



Inter Cropping of African Marigold with Tomato for Better Productivity, Pest Control and Economic Return in Tirap District of Arunachal Pradesh

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INTRODUCTION

Tomato is a widely grown vegetable in the world, next to potato. It seems to have originated from Mexico to Peru region. Now a day's very common vegetable in every part of world and has spread through Spanish colonization in world. The tomato is very common vegetable in India as well as Arunachal Pradesh. It's an essential in every meal of the people either in fresh form or processed form. The fresh form uses as salad and processed form like- tomato sauce, chatney, paste, juice, catchup etc. Due to its importance it is growing in all parts of Arunachal Pradesh as well as in India too.

The different insect's like- tomato fruit borer, fruit flies etc are the major damaging factor to this crop. The most commonly method for the control of this pest is to have a film of a persistent effective pesticide over the foliage and fruiting bodies. As tomatoes are picked at short intervals maintenance of insecticidal film is hazardous and uneconomic too. Now indiscriminate use of insecticide has disturbed the ecology and resulted the pesticides resistance among insects. The trap crop provides protection from by preventing the by reaching the main crop and pest diverted away from main crop. The trap crops have more attractive to pest than main crop and has additional functions against destructive insects. So, keeping all these facts, Krishi Vigyan Kendra- Tirap, Deomali, Arunachal Pradesh conducted On Farm Trials on "Intercropping of African marigold with tomato" to assess the scale of insect control in tomato plant; in Rabi season, 2017-18. African marigold was the companion crop. The marigold is used as carminative, analgesic, antiseptic, diuretic, antispasmodic, anthelmintic, stimulants, repellents etc. The marigold is highly aromatic perennial herb in nature. The "tagetes oil" is a costly produce, synthesized from this plant.

The marigold and tomato companion planting is a tested true technique, used by researcher and gardeners from hundreds of years. Different studies have showed that marigold planting between tomato crop protects from damaging nematodes that causes damage in soils. The aromatic scent of marigold plant is also act as repellents against different insect's like- aphids, thrips, fruit borers, fruit flies and against rabbits too. In different studies reported that marigold also reduced early blight in these ways- Allelopathic effect on *A. solanai* development, reducing humidity level in field caused unfavourable microenvironment for pathogens, behaved as physical barrier against pathogens.

The selected farmers were well educated through village level training about scientific cultivation practices of tomato with marigold as an intercrop. The total three (03) farmers were selected from these villages-

Noitong, Soha, Doidum . The total area of the trial was 0.10 ha (0.033 ha size plot of each farmer). The seeds of Pusa narangi variety of African marigold were sown in Nursery at KVK Tirap on 10th October, 2017. And seeds of tomato; variety- Pusa sadabahar were sown in nursery of KVK on 25th October, 2017. All the cultural practices were followed scientifically. The total two treatments were applied in the trial- T1- Tomato with marigold (3 lines of tomato: 1line of marigold), T2- Control (tomato sole crop).

The 25 days old tomato seedlings were transplanted at the spacing of 90 cm (row to row) x 45 cm (plant to plant). And 35 days old seedlings of marigold planted after every 3 lines of tomato at the spacing 60 cm from tomato rows and 40 cm (plant to plant). All the cultural practices followed as per recommendation.

Table-1: Result of marigold intercropping with tomato

Parameters	T1 (intercropping with marigold: 3 line tomato:1 line marigold)	T2- control (tomato sole crop)
Plant height (cm)	60.23	58.26
Days to 1 st harvest	93.57	90.62
No of fruits/plant	37.89	31.65
Total fruit yield(t/ha)	19.64	15.82
Marketable fruit yield (t/ha)	16.32	10.12
Unmarketable fruit yield (t/ha)	3.32	5.70
Net return (Rs/ha)	1,53,000	1,38,000
B:C ratio	3:11	2:84

The plant height of T1 & T2 was closely similar, very minor different were reported. But for days to 1st harvest, the T1 took 93.57 days while T2 took 90.62 days; which had very little differences. The total number of fruits per plant of tomato was higher with T1 (37.89) followed by T2 (31.65). This showed that the positive effect of marigold intercropping with tomato. This might be due to protection of different external factors like frost, insect pest and other environmental factors that resulted more no of fruits were

produced. The total fruit yield was also reported higher with T1 (19.64 t/ha) as compared control (15.82 t/ha). This might be due to presence of marigold as a intercrop. Because intercropping of marigold served as trap crop and act as a barrier against insect pests. Regarding total marketable fruit yield (t/ha) T1 reported significantly better (16.32 t/ha) over control (10.12 t/ha). This might be due to the better use of solar radiation attributed to increased interception of photo synthetically active radiation resulting better

solar radiation use efficiency. The unmarketable fruit yield recorded higher with control (5.70 t/ha) over T1 (3.32t/ha). This proved that the marigolds protects to tomato crop in better way against insects and root knot nematodes; which resulted in maximum

number of good quality fruits. Hence the economics was also higher with T1 as compared T2 (control). The total net return & B:C ratio were also higher with T1 (Rs. 1,53,000 & 3:11) as compared control (Rs. 1,38,000 & 2:84).