

# Annual Report

1999 - 2000



**NATIONAL RESEARCH CENTRE FOR ONION AND GARLIC**

RAJGURUNAGAR, PUNE (DISTT.) - 410 505 MAHARASHTRA

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# NRCOG ANNUAL REPORT - 1999-2000



NATIONAL RESEARCH CENTRE FOR ONION & GARLIC  
INDIAN COUNCIL OF AGRICULTURAL RESEARCH  
RAJGURUNAGAR, DIST. PUNE 410 505. (MAHARASHTRA) INDIA.

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## EXECUTIVE SUMMARY

After the National Research Centre for Onion and Garlic started functioning at Rajgurunagar w.e.f 16 June, 1998, preference was given to creation of infrastructural facilities for the smooth functioning. As part of this, renovation of building, residential quarters and tarring of approach roads was completed. In the farm, facilities for drip and sprinkler irrigation have been created for carrying out experiments on efficient irrigation management. The Agro – meteorological observatory acquired an Automatic Weather Station for recording various weather parameters which will be in turn used for disease forecasting. The soil science lab was equipped with an Atomic Absorption Spectrophotometer for analyzing the soil and plant tissues for different micronutrients.

Apart from this major emphasis was given towards finalisation of research projects after discussion in the SRC. Conservation of genetic resources, development of hybrids through production of haploids using conventional or non conventional approaches, use of integrated water and nutrient management, studying the feasibility of using drip and sprinkler irrigation for efficient water management and use of integrated disease and pest management for protecting the crops are some of the main projects finalized during the meeting. In Garlic, creation of variability through somaclonal variation and mutation breeding for development of bigger cloved variety is given top priority.

Moreover, Interspecific hybridization has also been attempted with four *Allium fistulosum* L. lines viz., TA 106, TA 104, TA 204 and AF 468 obtained from AVRDC, Taiwan for incorporation of disease resistant gene into the locally adaptable variety, N – 2 – 4 – 1. Results of the crosses are awaited.

Absence of superior F1 hybrids for commercial cultivation has been a major problem in our country for a very long time. To ameliorate this problem, we have obtained two MS lines and their maintainer lines ( MS 48 A & B and MS 65 A & B) from IIHR, Bangalore to be used in different crosses. Efforts have also been started to produce haploids through *in vitro* techniques using immature flower buds and also work on anther / ovule culture is to be initiated in January corresponding to the flowering period in onion. These haploids will be further diploidised to obtain inbreds which could be used as parental lines in heterosis breeding programmes.

During this year, 44 onion genotypes in *kharif* and 61 in *rabi* have been evaluated for various yield and other important horticultural traits. In case of garlic, 83 accessions have been subjected to evaluation in *rabi*. Elite lines have been selected and are been used for multiplication by selfing. Evaluation of different onion varieties during *kharif* and *rabi* was carried out and the result points out that Baswant – 780 was the best in both the seasons with N – 2 – 4 – 1 also on par in *rabi* season. Baswant – 780 was again adjudged the best performer under different dates of planting in *rangda* followed by N – 2 – 4 – 1 and Arka Niketan. Of the six exotic hybrids evaluated during *rangda*, Mercedes performed best. 16

exotic hybrids were evaluated in *rabi*, DPSX 1029 was the topper. In garlic, effect of mother clove size on growth and yield of garlic var. G – 41 was studied. It was seen that clove size more than 1.5g recorded the highest yield.

The first Institute Management Committee meet was convened on 4 October, 1999 and stress was given to development of infrastructural facilities at the centre to carry out the research activities. Master plan for office cum laboratory building was finalized and approved by IMC. Sanction for eight scientific instruments not included in the EFC Memo was also done as a special case. The SRC and II RAC meet also took place where all the projects were discussed and approved.

For the first time Dr. R.S. Paroda, DG, ICAR visited the National Research Centre for Onion & Garlic and visited different laboratories in the centre viz., Horticulture, Plant Tissue Culture, Pathology, Entomology, Soil Science and Computer Facilities created at the centre under ARIS Cell. He also emphasized the need of training scientists in advanced technologies and application of computers in research activities. On this occasion, the hon'ble dignitary released two technical bulletins viz., *Kanda Lagwad* and '*Kandyavaril rog ani kidinche vyavsthanan*' prepared by this centre for extension purpose.

## 2. THE ORGANIZATION

### 2.1 Background

National Research Centre for Onion and Garlic was established on 4 July, 1994 during the VIII plan with its headquarters at Nashik, a concentrated onion growing area of Maharashtra. The centre was having 100 acres of research farm at Pimpri, which is 40 kms away from Nashik city. Although the centre was sanctioned early, its establishment and development suffered due to remoteness of farm, shortage of irrigation water, delay in recruitment of scientific staff including the Director and other administrative matters. Keeping in view the lacunae, ICAR took the decision to shift the centre to CPRS, Rajgurunagar, Pune Distt, previously a substation of CPRI, Shimla with effect from 16 June, 1998.

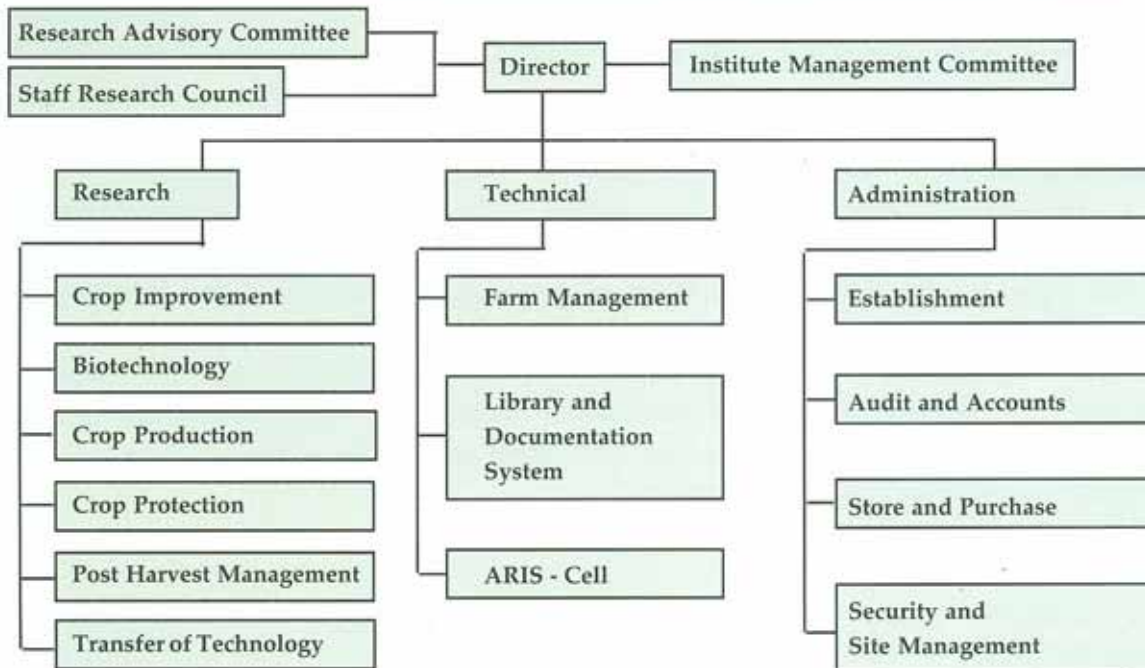
### 2.2 Location

The centre is located at Rajgurunagar, 43 kms away from Pune city on Pune-Nasik highway with a latitude of 18.32° N and longitude 73.51° E and is 553.8 m high above m.s.l. The average temperature ranges between 17.6°C to 31.8° C with an average rainfall of 669 mm.

### 2.3 Mandate

- To collect, maintain and act as a national repository for onion and garlic
- To develop hybrids/varieties suitable for domestic as well as export market coupled with resistance to biotic and abiotic stresses
- To enhance and sustain productivity and quality of seed as well as bulb crop through agronomic manipulations
- To develop packages for post harvest handling and value addition
- To act as clearing house of research and general information relating to onion and garlic

## 2.4 ORGANOGRAM OF NRC ONION &amp; GARLIC



## 2.5 ABOUT THE CENTRE

## 2.5.1 FARM

A total of 21.954 ha. of farm land is available with the centre for conducting research experiments and the remaining is under structures earmarked for civil works and landscaping. Drip and Sprinkler irrigation was installed in four acres of farm land for carrying out micro irrigation studies in onion and garlic. Mango Plantation was done in 0.61 ha. Leveling of complete farm with each plot having an area of 0.8 ha. per block was also completed. The old irrigation well was renovated and put to use for irrigation purposes. Farm revenue to the tune of Rs. 21,617/- was generated through sale of farm produces.





### **2.5.2 OFFICE CUM LABORATORY**

The office cum laboratory building has been established at the new site by renovating the 30-year-old CPRS buildings. All laboratories viz., Horticulture, Plant Tissue Culture, Soil Science and Plant Protection, are functioning fully with all necessary equipments been purchased.

### **2.5.3 LIBRARY**

The centre has enhanced its collection with 211 books, 150 publications viz., Newsletters, Annual Reports and Journals acquired through exchange or as gratis from ICAR institutes, Agricultural universities and other related organizations. The centre is at present subscribing for 21 Indian journals and 3 International journals. Apart from that, subscription towards Current Contents with abstracts on floppy and HortCD has been renewed. All the books have been entered in the database maintained at the centre. A reprint database for onion – “RepoOnion” has been developed and holds at present 20 records. All library resources are fully computerized.

### **2.5.4 ADMINISTRATION**

Effective support to all research activities is been provided by the administrative section comprising of Establishment, AA, C&B and Stores Section.

### **2.5.5 ARIS CELL**

An ARIS Cell with complete E-mail and Internet facility has been established at the Centre as per the directions and specification received from ADG (ARIS). A total of three computers and dot matrix printers have been received under NATP project.

### **2.5.6 TECHNICAL CELL**

A research co-ordination and management unit / technical cell has been initiated at the Centre to co-ordinate, plan, monitor and review the research programmes to be implemented.

### **2.5.7 AGRO-METEOROLOGICAL OBSERVATORY**

As part of strengthening of infrastructure facilities, an Automatic Weather Station has been installed at the Centre. Parameters like weekly total rainfall, minimum and maximum temperature, relative humidity and evaporation are recorded periodically (April 1999 to March 2000).

### 3. SALIENT RESEARCH ACHIEVEMENTS

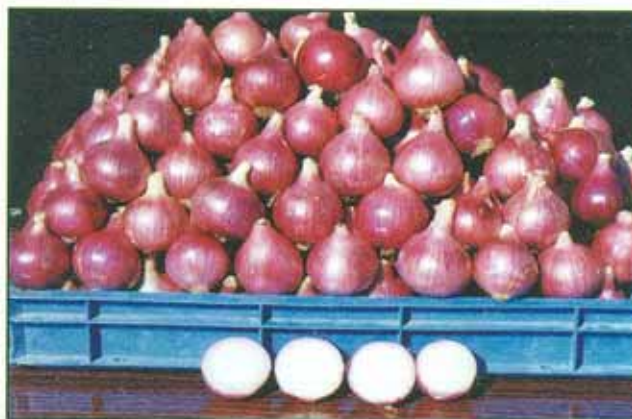
#### 3.1 CROP IMPROVEMENT

##### 3.1.1 ONION

#### Collection, Characterisation and Evaluation of Tropical Onion Germplasm

Anil Khar, A. Asha Devi, K. E. Lawande

In *kharif* season (1999), 44 onion genotypes were collected from various sources, in Maharashtra and Gujarat State and evaluated for yield and other important horticultural traits. On the basis of yield/m<sup>2</sup>, Acc. No. 780-5-2 performed best (1.77 kg/m<sup>2</sup>) (Table 1) and Kusur local with the lowest yield (1.058 kg/m<sup>2</sup>) amongst the ten promising lines selected (Table 1.1). As for the yield, it ranged from 0.037 – 1.77 kg/m<sup>2</sup>. Re-



garding plant height, Acc. No. 12-2 was promising (22.4 cm) followed by Acc no. 64-1 (46 cm). Average weight of bulb, ranged from 75 – 49.9 g with 64-1 recording the highest. In respect of marketable yield (q/ha), 780-5-2 performed well with a yield of 177.1 q/ha and 78-2 the least with 105.8 q/ha. The amount of total soluble solids were 14.6°B in Acc. No. 125 followed by Acc. No. 12-OP-1 and the range for TSS was 14.6 – 10°B.

**Table 1. Performance of ten best lines on the basis of yield / m<sup>2</sup>**

Date of sowing	: 30.06.99	Date of transplanting	: 20.08.99
Date of harvesting	: 26. 11. 1999	Plot size	: 3 x 2 m.
Spacing	: 10 x 15 cm.		

Acc. No	Neck thick.	Polar dia.	Equ. dia.	Bulb wt.(g)	TSS (°B)	Yield / m <sup>2</sup> (kg)	Mkt. yield (q/ha)
780-5-2	1.38	5.24	4.98	53.4	13.7	1.77	177.1
11-2	1.24	4.7	4.92	40.6	12.1	1.7	170.8
780-3-1	1.14	4.48	5.02	42.7	13.3	1.57	157
26-OP	1.52	5.04	5.64	67.4	11.9	1.47	147.6
101	0.68	3.94	4.62	30.1	11.7	1.34	134
.12-1	1.12	4.72	5.18	39.4	13.9	1.16	116
.23-2	1.22	4.74	5.32	50	13.4	1.13	113
780-5-1	1	4.14	5.14	31.9	12.9	1.09	109.5
Kusur Local	1.08	4	5	52.5	13.6	1.058	105.8
78-2	1.2	4.5	4.74	47	12.3	1.058	105.8

**Table 1.1** Best ten lines for various characters

Characters	Selected Accessions	Range
Yield / m <sup>2</sup> ( kg )	780-5-2, 11-2, 780-3-1, 26-OP, 101, 12-1, 23-2, 780-5-1, 78-2, Kusur Local	1.77 – 1.058
Plant Height (cm)	12-2, 73-4, 101, 101-4, 70-1, 68-1, 65-4, 68-3, 121, 64-1	10 – 8.8
Number of leaves	101-4, 68-3, 73-4, 8-OP-1, 780-3-1, 78-2, 73-1, 101, 67-1, 780-5-1	6.4 – 8.4
Av. Bulb wt. (g)	64-1, 26-OP, 73-4, 75-1, 65-3, 780-5-2, Kusur Local, 19-OP, 23-2, 65-4	75 – 49.9
Marketable Yield (q/ha)	780-5-2, 11-2, 780-3-1, 26-OP, 101, 12-1, 23-2, 780-5-1, Kusur Local, 78-2	177.1 – 105.8
TSS (°B)	125, 12-OP-1, 8-OP-2, 12-1, 117, 780-5-2, Kusur Local, 121, 75-1, 23-2	14.6 – 13.4

In the case of *rabi* germplasm (1999–2000), 61 indigenous genotypes were evaluated at preliminary level for yield and other desirable horticultural traits. Yield ranged from 10.5 – 2.26 kg/m<sup>2</sup> (Table 2 ) among the ten promising lines selected with Acc. No. 33 recording the highest value of 10.5 kg/m<sup>2</sup>. Acc. No. 206 performed best in terms of average bulb weight of 73.7 g and Acc. No. 14-1 showed highest marketable yield of 56.95 kg.

In case of plant height and number of leaves, Acc. No. 127-2 recorded lowest of 33cm

and 3.2 respectively. Acc. No 169-2 showed the highest, whereas Acc. No. 28 has the maximum number of leaves (5) among the ten selected lines. (Table 2.1)

**Table 2 : Performance of best ten accessions on the basis of yield / m<sup>2</sup>**

Date of sowing : 26. 10. 99                      Date of transplanting : 13.12.99  
Date of harvesting : 25.04.2000              Plot size : 3 x 2 m.  
Spacing : 10 x 15 cm.

Acc.No.	NOL	Pl.Ht (cm)	mkt.Yield (q/ha)	Yield/sqm (kg)	Polar Dia.	Equ. Dia.	Neck thickness	Avg bulb wt (g)
33	5.55	41.9	4191.50	10.5	3.44	4.52	0.53	36.306
156-2	6.6	45	991.63	9.91	3.43	4.42	0.66	42.893
206	5.5	41.75	1191.62	4.76	3.58	4.39	0.42	73.762
25- 0P-2	6	59.4	358.32	3.58	4.82	5.54	1	57.143
15R	6.2	47.6	474.98	3.16	4.32	5.14	0.82	56.250
132	7.6	47.3	258.32	2.58	4.1	5.42	0.88	61.111
142-2-w	5.9	46.2	2441.57	2.45	3.92	5.28	0.47	37.879
174	7.4	44.6	733.30	2.44	3.42	4.34	0.6	65.476
201	5.9	45.8	808.30	2.3	3.98	4.89	0.41	48.347
151	5.6	48.27	2266.58	2.26	3.9	5.22	0.85	42.735

**Table 2.1: Best ten lines for various characters**

Characters	Selected Accessions	Range
Yield / m <sup>2</sup> (kg)	33, 156-2, 206, 25-OP-2, 15R, 132, 142-2-W, 174, 201, 151	10.5 – 2.26
Plant Height (cm)	127-2, 27, 173, 23, 17, 175, 28, 32, 460, 169-2	33 – 39.75
Number of leaves	127-2, 27, 23, 57, 125, 142, 182, 17, 175, 28	3.2 - 5
Av. Bulb wt. (g)	206, 174, 132, 25-OP-2, 15R, 201, 133, 149, 14-2R, 51	73.7 – 44.9
Marketable yield (q/ha)	14-1, 56, 12-3, 131, 26, 153, 179, 182, 33, 142	9491.29 - 4099.84

### Preliminary studies on *in vitro* regeneration in onion (*Allium cepa* L.)

Asha Devi, A and Anil Khar



Different explants *viz.*, leaf, pseudo shoot tip, roots, flower buds and hypocotyl were used for indirect organogenesis in MS media. Amongst the different explants tried, flower buds responded well, with callus formation been initiated within one month's time. Various concentrations and combinations of plant growth regulators were tried. 5 mg/l Kin was the most successful in induction of callus from flower buds. 10 mg/l BA was most suitable for regeneration of shoots. 6 mg/l Kin induced multiple shoots (7-8) from *in vitro* seedling

explant obtained directly from flower buds. The shoots were transferred to 2 mg/l IBA for rooting. Hardening of plantlets is in progress.

### Interspecific Hybridisation between *Allium cepa* L. and *A.fistulosum*

Anil Khar, A. Asha Devi, K. E. Lawande

Six lines of *Allium fistulosum viz.*, TA 104, TA 106, TA 108, TA 198, TA 204 & AF 468 obtained from AVRDC, Taiwan were evaluated for their germination ability and crossability with local commercial cultivar. TA 106 gave good germination followed by AF 468, TA 104 and 204 whereas TA 108 and 198 did not germinate at all. Crossing of lines TA 106 and 104 with the commercial variety N-2-4-1 was initiated in February, 2000 along with reciprocal crosses because of their good flowering percentage. In the crosses where N-2-4-1 was used as female the success rate was 29% with TA 106 and 28% with TA 104 whereas in the reciprocal crosses the seed set was 12% with TA 106 and 4% with TA 104.

## 3.1.2 GARLIC

### Collection, Characterisation and Evaluation of Indigenous Garlic (*Allium sativum* L.) Germplasm

Anil Khar, A. Asha Devi, K. E. Lawande

A total of 83 accessions of garlic has been collected from various sources through exploration trips, from farmer's field and market yards. These were evaluated for various yield contributing characters during *rabi* 1999-2000. Of the total 83 accessions, Acc. No. 72 recorded highest yield/m<sup>2</sup> (4.375 kg), ( Table 3.1 ), Acc. No. 71 recorded least number of leaves (3.7) and maximum number of cloves per bulb (32). Shortest plant height was recorded in Acc. No. 95 (19.7 cm), whereas, Acc. No. 221 showed maximum average weight

per 10 bulbs (230 g). These accessions are being further evaluated for identifying promising lines.

Performance of the best ten accessions on the basis of yield/m<sup>2</sup> has been recorded (Table 3), where, Acc. No. 72 tops the list with an yield of 4.375 kg/m<sup>2</sup>, followed by Acc. No. 200 (1.65 kg/m<sup>2</sup>). The yield ranged from 0.083 – 4.375 kg/m<sup>2</sup>.

**Table 3. Performance of best ten accessions on the basis of yield / m<sup>2</sup>**

Date of planting : 05. 11. 1999      Date of harvesting : 15. 03. 2000  
Plot size : 3 x 2 m.      Spacing : 10 x 15 cm.

Acc. No.	NOL	PL.Ht. (cm)	Yield / m <sup>2</sup> (Kg)	Av. Wt/10 bulb (g)	Colour	NOClv	Av. Wt/ 50 clv (g)
72	9	52.6	4.375	150	WR	28.7	20
200	9.5	52.6	1.65	100	W	17.4	30
221	9.6	58.8	1.583	230	W	19	40
52	8.2	47.4	1.458	120	R	26.3	5
201	8.9	55.1	1.458	140	W	19.2	30
37	7.7	52.7	1.208	180	R	17.8	40
50	6.7	50.6	1.208	180	WR	16.2	35
55	8.5	40.4	1.208	105	WR	22.4	10
74	8.8	52.2	1.208	70	WR	15.6	15
63	9.3	51.4	1.183	90	WR	21.6	25

**Table 3.1. Best ten lines for various characters**

Character	Selected accessions	Range
Yield / m <sup>2</sup> ( kg )	72, 200, 221, 52, 201, 37, 50, 55, 74, 63	4.375 – 1.183
Plant Height ( cm. )	95, 87, 96, 98, 71, 88, 176, 163, 92, 148	19.7 - 26
Number of leaves	71, 95, 98, 176, 92, 88, 66, 87, 163, 175	3.7 – 4.3
Av. Wt. / 10 bulb (g)	221, 50, 37, 184, 61, 49, 44, 43, 72, 80	230 - 150
Number of cloves / bulb	71, 72, 52, 163, 217, 44, 225, 55, 88, 152	32 – 22.1

### 3.2 CROP PRODUCTION

#### Performance of onion varieties under *kharif* season

V.Sankar, Anil Khar, K.E.Lawande

During *kharif* season (1999), four released varieties were evaluated. Observations on plant height, number of leaves, yield and yield contributing characters and TSS were observed. The results revealed that B-780 recorded the highest yield of 112.0 q/ha followed by Phule Safed (105 q/ha). In general, the marketable yield of all varieties was very low, because the *kharif* rains affected the crop severely. There was no significant difference between the varieties and all the four varieties were on par with each other (Table 4).

**Table 4. Kharif onion varietal trial 1999**

Date of sowing	: 01.06.1999	Date of harvesting	: 04.11.1999
Date of planting	: 14.07.1999	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av.wt. Bulb (g)	%of grade A bulb	%of grade B bulb	%of grade C bulb	% of doublesbolter	% of T.S.S	Mark etable Yield (Q/ha)
ADR	52.4	7.0	0.52	3.81	3.38	16.3	13.6	31.8	33.3	21.2	—	89.5
B 780	61.7	8.6	0.55	4.3	3.79	23.0	18.8	33.3	37.7	10.1	—	112.0
Phule Safed	54.8	7.5	0.83	4.09	3.86	19.6	19.3	27.5	42.6	10.5	—	105.0
N 53	56.3	9.0	0.38	4.4	3.24	32.7	23.5	27.8	32.5	16.2	—	101.6
S.Ed												13.7
CD at 5%												30.9

#### Evaluation of exotic hybrids during *rangda* season

Anil Khar, A. Asha Devi, V. Sankar, K.E.Lawande

Field experiment was conducted to study the performance of exotic hybrids during *rangda* (late *kharif*) season (1999). Among the six hybrids evaluated, the performance and yield potential of Mercedes was good. It recorded the highest yield of 374.2 q/ha but other than Mercedes, all the varieties recorded very poor yield mainly due to high percentage of

doubles and bolters. Higher percentage of bolters and double bulbs is always associated with late *khariif* planting. The low temperature during November-December correspond to the bulb development period resulting in more doubles and bolters (Table 5).

**Table 5. Evaluation of hybrids during Rangda season (1999-2000)**

Date of sowing	: 15.06.1999	Date of harvesting	: 03. 12. 99
Date of planting	: 05.08.1999	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of grade A bulb	% of grade B bulb	% of grade C bulb	% of doubles	% of bolter	T.S.S (° brix)	Mark etable Yield (Q/ha)
Rio Raji Red	69.3	8.2	1.24	5.74	5.46	57.9	9.9	14.6	19.2	56.3	—	9.8	189.5
Mercedes	65.2	8.0	2.24	6.36	6.10	110.4	68.6	19.7	8.9	2.9	—	7.64	374.2
Pinnacle	69.7	9.0	1.85	5.43	4.72	48.3	5.0	7.8	15.4	71.8	—	7.3	53.6
Teton	72.4	9.7	1.42	5.71	5.22	50.2	39.3	15.2	17.8	26.0	1.7	8.4	162.8
PS 1190	73.0	11.0	1.8	4.97	5.11	52.5	7.3	12.8	14.1	63.8	2.0	7.3	76.3
Red Creole	59.4	9.3	0.38	4.34	5.32	25.9	56.6	16.5	15.4	9.9	1.6	12.6	191.4

### Evaluation of onion varieties for late *khariif* season under different dates of planting

V.Sankar, K.E.Lawande, Anil Khar

Seeds of different varieties were sown at fortnightly intervals on four dates, starting from the first week of August to second week of September. Correspondingly, seedlings were transplanted. The results revealed that irrespective of varieties, higher yield was observed when sowing was done during first week of September and subsequent transplanting during second week of October. In early date of planting, the yield was very poor because of occurrence of more bolters and twins which led to the development of less



High percentage of bolting



percentage of A grade and B grade bulbs. Among the various varieties evaluated under different date of plantings, the performance and yield of Baswant ( 307.2 q/ha ) , N-2-4-1 (285.0 q/ha) and Arka Niketan (261.4 q/ha) was superior over other varieties. More over the bulb TSS and storability was also found to be good (Table 6 a – d).

**Table 6. Performance of onion varieties under different dates of planting in late kharif (Rangda)**

**Table 6 (a) I – Date of planting**

Date of sowing	: 04.08.1999	Date of harvesting	: 24.01.2000
Date of planting	: 22.09.1999	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of A grade bulb	% of B grade bulb	% of C grade bulb	% of doublesbolter	% of brix	T.S.S (°)	Mark etable Yield (Q/ha)
Arka Niketan	61.5	8.80	0.89	4.41	4.59	42.6	21.3	27.1	23.0	11.0	17.6	13.9	139.7
ALR	55.8	8.80	0.85	4.30	4.72	48.2	28.7	23.0	24.8	9.5	14.0	13.0	167.4
B 780	57.3	8.88	0.82	4.45	4.80	51.6	43.3	29.0	11.3	12.0	4.5	13.4	229.5
N 2-4-1	58.4	9.16	0.86	4.30	4.74	54.0	28.9	26.1	24.3	9.23	11.3	14.0	237.0
Phule Safed S.Ed	53.6	8.72	0.83	4.21	4.67	46.1	18.6	24.4	15.0	37.4	4.5	12.6	120.4
CD at 5%													5.04
													10.90

**Table 6 (b). II- Date of planting**

Date of sowing	: 16.08.1999	Date of harvesting	: 02.02.2000
Date of planting	: 30.09.1999	Plot size	: 3 x 1.8 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of grade A bulb	% of grade B bulb	% of grade C bulb	% of doublesbolter	% of (°brix)	T.S.S	Mark etable Yield (Q/ha)
Arka Niketan	58.3	9.5	1.08	4.86	5.57	50.6	20.8	12.1	19.8	15.5	31.8	12.7	155.9
ALR	54.9	8.4	1.07	4.55	5.60	48.4	17.1	11.4	18.7	10.1	10.3	13.3	125.7
B 780	53.4	9.2	0.74	4.91	5.97	77.4	53.6	16.7	10.0	7.8	11.8	11.9	302.2
N 2-4-1	55.0	8.7	0.95	4.72	5.52	52.7	29.5	15.7	21.8	16.8	16.5	11.6	194.6
Phule Safed	54.4	8.2	0.90	4.50	5.63	53.4	17.8	11.0	10.9	42.5	50.3	10.9	129.4
S.Ed													3.4
CD at 5%													9.6

**Table 6 (c). III- Date of planting**

<b>Date of sowing</b>	<b>: 01.09.99</b>	<b>Date of harvesting</b>	<b>: 01.03.2000</b>
<b>Date of planting</b>	<b>: 20.10.99</b>	<b>Plot size</b>	<b>: 3 x 2 m</b>
<b>Spacing</b>	<b>: 15 x 10 cm</b>		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of grade A bulb	% of grade B bulb	% of grade C bulb	% of doublesbolter	% of (°brix)	T.S.S	Mark etable Yield (Q/ha)
Arka Niketan	65.8	7.4	0.7	4.9	5.3	46.7	30.5	13.2	15.9	17.6	22.8	12.9	261.4
ALR	60.2	9.2	1.2	4.4	5.7	42.2	32.5	20.0	7.6	22.3	17.7	11.3	223.8
B 780	54.4	10.0	0.8	5.3	6.2	60.3	41.2	21.4	12.7	15.5	9.2	13.1	307.2
N 2-4-1	52.7	9.5	0.7	5.0	5.7	52.7	40.2	14.2	6.3	27.0	12.4	12.8	285.0
Phule Safed	56.5	8.4	0.9	4.2	5.0	45.5	21.2	13.5	19.3	38.0	9.0	10.7	193.8
S.Ed													4.3
CD at 5%													9.4

Table 6 (d). IV- Date of planting

Date of sowing	: 16.09.99	Date of harvesting	: 09.03.2000
Date of planting	: 03.11.99	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of A grade bulb	% of B grade bulb	% of C grade bulb	% of doublesbolter	% of bolter	TSS (° brix)	Mark etable Yield (Q/ha)
Arka Niketan	60.3	7.9	0.9	5.3	6.0	53.8	34.3	21.0	4.2	27.5	13.1	12.2	168.4
ALR	54.8	8.8	0.76	5.2	4.7	47.3	27.2	18.1	5.6	28.5	20.7	10.7	152.6
B 780	59.2	9.7	0.95	5.2	6.3	57.3	41.7	24.2	3.0	18.2	13.0	12.6	227.3
N 2-4-1	62.8	11.1	0.82	5.0	6.1	54.0	39.0	11.8	11.5	17.2	21.0	12.7	196.4
Phule Safed	57.5	8.7	0.53	4.3	4.9	42.7	24.2	13.6	7.7	40.0	14.6	10.3	136.0
S.Ed													2.56
CD at 5%													7.84

### Performance of F<sub>1</sub> hybrids during rabi season

Anil Khar, A. Asha Devi, V.Sankar, K.E.Lawande

In rabi season 1999-2000, seven hybrids were collected from various sources and evaluated for yield and yield contributing characters. Among the seven hybrids, the performance of the Mercedes was found to be very good and recorded the highest yield of 401.9 q/ha followed by Rio Raji Red (338.1 q/ha). The increased yield may be due to higher percentage of A grade bulb, average weight of individual bulb and less number of twins (Table 7).



**Table 7. Rabi Season – Hybrids Trial (1999-2000)**

Date of sowing	: 14.11.99	Date of harvesting	: 29.04.2000
Date of planting	: 03.12.99	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of A grade bulb	% of B grade bulb	% of C grade bulb	% of doubles	% of bolter	T.S.S (° brix)	Mark etable Yield (Q/ha)
Mercedes	71.0	11.0	0.32	5.46	5.3	111.4	55.6	23.4	18.4	—	2.6	9.2	401.9
Rio Raji Red	67.3	9.6	0.26	4.78	5.0	76.4	47.5	29.2	12.3	—	11.0	8.8	338.1
3404 Hybrid	65.1	9.1	0.24	4.4	4.6	40.0	59.1	23.7	16.6	—	0.6	8.4	284.7
Demo													
Hybrid-3667	61.8	9.2	0.3	5.38	5.7	50.4	46.6	20.9	32.5	—	—	6.4	184.3
Santiago	57.3	8.6	0.36	4.9	4.6	37.0	38.1	29.9	31.2	—	0.8	9.24	222.6
A. Kirtiman	63.9	10.5	0.34	4.3	4.8	46.6	32.9	37.9	15.3	6.0	7.7	10.7	269.0
A. Lalima	69.7	9.7	0.34	4.02	4.76	63.5	51.1	15.8	9.7	12.7	10.5	11.6	262.2

\* Not Replicated

### Performance of onion varieties during rabi season

V.Sankar, A Khar, K.E.Lawande

Different onion varieties are recommended for growing in *rabi* season in different parts of the country. To study the performance of different onion varieties under western Maharashtra conditions, six released varieties were planted during *rabi* season. Among the different varieties, N-2-4-1 recorded the highest yield of 265.3 q/ha which was on par with Baswant 780 (265.0 q/ha). Higher TSS was observed in Arka Niketan (14.5 ° brix). The varieties Baswant 780 showed / recorded very low percent of bolters (3.5) and twins (5.8) compared to other varieties tested (Table 8).

**Table 8. Rabi onion Varietal Trial (1999 – 2000)**

Date of sowing	: 12.10.99	Date of harvesting	: 22.04.2000
Date of planting	: 27.11.99	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of A grade bulb	% of B grade bulb	% of C grade bulb	% of doubles	% of bolter	T.S.S (° brix)	Mark etable Yield (Q/ha)
N 2-4-1	62.1	13.2	1.02	4.4	5.34	67.5	40.8	23.7	11.2	7.0	17.3	12.8	265.3
Phule Safed	53.4	9.01	0.84	3.8	5.1	56.3	33.6	18.8	9.7	26.3	11.6	13.4	194.1
ALR	60.3	8.8	1.10	4.8	5.9	54.0	36.2	13.1	17.2	7.6	25.9	12.7	178.4
Arka Niketan	53.8	11.3	1.40	4.5	5.3	64.2	50.0	23.5	0.2	12.7	15.2	14.5	229.0
B 780	58.5	9.2	0.78	4.0	5.2	69.8	51.5	23.5	15.8	3.5	5.8	11.0	265.0
Phule Suwarna	50.9	8.1	1.02	3.7	3.2	53.0	22.9	22.3	13.7	15.9	24.9	12.5	157.2
S.Ed													7.31
CD at 5%													15.6

### Evaluation of exotic/hybrids (D-Palmer) during Rabi Season

Anil Khar, A. Asha Devi, V.Sankar, K.E.Lawande

A total of 9 exotic hybrids were received from D-Palmer seed company and these hybrids were evaluated in *rabi* season. Observations on growth characters yield and yield contributing characters and TSS were recorded. Among the different hybrids evaluated, DPSX-1029 recorded the highest yield of 485.3 q/ha followed by DPS-1043 (478.4 q/ha) and DPX-1009 (458.4 q/ha). Incidentally, all the varieties were on par with each



other. The highest TSS was observed in DPS 1008 (8.96 ° B). The increased yield may be due to higher percentage of A grade bulbs, less percentage of doubles and no bolters (Table 9).

**Table 9. Evaluation of exotic varieties (D-palmer)/hybrids**

Date of sowing	: 04.11.99	Date of harvesting	: 26.04.2000
Date of transplanting	: 03.01.2000	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of A grade bulb	% of B grade bulb	% of C grade bulb	% of doublesbolter	% of bolter	T.S.S ( <sup>o</sup> brix)	Mark etable Yield (Q/ha)
DPS -1034	68.3	9.8	0.80	6.9	5.12	75.1	74.7	10.9	9.8	—	4.6	8.76	346.03
DPX-1031	75.7	11.7	0.54	5.72	4.98	60.0	50.3	35.8	12.6	—	1.3	8.4	370.43
DPX-1009	61.7	10.0	0.24	5.26	3.92	70.3	78.5	11.9	4.8	—	4.8	8.52	458.4
DPSX-1024	69.3	9.7	0.44	4.32	5.12	59.2	67.4	22.2	7.3	—	3.1	8.5	378.6
DPSX-1013	70.4	11.9	0.64	4.86	4.96	79.4	62.2	19.4	13.7	—	4.7	8.8	366.5
DPS - 1008	63.5	11.0	0.62	5.38	5.14	50.3	68.6	21.0	6.8	—	3.6	8.96	356.7
DPS - 1043	77.1	11.4	0.68	6.42	5.42	54.6	78.8	10.9	2.9	—	7.4	8.8	478.3
DPS -1037	67.2	12.5	0.44	4.92	4.84	69.8	49.2	24.3	22.7	—	3.8	8.9	311.5
DPSX-1029	73.4	13.0	1.16	6.02	5.82	60.5	71.8	20.4	6.2	—	1.6	8.5	485.3
S.Ed													31.9
Cd at 5%													67.80

### Evaluation of IIHR, MPKV and PAU varieties during *Rabi* Season

V.Sankar, K.E.Lawande, Anil Khar

Ten released varieties of IIHR, MPKV and PAU were evaluated during *rabi* season. The experiment was conducted using RBD design with three replications. The results revealed that the highest marketable yield was obtained from IIHR variety Arka Niketan (289.3 q/ha) followed by Arka Kalyan (272.3 q/ha). In general, compared to IIHR varieties, MPKV and PAU varieties were more susceptible to bolters and twins, it leads very low marketable yield. With regards to total soluble solids, Arka Niketan was recorded the highest TSS of 14.2 <sup>o</sup> brix (Table 10).

**Table 10. Evaluation of IHHR, MPKV and PAU varieties during *rabi* season (1999-2000)**

Date of sowing	: 12.10.99	Date of harvesting	: 01.05.2000
Date of transplanting	: 27.11.99	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Variety Name	Plant Height (cm)	No. leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	%of A grade bulb	%of B grade bulb	% of C grade bulb	% of doublesbolter	% of T.S.S (° brix)	Mark etable Yield (Q/ha)	
Arka Kalyan	66.4	9.2	0.30	4.54	4.68	69.3	55.2	22.5	5.7	5.9	10.7	14.2	272.3
Arka Niketan	63.8	7.6	0.36	4.00	4.54	67.3	60.1	12.3	7.8	8.6	11.2	13.4	289.3
Arka Pragati	53.4	8.0	0.32	4.12	4.40	55.8	30.3	20.2	8.6	33.5	7.4	13.2	228.0
Arka Pitamber	57.6	8.8	0.26	4.40	4.60	66.1	40.3	23.9	10.1	24.5	1.2	11.0	249.0
Punjab Sel.	57.3	9.3	0.54	4.70	5.26	61.1	21.3	27.5	23.5	19.5	15.2	12.6	79.23
PBR - 4	64.2	7.0	0.46	4.58	5.48	50.0	18.9	15.6	8.3	55.5	1.7	12.8	135.30
PKO - 26	62.8	8.7	0.48	4.40	5.08	53.2	30.5	10.3	2.0	43.3	12.8	11.3	170.90
PRR	59.3	10.2	0.50	4.70	5.34	60.6	22.6	12.7	6.3	42.5	15.8	13.5	142.60
P.Naroha	61.7	7.8	0.50	4.66	5.46	42.1	20.4	1.8	3.3	72.3	2.2	10.4	91.3
P.Suwarna	64.5	9.1	0.50	4.40	4.88	63.5	27.2	22.4	13.2	18.2	19.0	10.1	148.3
S.Ed													4.3
CD at 5%													8.9

### Studies on different methods of planting system in onion variety B 780

V. Sankar, Anil Khar, K.E. Lawande

During the *kharif* season 1999-2000, onion variety B 780 was evaluated for yield and yield contributing characters under different methods of planting. Seedlings were transplanted on three methods of planting viz., flat bed, raised bed and ridges and furrow system. RBD design was followed with seven replications. The highest marketable yield was obtained in flat bed system (294.1) followed by raised bed system and the lowest yield was recorded (226.5) on ridges and furrow system (174.2). The increased yield might be due to more plant population per unit area contributing towards higher per centage of marketable yield in flat bed system of planting (Table 11).

**Table 11. : Studies on different methods of planting system in onion**

Date of sowing	: 04.08.99	Date of harvesting	: 25.01.2000
Date of planting	: 25.09.99	Plot size	: 3 x 2 m
Spacing	: 15 x 10 cm		

Method of Planting	Neck thickness (cm)	BPD (cm)	BED (cm)	Av.wt. Bulb (g)	%of grade A bulb	%of grade B bulb	% of grade C bulb	% of doublesbolter	% of bolter	TSS (°brix)	No. of bulbs harvested	Initial Popul-ati on	Yield/ m <sup>2</sup> (kg)	Mkt. yield (Q/ha)
Flat Bed System	0.83	4.51	5.00	60.4	46.4	23.9	13.5	2.94	13.3	13.1	235.8	360.0	2.94	294.1
Raised Bed System	0.79	4.46	5.26	65.3	42.4	16.4	12.2	11.2	17.8	11.0	165.0	245.0	2.26	226.5
Ridges x Furrow System	1.05	4.37	5.44	60.0	40.5	28.6	13.6	12.7	4.6	15.0	138.0	203.0	1.74	174.2
SeD														1.25
Cd at 5%														5.72

### Effect of mother clove size on growth and yield of garlic variety G 41

V Sankar, Anil Khar, K.E. Lawande

A study was conducted to know the effect of different mother clove size on growth and yield of garlic variety G 41. The treatment comprised of three sizes of cloves (0.5, 1.0 and 1.5 gm) and RBD design was followed with seven replications. Among the various treatments, mother clove size of 1.5 gm recorded the highest plant height and more number of leaves per plant. This might be due to big clove size contrib-



uting towards greater availability of reserved food for the better growth of the plant. For yield also the same treatment gave significantly higher yield at 80.0 q/ha followed by 1.0 gm mother clove size (54.4 q/ha). The increased yield is mostly due to good percentage



of field establishment, more number of bigger cloves and bigger bulbs. Further, keeping quality of garlic bulb was also good (Table 12).

**Table 12. : Evaluation of mother clove size on growth and yield of garlic var. G-41**

Treatments	Plant Height (cm)	No. of leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	No. of bulb harvested / plot	Av. wt. of clove (g)	Av. wt. of bulb (g)	% of grade A	% of grade B	% of grade C	Yield/ plot (kg)	Yield /ha (Q/ha)
0.5 g	45.8	8.5	0.51	2.30	2.38	220.6	0.35	12.5	38.0	21.6	27.3	2.28	38.0
1.0 g	59.3	9.0	0.58	2.39	2.42	256.3	0.42	16.8	49.3	24.5	23.5	3.09	51.5
1.5 g	64.5	13.0	0.73	2.64	2.46	275.5	0.51	21.5	51.4	27.0	21.3	4.57	76.2
CD at 5%													4.40
SEd													2.02

#### **Effect of plant spacing on growth and yield of onion varieties**

*V Sankar, Anil Khar, K.E. Lawande*

Investigations were undertaken to explore the possibility of improving growth and bulb yield of onion varieties phule safed and N 2-4-1 by means of adopting various spacing along with local method. The trial was laid out in RBD design with five replications. Treatments included five spacing ( 15 x 10, 15 x 7.5, 10 x 10, 15 x 15 cm and local method) and two varieties (Phule Safed and N-2-4-1). Local method included wet planting of seedlings by professional and seasoned women labourers. The results indicated that among the different spacings tested, 10x 10 cm recorded the highest yield followed by local method. Regarding varieties, N-2-4-1 gave the highest yield of 283.4 q/ha. The highest yield contributing traits were recorded at 10x10 cm spacing, which decreased linearly with an increase in plant spacing. This trend indicated that although the per plant yield was lower at the narrowest spacing, but due to higher plant density per unit area produced highest yield per hectare. The increased yield of N 2-4-1 might be due to exploitation of inherent potential and less percent of bolters and doubles, which led to increased marketable bulbs. (Table 13)

**Table 13 : Effect of spacing on growth, yield and contributing traits of onion var. N 2-4-1**

Treatments	Plant Height (cm)	No. of leaves	Neck thickness (cm)	BPD (cm)	BED (cm)	Av. wt. Bulb (g)	% of A grade	% of B grade	% of C grade	% of double	Marketable (Q/ha)
T <sub>1</sub> - 10 x 10 cm	52.2	10.0	0.75	4.1	4.5	37.2	41.5	30.3	25.5	2.6	283.4
T <sub>2</sub> - 15 x 7.5 cm	57.6	10.3	0.67	3.8	4.1	32.0	29.3	40.8	24.0	3.0	194.0
T <sub>3</sub> - 15 x 10 cm	66.8	11.9	0.82	4.0	4.8	39.7	34.7	33.0	26.0	6.2	228.0
T <sub>4</sub> - 15 x 15 cm	71.5	13.4	0.85	3.9	4.5	36.4	25.2	45.4	21.4	8.0	162.5
T <sub>5</sub> - Local method	64.2	12.0	0.73	4.0	4.3	34.2	40.0	33.8	42.5	5.7	245.0
CD at 5% marketable yield											16.7

**Effect of foliar application of micronutrients on dry matter yield of onion**

Md. A. Aziz Qureshi, V Sankar and K. E Lawande

In the *rabi* season (Jan 2000 - Mar 2000) pot experiment was conducted to study the effect of foliar application of micronutrient on the dry matter production of onion var. N2-4-1. The trial was taken up in the black clayey soil, in 20 kg capacity cement pots. Two levels of micronutrients (Fe, Mn, Cu & Zn) were superimposed in the form of sprays at 3 stages of crop growth (i.e., 30, 45 & 60 DAT). N, P and K was applied uniformly as per the recommendation to all the treatments. Eight onion seedlings were transplanted in the pots. The data for the dry matter yield of onion bulb and tops harvested after the crop has attained the maximum growth (90 days after transplanting) is presented below (Table 14).

**Table 14 : Effect of foliar feeding of micronutrient salts on the dry matter yield of onion**

Treatment	Dry matter yield of Onion bulb (g/pot)	Dry matter yield of tops (g/pot) of Onion
T1 FeSO <sub>4</sub> 1.0 %	37.38	11.23
T2 FeSO <sub>4</sub> 2.0 %	35.68	13.26
T3 MnSO <sub>4</sub> 0.5 %	42.93	13.64
T4 MnSO <sub>4</sub> 1.0 %	40.2	12.76
T5 Cu SO <sub>4</sub> 0.5 %	30.81	10.76
T6 CuSO <sub>4</sub> 1.0 %	40.83	12.13
T7 ZnSO <sub>4</sub> 0.5 %	41.79	9.76
T8 ZnSO <sub>4</sub> 1.0 %	37.7	9.76
Control (Only N,P & K)	32.73	8.76
CD (0.05)	2.21	0.654
CD (0.01)	2.93	0.868

Maximum bulb dry matter (42.93 g/pot) was recorded due to the application of 0.5 per cent of manganese sulphate and was found to be highly significant over all other treatments. In general, the performance of foliar application of micronutrients had better effect on the bulb dry matter yield, except the application of copper sulphate (0.5 %). It is also seen that similar values for highest dry matter of onion tops was recorded due to the application of 0.5 per cent of manganese sulphate. However, all the micronutrient treatments excelled significantly over control. Further studies on the uptake of micronutrients and its correlation with yield, and other quality parameters are to be evaluated in the field.

### Potassium and Sulphur nutritional effect on the dry matter yield of onion crop

Md. A. Aziz Qureshi, V Sankar and K. E Lawande

In another pot experiment, a study was initiated to find the effect of potassium and sulphur nutrients on the dry matter production of onion crop. Different levels of potassium (100, 75 and 50 kg/ha, respectively) and two sources of K (with sulphur as  $K_2SO_4$  and without sulphur as KCl) were selected. Black, clayey soil was filled in 20 kg capacity cement pots. Eight onion seedlings (var. N2-4-1) were transplanted in *rabi*. Uniform levels of N and P were applied to all the treatments as per the standard recommendation (Table 15).

**Table 15 : Effect of two potassium sources on the dry matter yield of *rabi* onion crop**

Treatments	Onion bulb dry matter yield (g/pot)	Onion tops dry matter yield (g/pot)
T1 KCl (100 kg/ha)	40.99	7.09
T2 KCl (75 kg/ha)	39.91	6.36
T3 KCl (50 kg/ha)	35.35	5.61
T1 $K_2SO_4$ (100 kg/ha)	42.85	7.03
T2 $K_2SO_4$ (75 kg/ha)	36.64	5.61
T3 $K_2SO_4$ (50 kg/ha)	35.77	6.36
Control (only N & P)	31.77	3.9
CD(0.05)	5.359	1.040
CD(0.01)	7.513	1.459

It is seen from the above results, that potash had positive role in increasing the dry matter yield of both the bulbs and leaf material and the highest levels of K (100 and 75 kg/ha) either sulphate of potash or chloride of potash had produced significant yields of dry matter of both the bulbs and tops over the treatments having lower levels of K (50 kg/ha) and the control. The sulphur application as  $K_2SO_4$  (100kg/ha) gave the bulb dry matter yield on higher side over the similar treatment of KCl. However, the value was not statistically significant. Hence, studies of split application of potash sources are to be made for further analyzing the effect of K and S on the growth and quality parameters of onion.

**Evaluation of foliar application of water soluble fertilizers: Nitrophoska solub and Fetrilon combi-II on the yield of *rabi* onion bulb**

*Md. A. Aziz Qureshi, V Sankar and K. E Lawande*

In a field experiment, the water soluble fertilizers: Nitrophoska Solub (NS), a source of major nutrients and Fetrilon Combi -II (FC), a source of micronutrients, the products of Vardhaman Fertilizers Pvt. Ltd., were tested as the treatments given below. These fertilizer material was foliar applied in the onion crop at 15, 30, 45, 60, 75 and 90 days after transplanting. Hence, six sprays of two products were super imposed on the crop which was supplied with three levels (100, 75, 50 percentages) of recommended dose of fertilizers (RDF) as soil application. A check treatment with only 100 per cent RDF without any foliar application was also maintained. Yield parameters namely, A, B and C grade bulb yields and marketable bulb yield in quintals per hectare was recorded and given in the below table.

**Table 16: Influence of Nitrophoska solub and Fetrilon Combi-II on the marketable and total yield (quintals/ha) and TSS content of bulbs of *rabi* onion var. N2-4-1**

Treatments	A Grade	B Grade	C Grade	Total yield	TSS(%)
T1 100% RDF + 0.5% NS + 0.5% FC	109.12	107.73	39.15	256.01	12.72
T2 100% RDF + 1.0% NS + 0.5% FC	109.96	114.95	25.27	250.18	12.07
T3 100% RDF + 1.5% NS + 0.5% FC	137.72	84.41	36.10	258.23	12.20
T4 75% RDF + 0.5% NS + 0.5% FC	104.40	96.07	28.04	228.52	12.59
T5 75% RDF + 1.0% NS + 0.5% FC	102.46	109.96	25.82	238.24	11.82
T6 75% RDF + 1.5% NS + 0.5% FC	99.96	104.96	33.88	238.79	12.24
T7 50% RDF + 0.5% NS + 0.5% FC	127.45	91.07	20.55	239.07	12.47
T8 50% RDF + 1.0% NS + 0.5% FC	110.51	94.41	31.10	236.02	12.08
T9 50% RDF + 1.5% NS + 0.5% FC	98.85	109.96	28.32	237.13	12.34
T10 Control (only 100 % RDF applied)	113.29	111.62	31.10	256.01	11.74
CD (0.05)				19.36	0.486

The data presented in the above table shows that the yields of onion bulb due to the treatment Nos. 1, 2 and 3 were on par with the control, where the normal RDF along with sprays was applied. Rest of the treatments 4, 5, 6, 7, 8, and 9 were found to be inferior than the control. Though the data pertaining to the percentage TSS content of the bulbs was found to be significant due to different treatments over the control plot, the difference is only in decimal values and not in units and hence the treatment effect is only marginal.

**Effect of granulated Ammonium sulphate (Nitrogold) on the yield of rabi onion var. N2-4-1**

*Md. A. Aziz Qureshi, V Sankar and K. E Lawande*

Field experiment for investigating the effect of Nitrogold, a granulated ammonium sulphate (product of BASF) as a slow release source of nitrogen along with SSP, DAP and MOP in comparison with Urea and ammonium sulphate as nitrogen fertilizer material was taken up to evaluate its effect on the yield parameters. The data has been tabulated for percentage TSS content, different grades of bulb(A, B and C) and marketable yield in quintals per hectare in the table (17) below.

**Table 17: Effect of Nitrogold on the yield of bulbs (Quintal/ha) and TSS (%) content of rabi onion var. N-2-4-1**

Treatments	A Grade	B Grade	C Grade	Onion bulb yield (Q/ha)	TSS(%)
T1 Urea , SSP & MOP	122.73	113.84	29.43	266.00	12.54
T2 Nitrogold, SSP & MOP	131.03	114.84	34.43	280.44	12.04
T3 Nitrogold (60% RDF) SSP & MOP	106.62	81.08	23.88	211.58	12.34
T4 Am. Sulphate (RDF) SSP & MOP	129.39	98.85	26.10	254.34	12.11
T5 Urea , DAP &MOP	122.73	101.63	26.66	251.01	12.32
T6 Nitrogold, DAP & MOP	116.62	99.96	27.77	244.34	12.90
T7 Nitrogold (60% RDF), DAP & MOP	101.07	78.3	27.21	206.58	12.14
T4 Am. Sulphate (RDF), DAP & MOP	104.4	89.41	25.55	219.35	12.31
T9 CONTROL (only P & K)	82.74	64.42	43.87	191.03	12.49
CD (0.05)	11.61	10.61	5.72	12.79	NS
CD (0.01)	16.00	14.63	7.89	18.43	

The data presented in the table showed that the bulb yield was significantly influenced by the various treatments. Application of nitrogen as nitrogold along with single super phosphate (SSP) and muriate of potash (MOP) in treatment No 2 gave the highest bulb yield (280.44 qt./ha), which was significantly higher over all other treatments. This was closely followed by urea and ammonium sulphate treatments. Reduction of nitrogold up to 60 % level was found to be inferior. Similar trend in the results was noticed when nitrogen source, nitrogold was tried with DAP and MOP.

Further details need to be worked out to know superior effects of nitrogold over other common sources of nitrogen fertilizers. The percentage TSS content of the bulbs due to different treatments was not influenced by the application of either Nitrogold or due to other nitrogen materials as the value for the least significant difference between the source of treatments was statistically non significant.

### 3.3 CROP PROTECTION

#### 3.3.1 PLANT PATHOLOGY

##### Study of Seasonal Incidence of Disease on Onion Crop

*Mrinalini N Maholay and K.E. Lawande*

To find out the diseases occurring throughout the year on onion and their effect on the yield, the experiment was conducted by transplanting the seedlings at 15 days interval from 1<sup>st</sup> June till 30<sup>th</sup> December 1999. The crop was protected from thrips by spraying monocrotophos. The incidence and intensity was recorded using 0-5 scale for different diseases.

Charcoal rot (*Rhizoctonia bataticola* (Taub) Butler) appeared on the crop transplanted from 1<sup>st</sup> June to 1<sup>st</sup> July 1999 with 24 – 32% intensity of the diseases. Anthracnose (*Colletotrichum gloeosporioides* (Penz) Saec) appeared on the crop transplanted from 1<sup>st</sup> June to 1<sup>st</sup> September 1999 with 6-24% intensity. Anthracnose appeared during *kharif* season due to rains (Fig. 5-8) during July to October. Stemphylium leaf blight (*Stemphylium vesicarium* (Wallr) Simmons) appeared throughout the year on the crop with intensity ranging from 14 to 57%.

Maximum marketable yield of 659 qt/ha was obtained in crop transplanted on 15.10.99 and minimum of 33.40 qt/ha in crop transplanted on 15<sup>th</sup> July 1999 which may be due to high incidence of diseases during *kharif* season (Table 18).

Fig. 5 No. of Spores and Weather report of Month July 99

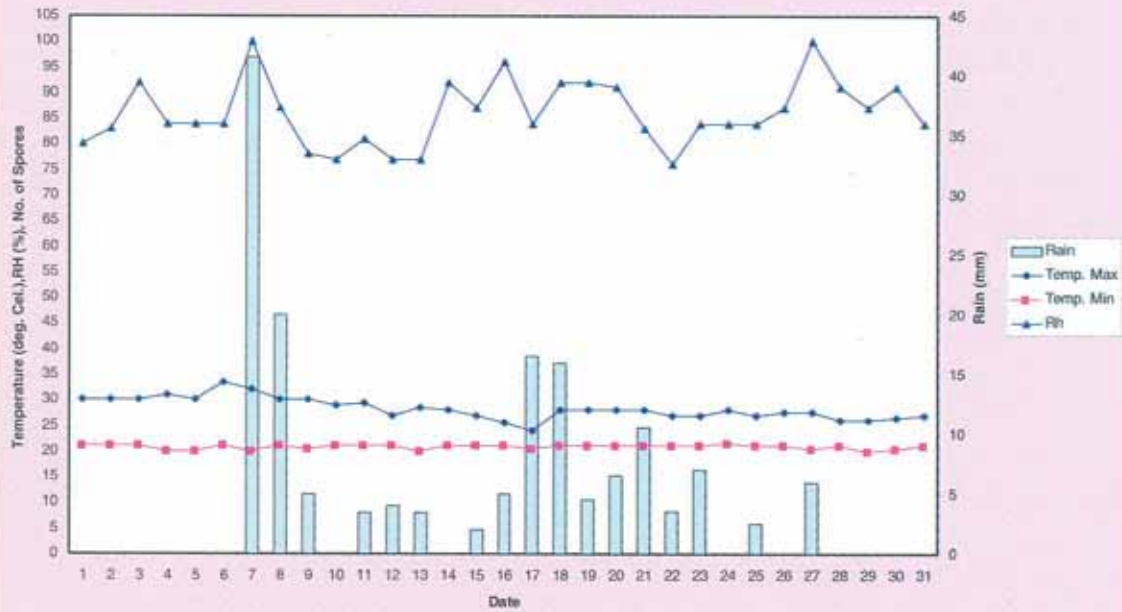


Fig. 6 No. of Spores and Weather Report of Month of August 1999

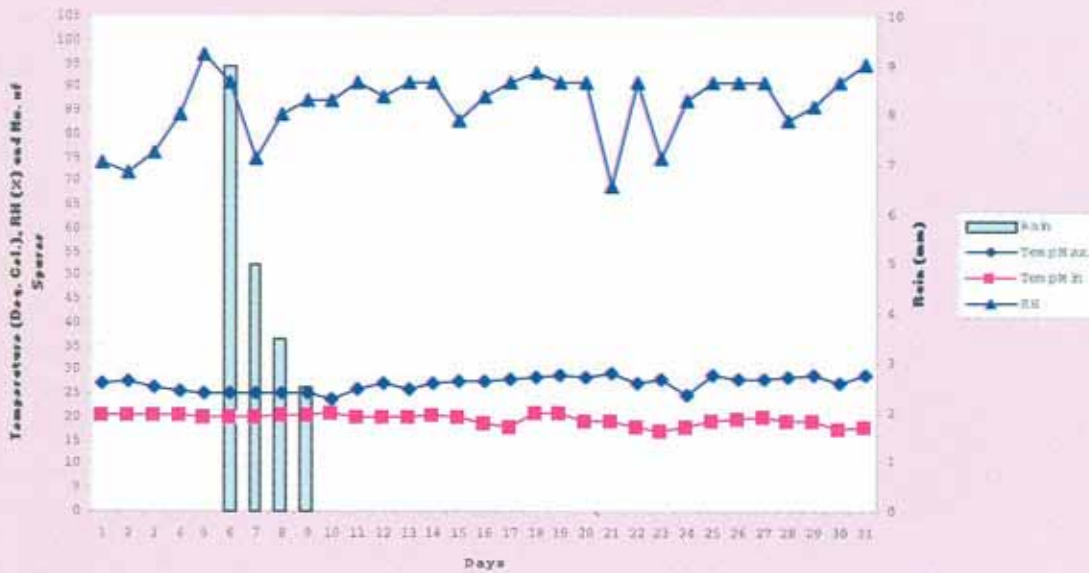


Fig. 7 No. of Spores and weather report of month Sept.1999

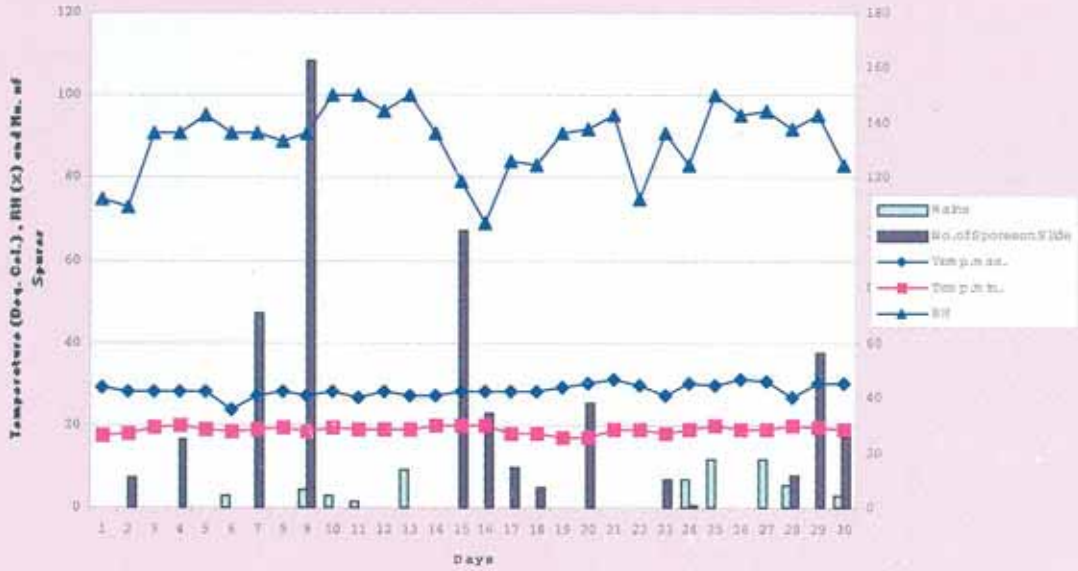
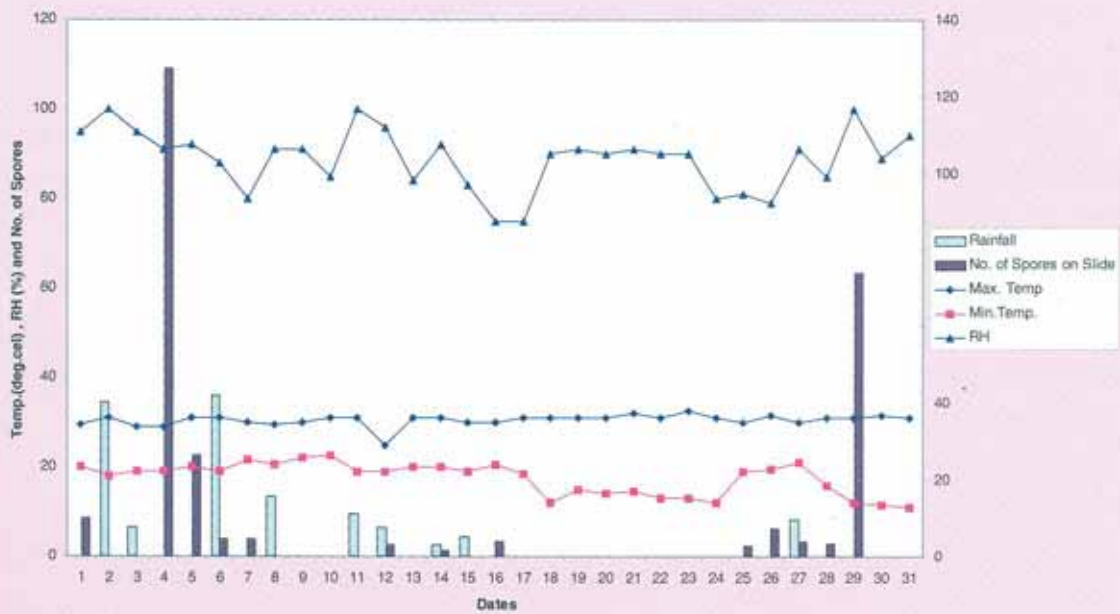


Fig. 8 No. of Spores and Weather Report for the Month of Oct.99





**Table 18 : Yield and incidence of different diseases on onion crop**

Date of Transplanting	Variety	Yield Q/ha	INTENSITY (%)		
			SLB	Anthracnose	Charcoal
01.06.99	B780	302.98	24.13	9.20	32.00
15.06.99	B780	178.49	35.46	23.60	24.00
01.07.99	B780	104.16	14.14	13.73	24.60
15.07.99	B780	33.40	56.86	9.33	
01.08.99	B780	193.05	21.20	14.30	
16.08.99	B780	308.87	35.33	9.30	
01.09.99	B780	411.78	16.13		
15.09.99	B780	507.34	18.33		
01.10.99	B780	484.56	14.00		
15.10.99	B780	659.94	47.60		
01.11.99	B780	405.53	43.73		
15.11.99	N-2-4-1	341.93	34.03		
01.12.99	N-2-4-1	254.48	32.00		
15.12.99	N-2-4-1	467.20	27.06		
01.01.2000	N-2-4-1	407.62	35.96		

SLB – *Stemphylium* Leaf Blight

### Screening of soil from onion rhizosphere from different fields for VAM fungi.

*Mrinalini N Maholay and K.E.Lawande*

Soil samples from onion rhizosphere from 46 fields of different Talukas in District Pune and Ahmednagar were collected and multiplied on Sorghum using sterilized soil. Roots were removed 90 days after planting, washed with water and estimated for percentage colonization using trypan blue staining technique. The soil was analyzed for chlamydospores through wet sieving and decantation technique.

The accession number of soil showing high percentage of root infection or high number of spore counts are given in table 19. These will be multiplied on Sorghum and will be tested for its effect on onion crop.

**Table 19: Promising accession numbers of soil samples.**

Acc. No.	Location			% Root Infection	Spore Count in 100 cc soil
	Village	Taluka	District		
10	Jatgaon	Shirur	Pune	15.78	1226
11	Manchar	Shirur	Pune	38.77	1745
12	Mahlunge	Khed	Pune	9.80	1000
13	Khalumbre	Khed	Pune	17.85	1362
15	Koteshwar	Khed	Pune	36.55	1925
24	Lonand	Haveli	Pune	42.37	1052
29	Kalamb	Ambegaon	Pune	39.21	1262
31	Narayangaon	Junnar	Pune	43.30	1353
43	Guha	Rahuri	A.Nagar	72.00	1341

**Survey of diseases on onion in Pune district***Mrinalini N. Maholay and K.E. Lawande*

Survey was conducted during the second fortnight of January 2000 for fungal diseases on onion crop in four Talukas of District Pune. Overall, the crop was good in most of the fields. The incidence of SLB was recorded in 39 fields where infection of leaves ranged from 8.5 to 40.54% and disease intensity ranged from 2 to 31% (Table 20). Out of 51 fields, 12 fields were free from diseases. The percentage of infected leaves was minimum i.e., 5.50 and 1.20 respectively in taluka Maval and maximum 21.68 and 5.13 in taluka Shirur.



Stemphylium leaf blight in onion

**Table 20: Average disease intensity of infected leaves due to SLB**

Taluka	No. of villages	No. of fields	% infected leaves	Disease Intensity
Khed	13	29	12.41	6.08
Shirur	5	8	21.68	5.13
Haveli	7	12	11.21	5.45
Maval	2	2	5.50	1.20

### Screening of germplasm of onion and garlic

*Mrinalini N Maholay and Anil Khar*

Germplasm of onion and garlic was screened for *Stemphylium* leaf blight (SLB) using 0-5 scale in the field condition (Table 21).

- Germplasm of garlic was screened for SLB. Out of 205 accession numbers (3 to 263), acc. no. 30, 32, 43, 53, 59, 61, 66, 68, 69, 112, 124, 175 and 183 were found to be moderately resistant (intensity = 11-20%). These are to be tested in the next season again for confirmation.
- Out of a total of 176 lines of onion screened, acc.no. 209, 224, 430, 449 were moderately resistant which are to be tested again.



Stemphylium leaf blight in garlic



- Four accessions of *Allium fistulosum* were found to be infected with SLB. The disease incidence was 100% in all the four accessions. The percentage of infected leaves ranged from 34 to 68% and disease intensity ranged from 45 to 74 percent.

Table 21:

Accession No.	%age of infected leaves	Disease Intensity	
TA 104	55.55	74.40	HS
AF 468	40.38	73.60	HS
TA 204	68.29	67.20	HS
TA 106	33.72	45.00	S
S = Susceptible	HS = Highly Susceptible		

### 3.3.2 ENTOMOLOGY

#### Economics of thrips management in onion (*Allium cepa* L.)

Srinivas P.S. and K.E.Lawande

Economics of management of thrips infesting onion was worked out during *rabi*, 1999. During this period the thrips infestation is very high so that minimum population that could be maintained is 15. Based on the current market price, cost benefit ratios were worked out. Though net income was highest at 8 thrips/plant level, C:B ratio was maximum at a 30 thrips/plant level (Table 22). Further, EIL was established following the method given by Pedigo. Based on regression coefficient of 129.9 kg/ha, the economic injury level is 41 thrips/plant. Hence, chemical intervention should be made when pest population reaches 30 thrips/plants (Table 23)

Table 22: Cost Benefit Ratio for Management of *Thrips tabaci* in Onion

Level of thrips population per plant	Marketable bulb yield (q/ha) over control	Gross income (Rs.)	Number of insecticidal applications	Cost of insecticidal application	Net income (Rs.)	Cost benefit ratio
2	124.16	24832	11	8008	16824	1:2.10
5	123.33	24666	10	7180	17386	1:2.38
8	138.00	27600	8	5824	21776	1:3.73
10	116.33	23266	8	5824	17442	1:2.99
15	119.16	23832	6	4368	19464	1:4.45
20	105.83	21166	5	3640	17526	1:4.81
25	101.00	20200	5	3640	16560	1:4.54
30	82.83	20100	4	2912	17188	1:5.90

**Table 23: Economic injury level of Thrips tabaci in Onion at current price**

Year and Season	Total Cost of pesticidal application for maintaining 30 thrips / plant (Rs./ha)	Price of onion bulb (Rs./kg)	Gain threshold	Economic Injury Level* (Number of thrips/plant)
1999, rabi	2912	2.00	1456	41.20
* Based on regression coefficient of 129.9 kg/ha				

**Efficacy of some botanicals in management of onion thrips, *Thrips tabaci***

Srinivas P.S. and K.E.Lawande

Different botanical pesticides/extracts were tested for their efficacy against onion thrips, *Thrips tabaci* during rabi 1999. All the treatments were found significantly superior over control. At 3 days after spraying, Karanj extract at 5% was found effective amongst the botanicals in reducing the thrips population. Most of the treatments were found more effective at 7 DAS. There is an increase in efficacy of neem at 7 DAS as compared to 3 DAS. However, the insecticidal spray of Dimethoate was found significantly superior over botanicals in reducing the pest population. The plots that received Dimethoate and *Annona* extract @5 ml/l realized higher yields and were at par (Table 24).

**Table 24: Efficacy of some botanicals in management of onion thrips, *Thrips tabaci***

Treatment	% reduction over control			Yield q/ha
	3 DAS	7 DAS	14 DAS	
Nivaar 4ml/l	25.59	40.34	34.8	151.1
Nivaar 6ml/l	24.19	42.6	31.08	155.6
NeemAzal 2ml/l	25.27	43.17	37.32	150.83
NeemAzal 4ml/l	30.36	29.4	19.72	162.49
<i>Annona</i> 5ml/l	23.55	30.9	32.42	173.32
<i>Annona</i> 10ml/l	25.61	41.81	29.78	157.49
Karanj extract 5%	40.74	37.68	37.14	155.55
Karanj oil 1%	33.15	29.84	23.21	167.77
Dimethoate 0.03%	70.09	70.08	59.81	176.38
Control	—	—	—	141.94
S.Ed	1.72	1.16	1.13	4.09
C.D. 5%	3.63	2.44	2.39	8.59

### Effect of date of planting on incidence of thrips and the abiotic factors affecting thrips population

Srinivas P.S. and K.E.Lawande

Effect of date of planting on incidence of thrips and the abiotic factors affecting thrips population were studied during 1999. The onions planted on 15<sup>th</sup> November was severely attacked by thrips followed by 1<sup>st</sup> Dec. planting. The planting done on 01.08.99 – 15.09.99 recorded lowest thrips population. However highest marketable yield was obtained in 15.10.99 planting (461.94 Q/ha.) besides having pest load of 18.63 thrips/plant. It is clear from the table 25, that regular spraying of insecticides not only reduces the thrips population but also increases the yield, more particularly during 01.06.99 to 15.07.99.

Different abiotic factors played an important role in population dynamics of thrips (Table 26). Maximum day temperature was positively correlated with the increase in thrips population build up. Other weather parameters viz., min. temperature, %RH and rainfall have a negative affect on thrips population.

**Table 25: Effect of date of planting on incidence of onion thrips, *Thrips tabaci***

Transplanting Date	Unsprayed		Sprayed		% increase in yield over unsprayed
	Th/Pl	Marketable Yield Q/ha	Th/pl	Marketable Yield Q/ha	
01.06.99	12.73	44.77	3.81	108.61	58.77
15.06.99	16.75	116.66	5.29	192.49	39.49
01.07.99	20.03	28.33	6.21	174.16	83.73
15.07.99	12.56	3.88	6.32	43.61	91.10
01.08.99	5.87	78.05	4.61	77.22	—
15.08.99	4.02	201.66	2.66	221.38	19.72
01.09.99	2.62	286.38	1.42	336.94	15.00
15.09.99	6.38	383.33	1.51	408.88	6.24
01.10.99	11.91	302.49	3.36	369.44	18.12
15.10.99	18.63	461.94	7.41	497.77	7.19
01.11.99	42.16	222.77	17.19	224.71	0.008
15.11.99	80.80	92.77	23.21	171.38	45.86
01.12.99	70.15	115.83	21.08	146.1	30.27
15.12.99	45.14	189.99	16.96	267.22	28.90
C.D. 5%	4.21	35.1	2.25	49.55	

**Table 26: Effect of abiotic factors on incidence of onion thrips, *Thrips tabaci***

Month	No. of thrips/plant	Max Temp.	Min temp Temp.	% RH	Rainfall mm
July	8.3	28.3	20.8	78.25	157.9
Aug	23.44	27.18	19.48	74	20
Sep.	11.72	28.27	18.9	70.25	88.5
Oct.	0.97	30.45	18.07	54.75	141.2
Nov.	6.19	30.88	12.38	33.4	
Dec.	13.44	28.95	9.35	38.5	
Jan.	43.15	29.97	9.975	30.25	
Feb.	112.18	31.16	10.42	34.8	
Mar	18.56	33.96	14.07	41.15	
Corr.Coeff.		0.161167	-0.44754	-0.35111	-0.43187

## 4. HUMAN RESOURCE DEVELOPMENT

### 4.1 Trainings:

Mr. Anil Khar, Scientist (Hort.) underwent 67<sup>th</sup> FOCARS training at NAARM, Hyderabad from 1 June, 99 to 28 Sept. 99.

Dr. K. E. Lawande, Director attended the training, "Dynamics of Labour Management" at NAARM, Hyderabad from 14 to 19 July, 1999.

Dr. M. N. Maholay and Dr. Md. Aziz Qureshi, underwent training in Methods of Mycorrhizae research at UAS, GKVK Campus, Bangalore from 20 – 25 Sept., 1999.

### 4.2 Paper Presentation / Publication:

Dhumal, K. N., Sushma Kirtane, S. L. Laware, Anil Khar and K. E. Lawande. Morphogenic and macromolecular analyses of combined mutagenic effect of Sodium Azide and Gamma radiation in onion (*Allium cepa* L.). In Tenth All India Congress of Cytology and Genetics, West Bengal, Oct. 29 – 31, 1999.

K.E.Lawande. Kanda Bijothpadan va Upalabhdatha Ek Samasya. Loksatta, April, 1999.

K.E.Lawande, V. Sankar and Anil Khar. 2000. Garlic. Kisan World 24(5):63 – 64.

K.E.Lawande. Kanda va lasun pikatil ekatmuk tan vyavasthapan. In: Adarsha Sheti Udyog, Tane Aani Tan Vyavasthapan Visheshark (I). May – June – July, 2000.

### 4.3 Participation in Seminars / Symposia / Meetings etc.

Dr. K. E. Lawande, Director, Asha Devi & Anil Khar attended a conference on "Biotechnological Application – Relevance to the Indian Farmers" organized by Poona District Agricultural Development Foundation on 20 – 21 May, 1999.

Dr. K. E. Lawande, Director delivered valedictory lecture in "Seminar on Advanced Indigenous Agriculture Hi-Tech for 21<sup>st</sup> Century Seed Production" on 9 – 10 June, 1999 at College of Agril. Pune organized by Agrotec Consultants, Pune.



Dr. K. E. Lawande, Director attended a farmer's rally on onion crop at Bidal, Dist., Satara, organized by IFFCO, Pune on 15 June, 1999.

Dr. K. E. Lawande, Director attended Director's Conference at KAB, New Delhi on 7 – 8 Sept., 1999.

Dr. K. E. Lawande, Director took part in the XVIII Group Meeting of AICVIP; PAU, Ludhiana from 11 – 14 Oct., 1999.

Dr. K. E. Lawande, Director took part in the 2<sup>nd</sup> Executive Development Programme in ARM, NAARM, Hyderabad from 21 – 23 Dec., 1999.

Dr. K. E. Lawande, Director, attended the International Conference on Micro and Sprinkler Irrigation Systems at Jalgaon, Maharashtra. 8 – 10, February, 2000.

Dr. K. E. Lawande, Director, attended seminar on Onion and Tomatoes as Chairman of the session on Onion and Tomatoes, and delivered lecture on "Onion Seed Production" at Krishi Parishad in Krishimela – 2000 at Pimpalgaon on 26 February, 2000.

#### 4.4 Distinguished Guests:

Dr S.P.Ghosh, DDG (Hort.) ICAR, New Delhi	07.06.99
Dr K.L.Chadha National Professor (Hort.), Former DDG (Hort.) ICAR	22.06.99
Dr Krishna Lavlekar Director (Hort.), Pune	24.07.99
Dr G.L.Kaul Ex OSD (NATP), ICAR, New Delhi	13.08.99
Dr B.S.Dhankar ADG (VC), ICAR, New Delhi	04.10.99
Dr. R. S. Paroda DG, ICAR & Secretary, DARE, New Delhi	04.01.2000

Sh. Sambhajirao Kakde Ex – MP, Pune Dist	04.04.2000
Dr. A. G. Sawant Chairman, ASRB, New Delhi	24.04.2000
Dr. Debendra Pradhan Minister of State for Agriculture, GOI, New Delhi	13.06.2000

## 5 INSTITUTIONAL ACTIVITIES

### 5.1 IMC Meeting

The first Institute Management Committee Meeting of NRCOG was held on 4<sup>th</sup> of October, 1999 under the chairmanship of Dr. K. E. Lawande, Director, NRCOG. The other members included Dr. B. S. Dhankhar, ADG (VC), Dr. M. K. Banerjee, Pr. Scientist, IIVR, Dr. A. Aziz Qureshi, Ms. A. Asha Devi, Mr. Anil Khar, Scientists, NRCOG and A.A.O, NRCOG as the member secretary. Stress was given to development of



infrastructural facilities at the centre to carry out the research activities. Master plan for office cum laboratory building was finalized and approved by IMC. Sanction for eight scientific instruments not included in the EFC Memo was also done as a special case.

### 5.2 Sports Meet

A team of twelve members participated in the ICAR Interzonal sports meet held at Central Arid Zone Research Institute, Jodhpur from 11 October 99 to 14 October 99. The team was led by Dr. A. Aziz Qureshi as *Chief – de – Mission* and Sh. S. C. Sharma as Team Manager.

### 5.3 Staff Research Council Meet:

The SRC meeting was convened on 08.03.2000 with Dr K.E.Lawande, Director presiding over the meeting. Dr S.H.Shinde, HOD Agronomy, Dr U.N.Mote, Prof. (Ari. Ento.), Dr N.D.Jambhale, Prof (Agril. Botany) and Prof. S.A.Memane, Pl. Pathologist of MPKV, Rahuri attended the meeting. The scientists presented their research projects, which were finalized for presentation in the RAC meeting.

### 5.4 RAC Meet:

The II RAC meeting was held on 20.04.2000 under the chairmanship of Dr. M.L.Pandita (Advisor, FVP, NDDDB). Dr B.S.Dhankhar, ADG (VC), Dr P.N.Kale, Dr B.N.Shinde, Dr U.B.Pandey, Director, NHRDF, Mr C.B.Holkar, Chairman, VFComs attended the meeting with Dr (Ms) M.N.Maholay, as Member Secretary. Research projects (RPF-1) were finalized in the meeting.

**6. FINANCIAL POSITION (1999 – 2000)**

Sub Heads	Plan		Non – Plan	
	Budget Expenditure		Budget Expenditure	
Estt. Charges	20.80	20.80	10.98	10.98
TA	2.20	2.20	0.29	0.29
Other charges	89.66	89.66	1.57	1.57
Works	12.34	12.34	2.44	2.44
Total	125.00	125.00	15.28	15.28

## 7. STAFF POSITION

### Staff strength of NRCOG, Rajgurunagar as on 31. 03. 2000

Name	Designation
Dr. K. E. Lawande	Director
Dr. (Ms.) M. N. Maholay	Sr. Scientist (Pl. Patho.)
Dr. Md. A. Aziz Qureshi	Scientist (Soil Sci.)
Ms. Asha Devi, A.	Scientist (Genet.)
Mr. Anil Khar	Scientist (Hort.)
Dr. P. Satya Srinivas	Scientist (Ento.)
Mr. V. Sankar	Scientist (Hort.)
Sh. S. C. Sharma	A. F. & A. O.
Smt. S. S. Joshi	Assistant
Sh. G. S. S. R. Krishnan	S. L. A.
Sh. D. B. Mundharikhar	Stenographer
Sh. N. L. Gore	T-II-3, Field A
Sh. A. P. Trivedi	T-II-3, T. Asst.
Sh. H. S. C. Shaikh	T-II-3, Comp.
Sh. S. P. Kandwal	Senior Clerk
Sh. P. S. Tanwar	Senior Clerk
Smt. Usha Vishnu Raskar	Hindi Typist
Sh. R. K. Dedge	Jr. Clerk

Sh. D. M. Panchal	T-I, Lab Tech.
Sh. R. B. Baria	T-I, Field Tech.
Sh. S. P. Yeole	T-I, J.Driver
Sh. B. A. Dahale	T-I, T. Driver
Sh. S. K. Said	Beldar, SSG-II
Sh. R. S. Kulkarni	Lab Attnd. SSG-I
Sh. P. E. Tadge	Lab Attnd. SSG-I
Sh. P. R. Sonawane	Lab Attnd. SSG-I
Sh. M. S. Kale	Messenger, SSG-I
Sh. S. D. Waghmare	Watchman
Sh. N. H. Shaikh	Messenger

### Transfers

Name	Designation	Institute to which transferred	Date of transfer
Sh. B. Satish	A.A.O	NRC for Oil Palm, Elluru, A.P	15.09.1999

## सारांश

राष्ट्रीय प्याज एवं लहसुन अनुसंधान केन्द्र के राजगुरुनगर में कार्य आरम्भ करने के पश्चात त्वरित गति से कार्य करने के लिए ढाँचागत सुविधाओं के सृजन को वरीपता दी गयी। इस के अन्तर्गत भवन तथा आवासीय भवनों के नवीनीकरण, सडकों के डामरीकरण का कार्य पूर्ण कर लिया गया, अनुसंधान प्रक्षेत्र में प्रयोगों को बेहतर सिंचाई प्रबन्धन के लिए टपक एवं छिड़काव सिंचाई सुविधाओं का सृजन किया गया। मौसम सम्बन्धी जाँकारी एकत्र करने के लिए कृषि - मौसम वेधशाला में एक स्वचालित मौसम केन्द्र की स्थापना की गयी, जिसको भविष्य में बीमारियों की भविष्यवाणी के लिए प्रयोग किया जायेगा। मृदा विज्ञान प्रयोगशाला को सूक्ष्म पोषक तत्वों के विश्लेषण के लिए एटोमिक अवसोप्शन स्पेक्ट्रोमीटर से सुसज्जित किया गया।

इसके अतिरिक्त एस. आर. सी. में विचार-विमर्श के पश्चात अनुसंधान परियोजनाओं को अन्तिम रूप देने पर मुख्य जोर दिया गया। परम्परागत या गैर परम्परागत विधियों द्वारा आनुवंशिक स्रोतों के संरक्षण, हेप्लाइड द्वारा संकरों के विकास; समन्वित जल एवं पोषक तत्व प्रबन्ध के प्रयोग; बेहतर जल प्रबन्धन हेतु टपक एवं छिड़काव सिंचाई के उपयोग की सम्भावनाएं, समन्वित रोग एवं पीड़क प्रबन्धन द्वारा फसलों के बचाव जैसी कुछ परियोजनाओं को एस. आर. सी. द्वारा अन्तिम रूप दिया गया। लहसुन में बड़े फाकोंवाली किस्म के विकास के लिए सोमाक्लोनल वैरिएशन तथा उत्परिवर्तन प्रजनन द्वारा विभिन्नताओं के सृजन को प्रथम वरीयता दी गयी है।

इसके अलावा, एलियम फिसचुलोसम के ए. वी. आर. डी. सी. ताईवान से प्राप्त चार लाइन्स तथा टी ए - १०६, टी ए - १०४, टी ए - २०४ और ए एफ ४६८ से स्थानिक अनुकूलित किस्म एन - ४-२-१ में अन्तर्जातीय संकरण द्वारा रोग प्रतिरोधक गुण के अन्तःकरण के प्रयास किये गये। जिसके परिणाम आने अभी शेष है।

व्यावसायिक खेती के लिए उत्तम एफ १ संकरो का अभाव लम्बे समय से हमारे देश की मुख्य समस्या रही है। इस समस्या के समाधान के लिए भा. बा. अनु. सं. बंगलोर से दो एम एस लाइन तथा उनकी मेन्टेनगर लाइन (एम एस ४० ए और बी तथा एम एस ए और बी) को लाया गया है जिनको विभिन्न संयोगों में प्रयोग किया जाएगा। इन विट्रो विधियों से अपरिपक्व पुष्पकलियों से हेप्लॉइड विकसित करने के प्रयास आरम्भ किये गये हैं। तथा परागकोष तथा बीजाण्डों संवर्धन विधियों से भी इनके विकास के प्रयास जनवरी में पुष्पन

के पश्चात आरम्भ किये जाते हैं। इन हेप्लॉइडो को द्विगुणित कर इनब्रेड प्राप्त किये जायेंगे, जिन्हे हेटरोसिस प्रजनन कार्यक्रमों में मातृ लाइन के लिये प्रयोग किया जा सकेगा।

इस वर्ष के दौरान प्याज के ४४ तथा ६१ जनन द्वृत्यों का क्रमशः खरीफ तथा रबी के मौसम में उपज तथा अन्य औद्योगिक गुणों के लिए मूल्यांकन किया गया। लहसून के ८३ संकलनों को रबी के मौसम में मूल्यांकन के लिए लगाया गया। इनमें से उत्तम लाइनों का चयन किया तथा उनके उत्पादन के लिए स्वपरागित किया गया। प्याज की विभिन्न किस्मों को खरीफ तथा रबी के मौसमों में मूल्यांकन के लिए लगाया गया तथा परिणाम यह इंगित करते हैं कि बी- ७८० दोनों मौसमों में सर्वोत्तम पायी गयी जब कि एन २-४-१ रबी के मौसम इसके लगभग बराबर थी, रांगडा मौसम में मूल्यांकित किये गये ६ विदेशी संकरो में मरसिडिज सर्वोत्तम पायी गयी। रबी के मौसम में मूल्यांकित १६ संकरो में एस एक्स १०२९ प्रथम रही। लहसुन की किस्म जी-४१ में मातृ फाकों के आकार का वृद्धि व उपज पर प्रभाव का अध्ययन किया गया। प्रयोगों से यह ज्ञात हुआ कि १.५ ग्राम से अधिक आकार वाले फाकों से अधिकतम उपज प्राप्त हुई।

संस्थान प्रबन्ध समिती की प्रथम बैठक ४ अक्टूबर १९९९ को आहुत की गयी तथा इसमें अनुसंधान गतिविधियों हेतु ढाँचागत सुविधाओं के विकास को महत्व दिया गया। कार्यालय - प्रयोगशाला की मूल योजना को अन्तिम रूप दे दिया गया है तथा इसे स. प्र. स. द्वारा अनुमति दे दी गयी है। इ. एफ. सी. प्रपत्र में असम्मिलित आठ वैज्ञानिक उपकरणों की विशेष दशा में स. प्र. स. से अनुमति ले ली गयी है। सभी अनुसंधान परियोजनाओं पर एस. आर. सी. तथा द्वितीय आर. ए. सी. में विचार विमर्श कर अनुमति प्राप्त की गयी।

डा. राजेन्द्र सिंह परोदा, महानिदेशक, भा. कृ. अनु. प. ने प्रथमवार राष्ट्रीय प्याज तथा लहसुन अनुसंधान केन्द्र का दौरा किया और उन्होने केन्द्र की विभिन्न प्रयोगशालाओं यथा उद्यानविज्ञान, पादप संवर्धन प्रयोगशाला, पादप रोगविज्ञान, मृदा विज्ञान तथा एरिस प्रकोष्ठ के अन्तर्गत सृजित संगणक सुविधाओं का भ्रमण किया। उन्होंने वैज्ञानिकों के अनुसंधान की उन्नत प्रौद्योगिकियों तथा संगणक प्रयोग पर परिक्षण की आवश्यकता पर भी महत्व दिया। इस अवसर पर महानिदेशक महोदय ने इस केन्द्रप्रसार हेतु रचित दो तकनीकी बुलेटिन यथा 'कांदा लागवड' और 'कांदावरील रोग आणि किडींचे व्यवस्थापन' का विमोचन किया।



