

## Original Research Article

# Efficacy of Different Intercrops in Dryland Fruit Crops under Rainfed Conditions of North Maharashtra

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## ABSTRACT

### Keywords

Ber, Anla, Cowpea  
and Income

When inter crops were grown in aonla and ber, the additional income from these inter crops was found to be ranged from Rs.5,111/- to 9,150/- ha<sup>-1</sup> in Aonla and Rs.5,695/- to 14,954/- ha<sup>-1</sup> in Ber as base crop. On the basis of cost analysis, cowpea was found beneficial as inter crop both in Aonla and Ber with additional income of Rs. 9150/- in Aonla and Rs. 14,954/- in Ber as compare with other inter crops and control under rainfed conditions in order to achieve the goal of livelihood security under climate resilience.

## Introduction

Aonla and ber are two important arid fruit crops which are spacious and come into bearing very late. The intercropping experiments were conducted with an object to increase per unit productivity of these juvenile as well as productive orchards utilizing the space in between the Aonla and Ber plants. During the juvenile phase farmers are not getting any income. Ultimately cost of cultivation goes on increasing and output is nil during pre bearing stage. To compensate this expenditure, multiple cropping system and intercropping may become important options to bridge up this gap of input and output on cultivation of fruit crops. To quantify the influence of inter crop on fruit crops and suitability of inter crops in base fruit crops, present experiment was conducted at Horticulture section, College of Agriculture, Dhule during the year 2000-2004 with following objectives-

- To develop multiple cropping systems for Aonla and Ber crops under rainfed production system.
- To determine effect of seasonal intercrops on main fruit crops *viz.* Aonla and Ber.

## Materials and Methods

The intercropping experiment was conducted as on station and on farm trial on the farmers' field at Deobhane and College of Agriculture, Dhule (M.S.) on fruit trees having age of 12 and 6 years respectively. The inter crops were sown taking four plants per treatment of Aonla and Ber at the center. Cowpea and sesamum were sown in *Kharif* and gram and mustard in *Rabi* season. The cultural practices for the intercrops were same as given to them when sown as sole crop. The yield data of intercrop as well as sole crops was recorded after harvesting of inter crops separately at each location.

Experiment was laid out in randomized block design with six replications having four trees in each treatment. Aonla and ber was planted

at the distance of 7x7 m and 6x6 m respectively with plot size 14x14 m for Aonla and 12x12 m for ber.

Details of treatments are as below-

Treatment No.	Aonla	Ber
1.	Aonla + Cowpea ( <i>Kharif</i> ).	Ber + Cowpea ( <i>Kharif</i> ).
2.	Aonla + Sesamum ( <i>Kharif</i> ).	Ber + Sesamum ( <i>Kharif</i> ).
3.	Aonla + Mustard ( <i>Rabi</i> ).	Ber + Mustard ( <i>Rabi</i> ).
4.	Aonla + Gram ( <i>Rabi</i> ).	Ber + Gram ( <i>Rabi</i> ).
5.	Aonla – Control.	Ber – Control.

Variety of Crops Sown: -

Aonla – Krishna      Ber – Meharun      Cowpea – Pusa Barasati  
Sesamum – JLT-7      Mustard – Pusa Bold      Gram - Vishwas

Spacing of Intercrops :-

Cowpea – 45 X 15 cm.      Sesamum – 30 X 15 cm.  
 Mustard – 45 X 15 cm.      Gram – 37.5 X 15 cm.

Average Selling Rate of (Rs./kg) :-

Aonla – 15.00      Ber – 5.50      Cowpea – 12.00  
 Sesamum – 32.00      Mustard – 15.00      Gram – 12.00

Soil Type of different experimental locations –

1. College of Agriculture, Dhule Aonla - Medium black soil  
                                                                                          Ber - Medium black soil
2. Deobhane Aonla- Black cotton soil

### Results and Discussions

Data depicted in Table 1 it is revealed that differences among the treatments were significant with regards to yield of aonla and not significant in ber. However, yield of Aonla and Ber yields was increased with various intercrops.

From pooled analysis of data (Table-2) it was observed that there was no any adverse effect of intercropping yield of base crops. It is possible to get bonus yield from intercrops without any adverse effect on yield of Aonla

and Ber crops. There are significant differences between the treatments and all treatments are found superior over control (i.e. without intercrop). Cowpea performed best in *Kharif* as an intercrop in Aonla and Ber while, in *Rabi* season gram gave highest yield both in Aonla and Ber. However, on the basis of cost analysis (Table 3) it was found that highest gross monetary returns per hectare was obtained by cultivation of cowpea both in Aonla (Rs.19008/-) and Ber (Rs.34,880/-). Highest additional income was obtained by cultivation of cowpea in Aonla (Rs. 5,132/-) and Ber (Rs.10, 936/-).

**Table.1** Average on station + on farm trials yield of main and Intercrop per plot and per hectare

Treatments	Aonla Fruit Yield (kg.)		Inter Corp Yield (kg.)		Ber Fruit Yield (kg.)		Inter Corp Yield (kg.)	
	Per Plot	Per ha.	Per Plot	Per ha.	Per Plot	Per ha.	Per Plot	Per ha.
Cowpea (K)	79.22	4040.07	7.95	405.25	65.66	4556.67	5.38	373.23
Sesamum(K)	79.60	4059.80	5.87	299.32	68.33	4741.89	3.18	220.97
Gram ®	78.30	3993.30	12.39	631.94	101.65	7054.37	7.50	520.29
Mustard ®	80.39	4099.99	7.07	360.37	67.50	4684.22	3.21	222.98
Control	73.84	3765.94	--	--	63.04	4374.84	--	--
<b>SE ±</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>

**Table.2** Gross Monetary Returns from Aonla and Ber based intercropping

Treatments	Aonla + Inter Crop Yield (Rs.)		Ber + Inter Crop Yield (Rs.)	
	Per Plot	Per ha.	Per Plot	Per ha.
Cowpea (K)	372.70	19007.90	502.59	34879.81
Sesamum (K)	293.50	14968.39	395.73	27463.59
Gram ®	309.30	15774.25	388.63	26971.13
Mustard ®	318.83	16260.23	369.17	25620.54
Control	193.29	9857.64	287.11	19925.43
<b>SE ±</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>

K- Kharif R-Rabi

**Table.3** Cost of cultivation and net returns from Aonla and Ber based Intercropping

Treatments	Cost of Cultivation (base crop+ Intercrop) (Rs.)	Gross monetary returns (Rs.)	Net monetary returns (Rs.)	Additional returns from intercrops (Rs.)	B:C Ratio
<b>Intercropping in Aonla</b>					
1. Cowpea	9308	19007.90	9699.00	5132.00	2.04:1
2. Sesamum	9056	14968.39	5912.39	1345.39	1.65:1
3. Gram	9365	15774.25	6409.25	1842.25	1.68:1
4. Mustard	9080	16260.23	7180.23	2613.23	1.79:1
5. Aonla alone	5290	9857.64	4567.00	00	1.86:1
<b>Intercropping in Ber</b>					
1. Cowpea	10818	34879.91	24061.91	10936.48	3.22:1
2. Sesamum	10566	27463.59	16897.59	3772.16	2.60:1
3. Gram	10875	26971.13	16096.13	2970.70	2.48:1
4. Mustard	10590	25620.54	15030.54	1905.11	2.42:1
5. Ber alone	6800	19925.43	13125.43	00	2.93:1

On the basis of B:C ratio (Table-3) highest B:C ratio was observed for cowpea cultivated as intercrop in Aonla (2.04:1) and Ber (3.22:1). These results are in conformity with Baghel *et. al*; (1986) incase of bananas with moong (*vigna radiata*), udid (*vigna mungo*), soybeans, groundnuts and cowpeas had no adverse effect on banana yield. The intercrops gave additional yields and increased the net returns; *Vigna mungo* was the most effective intercrop. Dinesh Kumar and Pandey (2003) who tried cowpea, black gram and green gram as intercrops and sun hemp as green manure crop along with control. Pathak (2003) who observed fruits, vegetables, flowers and the medicinal and aromatic plants have been found to be well suited for intercropping in aonla orchards in three tier system *viz.* Aonla + Dhaincha +Onion/Garlic/Fenugreek or Brinjal and Aonla + Dhaincha + German chamomile. During early years of plantation, short duration crop suiting to the region could be

grown and in full grown orchards spices, herbs and flowers could be grown.

### References

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