticed for yield contributing traits viz., ear girth, kernel rows ear-1, shelling %, and 1000 grain weight.

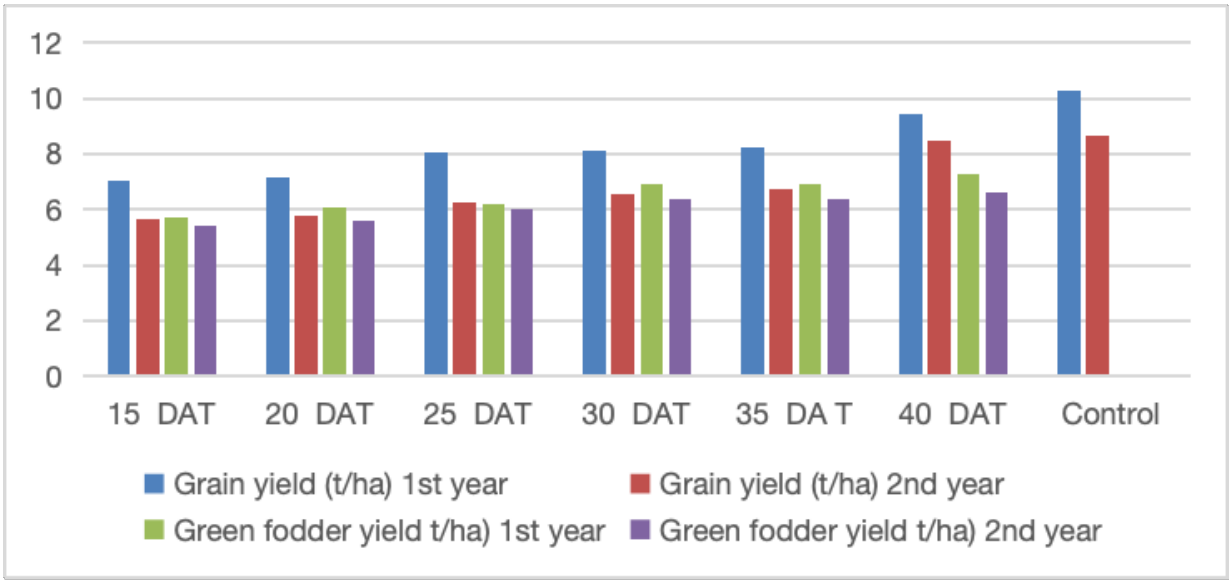

Fig. 1. Effect of time of dropping on yield of maize crop during Rabi 2013-14 & 2014-15

Experiment 2: In an experiment conducted during rabi 2013-14 on different lengths of detopping on maize showed that among all the treatments, the Control treatment (without stopping) had significantly highest grain yield (10,265 kg/ha) and is on par to stopping at fifth (8,976 kg/ha) & fourth node above the cob (8,532 kg/ha). Green fodder yield was also higher at stopping at fifth node above the cob (2.0 t/ha). Significantly lowest grain yield was observed with the treatment of detopping at the second node above the cob and a single node above the cob. It shows that dropping in maize after 35 DAT at the fourth node above the cob could not affect the grain yield with green fodder yield of 6.6 t/ha. Green fodder yield also increased with an increase in the length of detopping (ranging from 2.0 – 9.7 t/ha).Nonsignificant differences were observed for all yield contributing characters except ear length and 1000 grain weight. Similar trend was observed in rabi 2014-15 and the Control treatment (without stopping) yielded significantly highest grain yield of 8642 kg/ha on par to detopping at fifth node above the cob (8378kg/ha). Non significant differences were observed for all yield contributing characters except ear length. Highest green fodder yield was obtained at stopping at fifth node above the cob (9.66 t/ha). The significantly lowest yield was observed with the treatment of detopping at second node above the cob and a single node above the cob. It inferred that dropping in maize after 40 DAT at fifth node above the cob could not affect the yield with green fodder yield of 6.6 t/ha. Further, green fodder yield decreased with increasing the length of detopping (Table 2). These results were also confirmed with the findings of Emam et al. (2013), Mimbar and Susylowati (1995), Rajkumara et al., 2020 and Subedi (1996).

4. CONCLUSION

Results revealed that detopping at 40 days after tasseling could provide high grain and fodder yields and detopping at the fifth node above the ear yield an additional fodder yield of 1.96 t/ha. So, farmers can practice this stopping technique in maize to get both grain and fodder yields to meet the fodder requirement of the livestock population.

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Conflict of Interest

The authors don't have any conflict of interest.

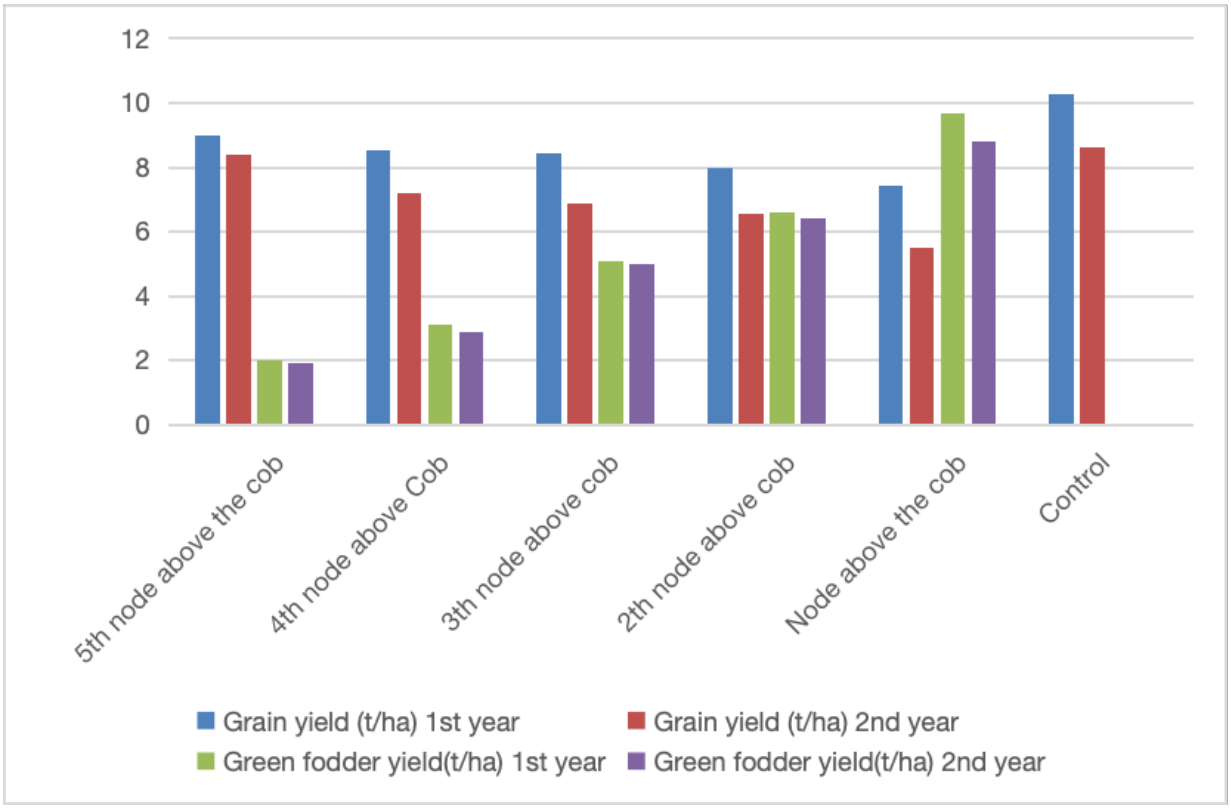

Fig. 2. Effect of length of detoppingon yield of maize crop during Rabi 2013-14 & 2014-15.

REFERENCES

1. Emam, Y., H. Bahrani, and K. Maghsoudi. *Effect of leaf defoliation on assimilate partitioning in maize (Zea mays L.)*. Scientific Journal of Agronomy and Plant Breeding, 1(1):26–33, 2013.
2. Esechie, H. A., and K. Al-Alawi. *Effect of tassel removal on grain yield of maize (Zea mays L.) under saline conditions*. Crop Research, 24:96–101, 2002.
3. Manju Bhargavi, B., B. Mukundam, M. Malla Reddy, and Ch. Aruna Kumari. *Different detopping levels effect on yield and nutrient uptake of maize (Zea mays L.)*. International Journal of Chemical Studies, 5(5):267–270, 2017.
4. Mimbar, S. M., and Susylowati. *The effect of time and position of topping of maize on yield of the maize-groundnuts cropping system (Indonesian)*. Agrivita, 18(1):21–25, 1995.
5. Rajkumara, S., Vinita, R. M. Kachapur, and B. G. Shivakumar. *Detopping in Maize: A Review*. Agricultural Reviews, 41(2):175–178, 2020.
6. Roy, S. K., and P. K. Biswas. *Effect of plant density and detopping following silking on cob growth, fodder and grain yield of maize (Zea mays L.)*. Journal of Agricultural Science, 119(3):297–301, 1992.
7. Saha, R. R., M. S. Rahman, and P. C. Golder. *Maize-legume intercropping and effect of detopping of maize after silking*. Bangladesh Journal of Agricultural Research, 26(3):445–451, 2001.
8. Shewangizaw, Woldeamlak, Habtamu Zelleke, and U. R. Pal. *Effect of time and level of detopping on grain and fodder yield and quality of maize (Zea mays L.) tops in Eastern Hararghe*. Crop Science Society of Ethiopia, pp. 154–161, 2006.
9. Subedi, K. D. *Effect of leaf stripping, de-tasselling and topping of maize on the yield of maize and relay intercropped finger millet*. Experimental Agriculture, 32(1):57–61, 1996.