

ANNUAL REPORT

1998- 1999



NATIONAL RESEARCH CENTRE FOR ONION AND GARLIC
RAJGURUNAGAR, PUNE (DISTT.) - 410 505 MAHARASHTRA

NRCOG

ANNUAL REPORT - 1998-1999



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

Annual Report 1998-99
National Research Centre for Onion & Garlic
Rajgurunagar - 410 505, Distt. Pune (MS), India

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EXECUTIVE SUMMARY

National Research Centre for Onion and Garlic was established in July 1994 at Nasik. The 100 acres of experimental farm was located in Niphad tehsil, 40 kms away from Nasik. Till May 1997, there was only one scientist with meagre supporting staff. Due to remoteness of farm, shortage of irrigation facilities and late appointment of scientists and the Director, the centre could not be established properly. Considering these problems, decision was taken by ICAR for shifting of the centre from Nasik to Pune. Accordingly, the centre was shifted from Nasik to CPRS, Regional Station, Rajgurunagar, which is 43 km away from Pune Distt on Pune-Nasik highway on 16 June, 1998.

Immediately upon shifting, priority was given to development of farm, irrigation facilities, renovation of old structures, approach road, drinking water supply, renovation of electric fittings and fixtures, purchase of necessary equipments etc., so that preliminary work can be started. The posts of AAO, AFAO and other junior staff, which were lying vacant since inception, were filled. EFC document worth Rs. 615 Lakh was prepared and finalized. The master plan of administrative office cum laboratory building and quarters was prepared and sent for approval.

Tissue Culture, Soil Science and Production Technology, Plant Protection laboratories and ARIS cell have been set up with required equipments. Apart from this, major emphasis was given on finalization of research programme commensurate to the mandate of the centre. Major thrust areas in onion are development of disease resistant varieties/hybrids, development of hybrids in short day type, development of varieties/hybrids suitable for late *kharif* (*rangda*) season and development of varieties with high T.S.S. in white onion for processing. In case of garlic creation of variability through somaclones and selection for bigger cloved bulbs which can be produced under short winter of Northern and Western India, is a priority.

Both the crops are severely affected by fungal disease viz., purple blotch, stemphylium blight, *colletotrichum* and thrips. The incidence of *colletotrichum* and purple blotch is more severe in *kharif* and late *kharif* crop, while stemphylium causes more damage in *rabi* crop. High rainfall, cloudy and warm weather in *kharif* season favours the diseases and losses can go up to 60 - 80 per cent. Failure of *kharif* and subsequently *rangda* crop leads to disturbance in domestic supply during October - February which is the most crucial period for onion in Indian markets. *Kharif* and late *kharif* crop contribute nearly 40 per cent of country's onion production and from that angle management of these two crops is very important in the absence of resistant varieties.

Hybrids in onion are valued for their uniform size and colour of bulb and uniform maturity. India grows short day onion and almost 100 per cent area is under open pollinated varieties. Development of M.S. lines along with suitable hybrid combination is the most urgent need.

Considering the mandate and major thrust areas, the research programme was finalised and experiments were planned accordingly. During the year under report 539 lines of onion and 269 lines of garlic were collected and evaluated. Selected lines have been multiplied by selfing. For *kharif* and *rangda* season onion, Baswant 780 was found suitable

than other varieties tried. For *rabi* season N-2-4-1 and Agrifound Light Red recorded higher yield which confirms the earlier recommendations. About 65 exotic hybrids/varieties were evaluated in *kharij*, *rangda* and *rabi* seasons. The performance of most of the hybrids was better during *rangda* season. The lines like Mercedes, H-1268, Rio Honda and H-9 were more promising in respect of yield and bulb weight. In case of garlic, among released varieties performance of G-41 was promising followed by G-282. Among various germplasm lines evaluated, accession numbers 95, 263, 248, 181, 225 were more promising. The accession No. 225 was high yielder as well as resistant to eriophyid mites and thrips.

Survey for incidence of disease and pests was done in *kharij* as well as *rabi* in major onion growing areas of Pune and Ahmednagar districts. In *kharij*, *colletotrichum* and purple blotch incidence was more than 50% in every village. Incidence of *Ditylenchus* nematode was noticed in many areas. In *rabi* season incidence of stemphylium blight was more. Incidence of thrips was very high during February.

The RAC members met on 15 February, 1999 and discussed about the mandate and the research activities to be carried out accordingly. The detailed technical programme was finalised.

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.

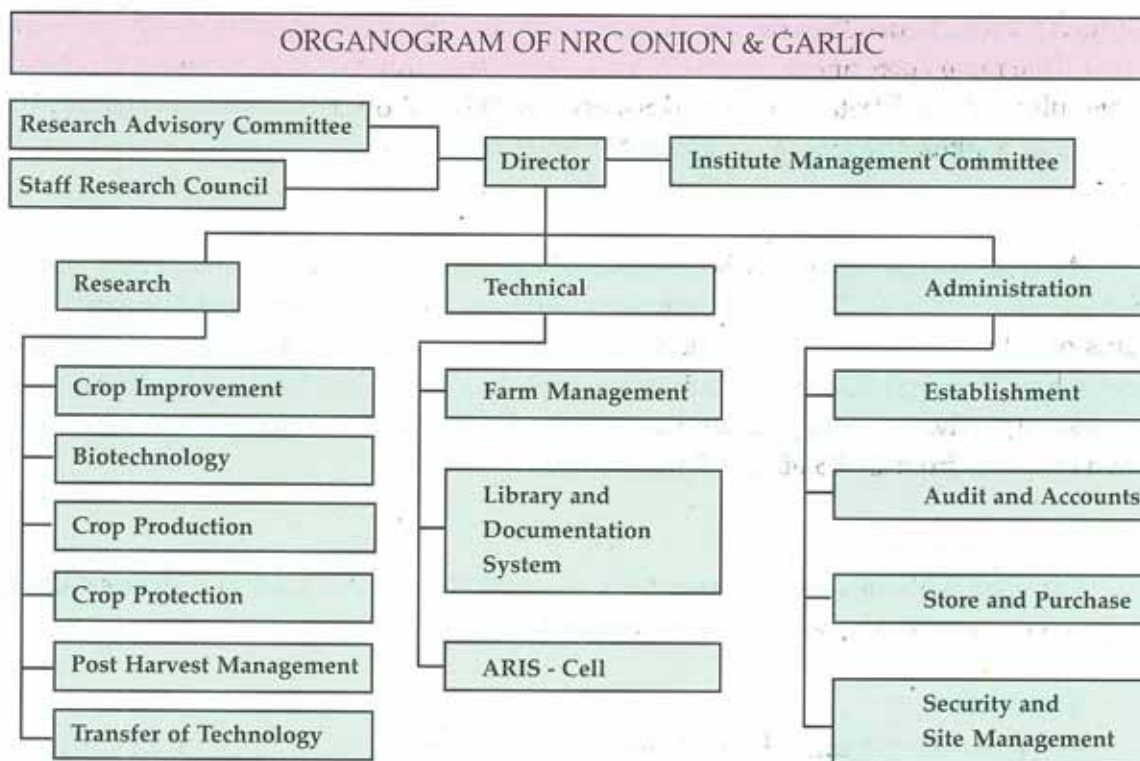


2.2 Location:

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



2.5 ABOUT THE CENTRE

Immediately after the establishment of the Centre at Rajgurunagar, emphasis was given to creation of infrastructural facilities at site. Since the Regional Station was under the process of closing, it was neglected for the last ten years and needed shaping up badly.

2.5.1 Farm

The Centre has a total area of 21.954 ha, out of which 16.06 ha is available for conducting experiments while the remaining is under structures and earmarked for civil works and landscaping. The farm was levelled and properly demarcated having about 0.8 ha in each plot. All the unwanted plants growing on the bunds were cleared. The old irrigation system was completely changed and reinstalled with PVC underground pipeline with openings for every 0.8 ha. block. The irrigation well, which was collapsed, has been renovated and put to use. Three phase electricity connection was approved for irrigation well and got installed.

2.5.2 Office cum Laboratory

The office has been established in the 7 rooms of old CPRS building. There were two storage structures and four residential quarters occupied by the CPRS staff. All the structures were 30 years old and were badly in need of repair because of leakage and poor

electricity connections. The office building, laboratories, stores and quarters have been renovated. The main gate and the approach road were also given a face-lift. Shaping up of the Horticulture, Plant Biotechnology, Soil Science and Plant Protection laboratories and equipping them with the necessary equipments is underway.

2.5.3 Library

A part of the laboratory has been modified into the library cum conference hall. Books and journals worth Rs. 3.82 lakhs have been purchased in the current year. Current Contents on CD- ROM and Hort CD have been made available for reference. Presently 126 books have been purchased and 2 international and 20 national journals are being subscribed regularly. Moreover, 110 numbers of bound volumes of national journals have also been obtained from CPRS library, Rajgurunagar.

2.5.4 Administration

The administration section comprising of establishment, AA, C&B and stores section is effectively providing all the required research support.

2.5.5 ARIS Cell

As per the directions and specification from ADG (ARIS), an ARIS Cell has been initiated with complete E – mail and Internet facilities.

2.5.6 Technical Cell

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

2.5.7 Agro- Meteorological Observatory

The old CPRS farm has an agro-meteorological observatory at the centre. Parameters like weekly total rainfall, minimum and maximum temperature, relative humidity and evaporation for the period April 1998 to March 1999 are presented in Fig. 1(a-d).

3. SALIENT RESEARCH ACHIEVEMENTS

3.1 CROP IMPROVEMENT

3.1.1 ONION

Performance Studies in Released Varieties of Onion

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

Seasonwise varieties of onion have been recommended in the past. New varieties are being developed by various organizations. Evaluation of newly developed genotypes is a continuous process with a quest for finding most adapted and high yielding varieties for a particular locality/ area. In the new location of NRC O&G, it was proposed to evaluate the performance of recently released varieties in different seasons. Normally in western Maharashtra, onion is planted in *kharif* and *rabi* seasons. However, due to late arrivals of monsoon and limited availability of irrigation water in the wells from September to February, farmers are compelled to go for late *kharif* planting which is normally called as *rangda* onion in Maharashtra.

For *kharif* and *rabi* season there are well-identified varieties. Nevertheless, for late *kharif* or *rangda* onion, very little information is available as to which variety is most suitable. A comprehensive trial was therefore planned with varying dates of planting comprising of released and most adapted varieties usually being used in *kharif* as well as *rabi* season, so that a proper combination of variety and time of planting can be identified.

Kharif season

Five released varieties were evaluated (Table 1). It was revealed that, in general, yield level was very low as the late *kharif* rains affected the crop more severely. Among all the varieties, the performance of Baswant 780 was significantly superior to others in respect of yield of marketable bulbs whereas percentage bolters and twin bulbs were minimum. The bulbs had a very good attractive crimson red colour, which remained for longer period.



Fig 1 (a) : Rain Fall at Rajgurunagar for year 1998 - 99

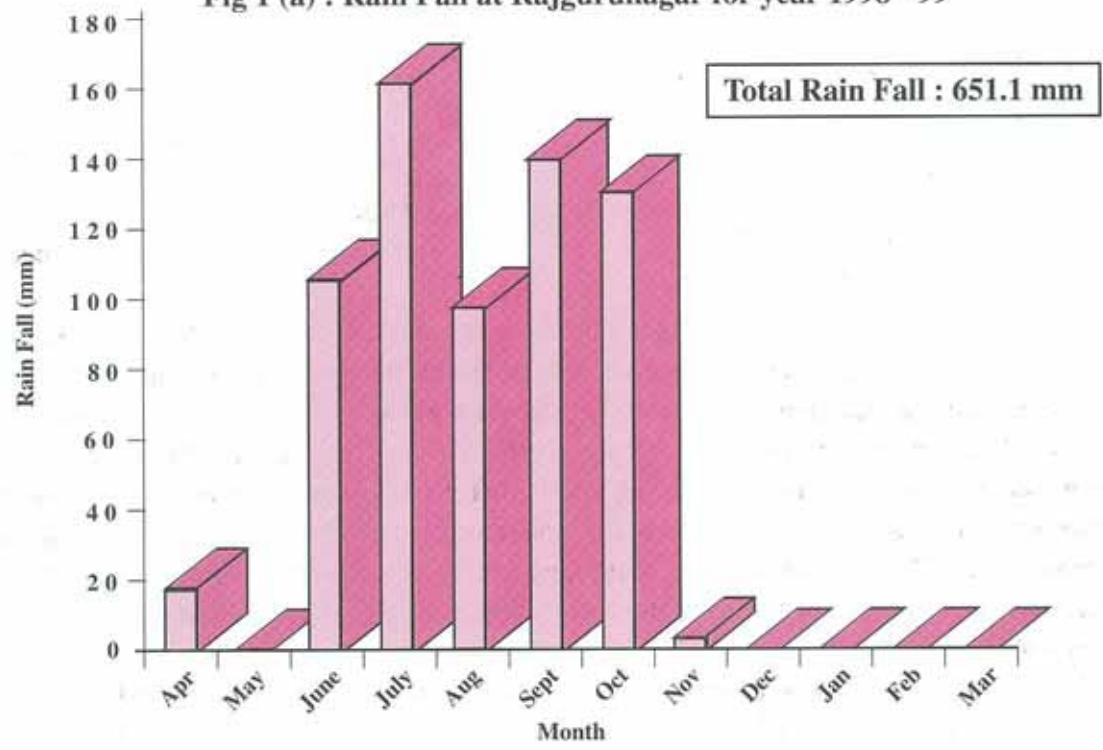


Fig 1 (b) : Temperature at Rajgurunagar for year 1998 - 99

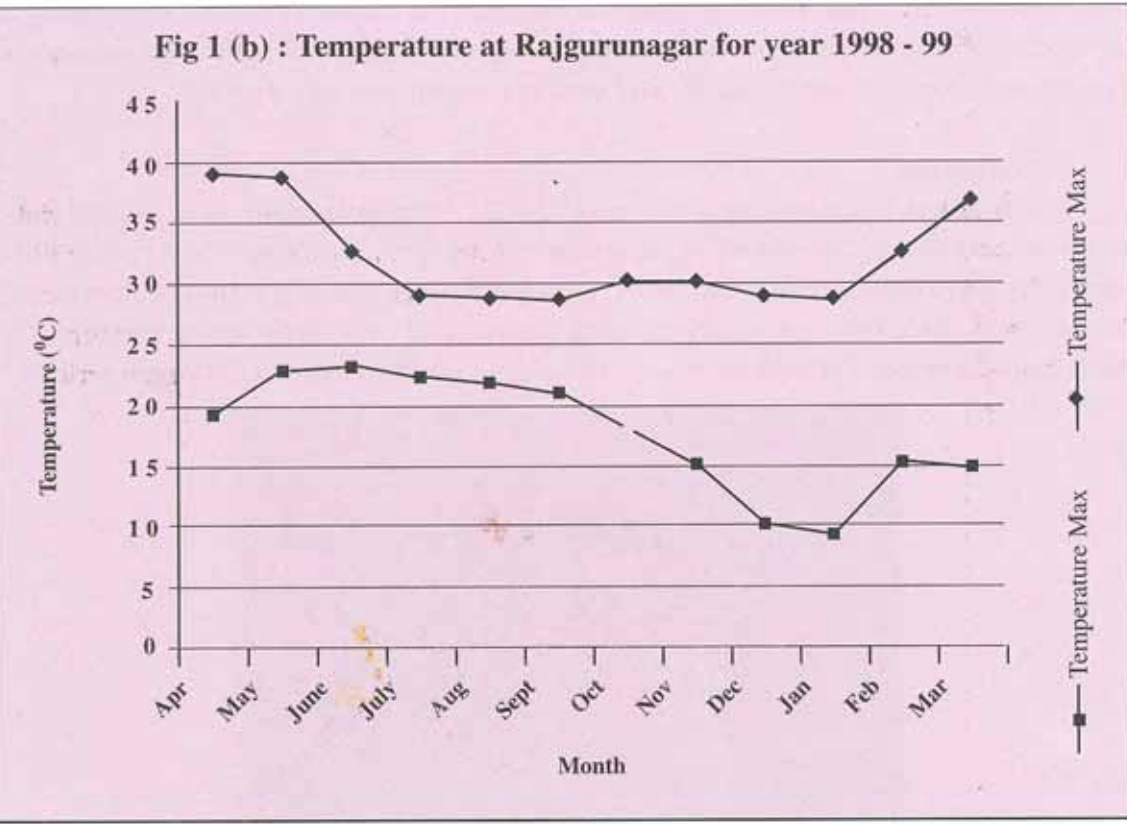


Fig 1 (c) : Humidity at Rajgurunagar for year 1998 - 99

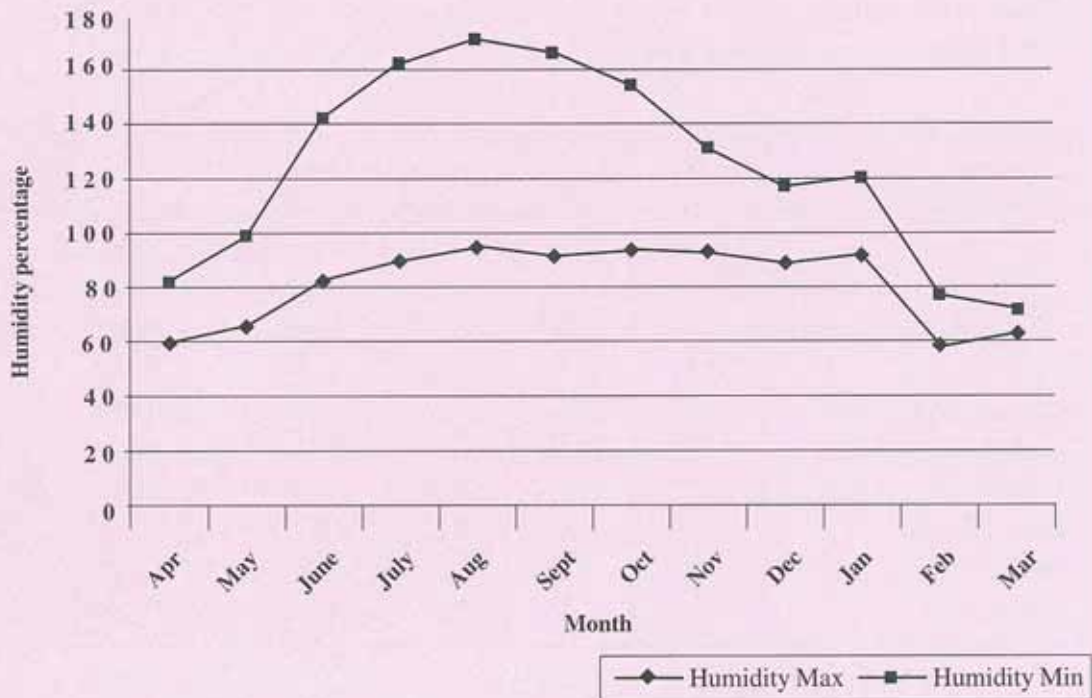


Fig 1 (d) : Evaporation at Rajgurunagar for year 1998 - 99

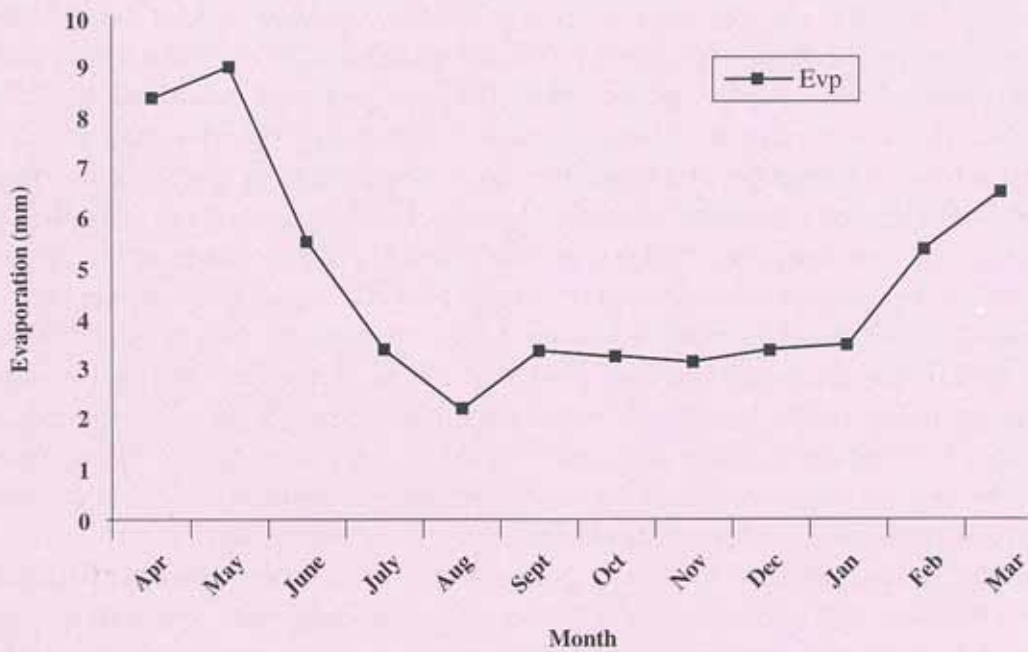


Table 1 : Performance of onion varieties during *kharif* season

Date of sowing	: 01.07.98	Date of transplanting	: 20.08.98
Date of harvesting	: 30.11.98	Spacing	: 15 x 10 cm
Plot Size	: 3m x 2 m		

Characters	Varieties				
	B- 780	N-53	ADR	Arka Kalyan	Arka Niketan
Marketable yield (q/ha)	107.12 ^a	55.98 ^b	56.48 ^b	58.98 ^b	58.98 ^b
Polar Dia.(cm)	04.76	04.55	04.05	04.47	04.48
Equ. Dia. (cm)	05.74	05.59	05.06	05.19	05.57
Neck thickness (cm)	01.34	01.44	00.96	01.17	01.53
TSS (^o B)	10.67	10.60	11.27	09.93	09.80
Marketable bulb (%)	66.13	58.52	31.24	60.71	05.82
Bolters (%)	09.42	11.48	21.84	11.48	26.53
Doubles (%)	02.72	04.20	17.24	02.43	00.61

C.D. at 5% level for marketable yield : 28.33

Late *Kharif* (*Rangda*) season

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 after attaining proper stage. The data presented in table 2a, 2b, 2c and 2d revealed that irrespective of varieties, there was higher yield when sowing was done during first week of September and subsequent transplanting during first week of November followed by second sowing in September. In early dates of planting, not only the yield was less but the percentage of A and B grade bulbs was also low as compared to the later dates. Further, percentage of bolters and twin bulbs was also higher in the earlier dates as compared to the dates of September sowing. Higher percentage of bolters and double bulbs is always associated with late *kharif* planting. The low temperature during December and January correspond to the stages of bulb initiation which transform plant from vegetative phase to reproductive phase, thus resulting in direct and premature bolting. Genotype x Environment variation for this character has been reported earlier. Selection of non-bolter or less bolting variety for *rangda* planting is the most urgent need.

Among various varieties tried during different dates, the performance of Baswant 780, Arka Niketan and Agrifound Light Red was superior over other varieties. The percentage of A grade bulb was higher, while bolters and double bulbs were less. Further, keeping quality of bulbs was very good.



Arka Niketan

Table 2 : Performance of onion varieties under different dates of planting in late kharif (rangda) season

Table 2a : I date of planting

Date of sowing	: 03.08.98	Date of transplanting	: 22.09.98
Date of harvesting	: 06.02.99	Spacing	: 15 x 10 cm
Plot Size	: 3 x 2 m		

Characters	Varieties						
	N-53	N-2-4-1	ADR	Arka Kalyan	Arka Niketan	B-780	ALR
Marketable Yield (q/ha)	329.87 ^{ab}	271.01 ^{bcd}	230.46 ^{cd}	275.72 ^{bc}	193.81 ^d	405.95 ^a	271.59 ^{bcd}
Polar Dia. (cm)	5.28	5.03	4.56	50.18	5.01	5.16	4.86
Equ. Dia. (cm)	6.30	5.71	5.76	6.32	5.90	6.04	5.57
Neck Thickness (cm)	9.00	1.00	0.62	0.75	1.21	0.85	0.93
T.S.S. (°B)	13.30	13.04	12.60	11.44	13.48	13.20	12.04
% of A grade Bulb	54.77	52.50	41.21	47.00	36.19	56.43	46.24
% of B grade Bulb	10.81	16.09	12.47	11.31	10.12	14.46	15.82
% of C grade Bulb	11.97	10.43	4.23	6.36	14.66	5.63	13.5
% of Bolters	25.53	16.65	32.00	31.68	35.02	21.22	14.93
% of Doubles	2.22	6.55	10.09	3.65	4.02	2.25	9.51

CD at 5% level for marketable yield : 78.66

Table 2b : II date of planting

Date of sowing	: 16.08.98	Date of transplanting	: 24.10.98
Date of harvesting	: 24.02.99	Spacing	: 15 x 10 cm
Plot Size	: 3 m x 2 m		

Characters	Varieties						
	ALR	B-780	Phule Safed	Arka Niketan	Arka Kalyan	ADR	N-2-4-1
Marketable Yield (q/ha)	291.55 ^{ab}	343.20 ^a	146.61 ^{de}	89.13 ^e	187.43 ^{cd}	117.45 ^e	241.57 ^{bc}
Polar Dia. (cm)	5.76	5.24	4.66	4.82	4.92	4.03	4.42
Equ. Dia. (cm)	6.61	5.92	5.56	5.39	6.46	5.65	5.47
Neck Thickness (cm)	1.91	1.23	1.26	1.37	0.94	0.63	1.69
T.S.S. (°B)	12.04	13.2	9.80	13.48	11.44	12.60	13.04
A grade Bulb (%)	33.13	38.13	19.47	10.03	23.75	14.92	30.29
B grade Bulb (%)	15.52	13.87	7.89	4.61	4.49	7.33	14.41
C grade Bulb (%)	21.19	11.20	6.32	20.33	8.44	6.28	22.06
Bolters (%)	26.27	29.33	63.42	55.04	51.48	62.83	32.35
Doubles (%)	3.88	7.47	2.89	0.00	1.85	8.64	0.88

CD at 5% level for the marketable yield : 59.33

Table 2c : III date of planting

Date of sowing	: 01.09.98	Date of transplanting	: 15.10.98
Date of harvesting	: 01.03.99	Spacing	: 15 x 10 cm
Plot Size	: 3 m x 2 m		

Characters	Varieties						
	B-780	ALR	N-2-4-1	ADR	Arka Kalyan	Phule Safed	Arka Niketan
Marketable Yield (q/ha)	342.70 ^b	363.52 ^b	323.70 ^{bc}	281.55 ^c	365.19 ^b	285.72 ^c	418.17 ^a
Polar Dia. (cm)	4.44	4.36	4.44	3.86	4.26	4.52	4.18
Equ. Dia. (cm)	5.42	5.50	5.36	5.30	5.70	5.46	5.50
Neck Thickness (cm)	0.52	0.70	0.62	0.54	0.64	0.78	0.56
T.S.S.(°B)	10.67	10.47	12.53	11.27	9.93	9.80	10.8
A grade Bulb (%)	66.17	57.77	56.63	53.28	60.64	53.97	71.88
B grade Bulb (%)	17.80	15.89	22.89	10.56	10.37	13.14	11.77
C grade Bulb (%)	6.53	13.73	8.88	0.00	4.17	6.35	3.41
Bolters (%)	5.74	9.41	9.08	26.14	23.49	22.66	11.41
Doubles (%)	3.76	3.20	2.50	10.02	1.33	3.88	1.53

CD at 5% level for marketable yield : 45.33

Table 2d : IV date of planting

Date of sowing	: 16.09.98	Date of transplanting	: 10.11.98
Date of harvesting	: 01.03.99	Spacing	: 15 x 10 cm
Plot Size	: 3 m x 2 m		

Characters	Varieties					
	ALR	ADR	Phule Safed	B-780	Arka Niketan	Arka Kalyan
Marketable Yield (q/ha)	310.71 ^{cd}	266.56 ^d	270.73 ^d	335.28 ^{bc}	379.43 ^{ab}	334.87 ^{bc}
Polar Dia. (cm)	4.56	4.42	4.44	4.62	4.26	4.44
Equ. Dia. (cm)	5.82	5.50	5.58	5.38	5.30	5.92
Neck Thickness (cm)	0.70	0.56	0.82	0.52	0.64	0.74
T.S.S. (°B)	10.47	11.27	9.80	10.67	10.80	9.93
% of A grade Bulb	41.11	48.29	50.71	48.35	54.97	47.78
% of B grade Bulb	24.55	10.84	10.76	25.69	21.13	15.10
% of C grade Bulb	22.89	3.43	7.22	13.57	10.08	12.47
% of Bolters	9.19	26.20	30.59	9.22	12.85	24.65
% of Doubles	2.26	11.25	0.71	3.16	0.97	0.00

CD at 5% level for the marketable yield : 44.99

Rabi season

Six released varieties were evaluated during *rabi* season. Due to continuous rainfall during seed sowing period, seed was sown late and subsequently transplanting was delayed. Normally, for *rabi* season seedling should be transplanted during second fortnight of November or first week of December. Late planting had effect on yield of all the varieties. Among different varieties ALR and N-2-4-1 recorded significantly higher yield than other varieties (Table 3). Incidentally, both the varieties were on par with each other. Higher TSS (12.53°B) was recorded in N-2-4-1. The percentage of A grade bulbs was also higher in these varieties.





A. L. R.

Table 3 : Performance of *rabi* varieties

Date of sowing	: 05.11.98	Date of transplanting	: 09.01.99
Date of harvesting	: 06.05.99	Spacing	: 15 x 10 cm
Plot Size	: 3 m x 2 m		

Characters	Varieties					
	Arka Niketan	Hissar-2	ALR	Phule Safed	B-780	N-2-4-1
Marketable Yield (q/ha)	270.53 ^{ab}	90.38 ^c	308.21 ^a	266.37 ^b	270.31 ^{ab}	306.96 ^a
Polar Dia. (cm)	3.62	3.46	3.66	3.55	3.59	3.60
Equ. Dia. (cm)	4.30	4.09	4.41	4.18	4.26	4.41
Neck Thickness (cm)	0.38	0.40	0.46	0.45	0.33	0.44
T.S.S.(°B)	10.80	10.07	10.47	9.80	10.67	12.53
A grade Bulb (%)	29.46	4.62	45.32	26.45	31.51	40.00
B grade Bulb (%)	55.17	30.87	40.66	50.48	52.80	48.04
C grade Bulb (%)	8.35	13.49	3.31	6.19	14.71	8.95
Doubles (%)	7.02	51.03	10.71	6.88	0.98	3.01

CD at 5% level for the marketable yield : 38.66

Collection, Characterisation and Evaluation of Onion Germplasm

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

The mandate of the centre is to act as national repository of onion and garlic germplasm. In this respect, germplasm is assembled through exploration, collecting activities and donors. At present, the centre is involved in maintaining the germplasm through seed production in onion and vegetative propagation in garlic. Until now, 539 accessions of onion is being maintained at the centre. These have been evaluated for various horticultural traits.

Evaluation of indigenous collections of onion

A total of 131 lines collected from different parts of Maharashtra were evaluated during *rabi* season for yield, TSS and other yield contributing traits. Accession no. 52 recorded higher yield/m². (5.167 Kg.) (Table 4) and average wt. / bulb (86 g.). On the basis of TSS, Acc. No. 146 recorded highest TSS (16.33°B). Lowest number of leaves were recorded in Acc. No. 120 (7) and Acc. No. 15 showed shortest plant height (41.4 cm.). Acc. no. 29 , 35, 35-1(R), 35-2(W), 52, 58, 69, 72, 91, 103, 105, 113 recorded highest (100%) percentage of marketable bulbs. The promising lines selected on the basis of these characters are presented as under:

Characters	Acc. no.	Range
• Yield / sq. m (Kg.)	52, 45, 145, 39, 130, 43, 94, 51, 53, 50	5.167 - 3.313
• Average weight(g)/bulb	52, 42, 54, 43, 38, 39, 51, 53, 115, 45	86 - 61
• Marketable bulb (%)	29, 35, 35-1(R), 35-2 (W), 52, 58, 69, 72, 91, 103, 105, 113	100 - 100
• TSS (°B)	146, 130, 59, 93, 38, 61, 63, 116, 11, 69	16.33 - 12.13
• Number of leaves	16, 108, 31, 103, 84, 6, 46, 119, 121, 120	8 - 7
• Plant height (cm)	121, 16, 72, 18, 26, 25, 147, 24, 23, 15	46 - 41.4

Table 4: Performance of promising lines on the basis of yield / sq. m.

Acc. No.	Yield/ sq. m. (Kg.)	TSS (°B)	Mkt. Bulb (%)	Av. Bulb wt. (g)
52	5.167	09.93	100.00	86
45	4.125	10.53	77.33	61
145	3.900	09.60	99.52	48
39	3.833	11.13	92.31	64
130	3.820	12.93	96.21	50
43	3.786	11.00	95.24	67
94	3.476	09.20	96.05	52
51	3.473	09.47	97.86	64
53	3.327	10.67	98.50	63
50	3.313	10.73	98.02	53

Evaluation of exotic onion collections

A total of 65 lines of exotic germplasm collected under International onion trial programme from NRI, UK ; Hazera Seeds, Israel and USA were evaluated in late *kharif* (two dates) and *rabi* seasons. Observations on yield, TSS and yield related characteristics were recorded. On the first date of planting in *rangda* season, the following lines were observed promising for various characters.

Characters	Varieties
Yield/sq.m (kg)	Mercedes, H-1268, Rouge de Tana, RM 7936 & Rio Honda
Mkt Bulb (%)	RM 7936, Mercedes, H-902, RM 739 & PX 292
Plant Height (cm)	Rouge de Tana, Rio Blanco Grande, Red Creole & Violet de Galmi
No. of leaves	RM 7936, Rio Blanco Grande, RM 737, Rio Honda & Red Cornet
TSS (° B)	While creole PRR, Red Synthetic, Violet de Galmi, Red Creole, Yellow Granex
Av. bulb Wt (g)	H-1362, RM 737, RCS-2211, H-902 & RM 7936

Table 5 : Performance of some promising lines selected on the basis of yield per m²

Acc. No.	Variety	Yield/ Sq.m (Kg.)	Mkt. Bulb (%)	TSS(°B)	Percentage double bulbs	Av. Wt. / bulb (g)
267	Mercedes	3.830	90.12	11.20	00.0	142
286	H 1268	3.830	78.00	10.70	10.5	115
301	RM 771	3.750	68.97	11.53	20.0	129
236	Rouge de Tana	3.440	70.89	11.93	6.30	085
299	RM 7936	3.170	93.75	09.60	4.80	148



Mercedes

On the second date of planting in *rangda* season, the following lines were observed promising for various characters.

Characters	Varieties
Yield per sq.m(kg)	H - 650, H 893, Ringer Grand Improved, Grano F1, Nikita
Mkt. Bulb (%)	Deko, Candy, Lind vistra, RCS 2211, RM 7936
Plant Height (cm)	Ori, Rouge de Tana, Violet de Galmi, RS - 209, H-202
No. of leaves	Ori, Rouge de Tana, H-944, RS 209, Contessa
TSS (°B)	Deko, H-902, Chariot, HS-675, Rio Blanco Grande
Average bulb wt. (g)	H 650, RM 780, Grano F1, H 230, Yellow Granex, HA 950

Table 6 : Performance of some promising lines selected on the basis of yield per m².

Acc. No.	Variety	Yield/ sq.m (kg)	Mkt. Bulb (%)	Av. bulb wt. (g)	TSS (°B)	Percentage Double Bulbs
293	H 650	6.540	86.86	183	7.68	12.74
288	H 893	6.330	78.45	076	9.2	20.72
250	Ringer Grand Improved	5.980	98.71	092	9.0	0.9
322	Grano F 1	5.860	94.83	100	9.4	3.45
252	Nikita	5.830	97.85	088	7.96	0.25

In *rabi* season, 20 exotic lines collected from Hazera Seeds, Israel and one line from USA were tested for their adaptability and suitability under Indian conditions. They were evaluated for qualitative as well as quantitative characteristics.

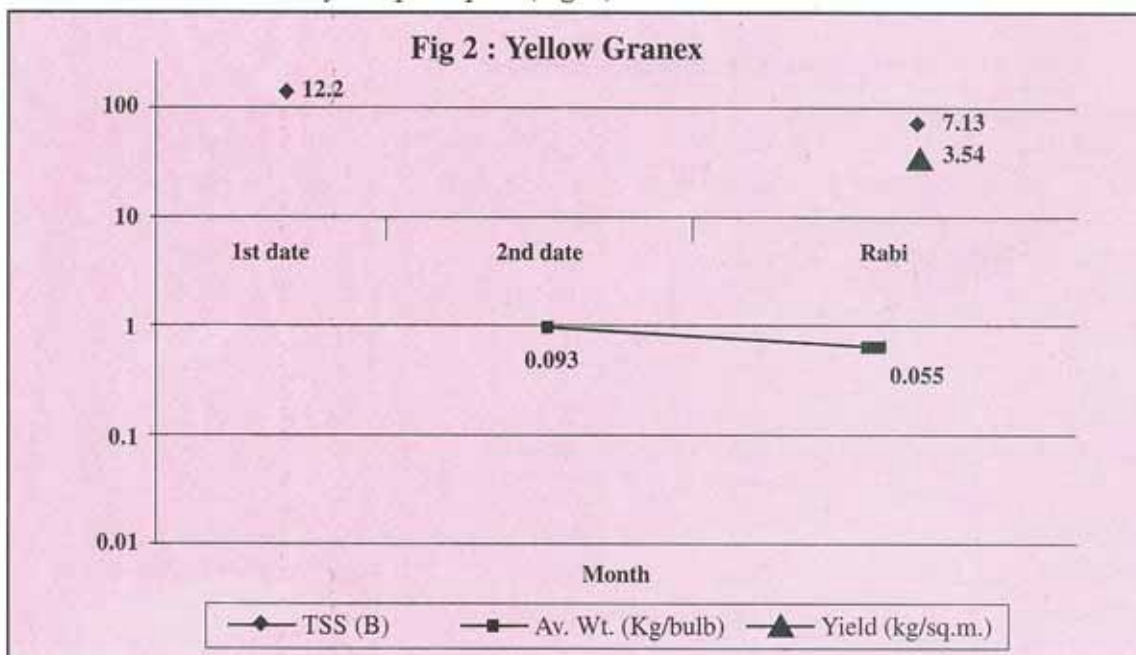
Following lines were found promising for various characters :

Character	Varieties
Yield per sq.m (kg)	H 1367, Yellow Granex, H 1338, H 60, Grano F1
Marketable bulb (%)	H 230, H 1362, H 1367, H 1268, H 9
Plant Height (cm)	H 944, H 9, H 1362, H 202, H 902
Number of leaves	H 1268, H 1362, H 9, H 944, H 202
TSS (°B)	H 893, H 1338, H 60, Yellow Granex, H 202
Av. Bulb wt. (g)	H - 1367, Yellow Granex, H - 1338, H 60, Grano F1

Table 7 : Performance of some promising lines selected on the basis of yield per m².

Acc. No.	Variety	Yield/ sq.m (kg)	Mkt. Bulb (%)	Av. Bulb wt. (g)	TSS (°B)	Percentage Double Bulbs
297	H 1367	4.24	99.77	58	6.00	0.23
279	Yellow Granex	3.54	96.19	55	7.13	3.81
287	H 1338	3.42	95.20	52	7.60	4.80
290	H 60	3.18	95.90	57	7.27	4.10
296	Grano F-1	2.98	98.31	49	6.67	1.69

Amongst all the lines tested, Yellow Granex was found best with regards to its adaptability in both the seasons tested and also with respect to other traits like T.S.S., percentage of marketable bulbs and yield per sq. m. (Fig. 2)



3.1.2 GARLIC

Collection, Characterisation & Evaluation of Garlic (*Allium sativum* L.) Germplasm

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

During the *rabi* season 1998-99, 208 accessions collected from various sources were evaluated for yield and yield contributing characters. Since, it was the first year of planting, it was delayed by about one month due to problems in irrigation facilities. As a result the yield range was slightly on the lower side. Among various accessions the yield ranged between 40 g to 1.667 Kg/sq.m.

Best ten lines for various characters.

Character	Selected Accession	Range
Yield per sq.m (kg)	95, 263, 248, 181, 225, 203, 221, 219, 260, 254	1.667 - 0.908
Plant Height (cm)	248, 109, 102, 104, 221, 106, 187, 177, 116, 258	57.15 - 51.05
Number of leaves	99, 147, 145, 205, 263, 109, 106, 117, 54, 93	9.9 - 9.3
Av. Bulb wt. (g)	172, 66, 263, 194, 117, 163, 109, 181, 177, 166	19.2 - 17.5
Number of cloves per bulb	99, 112, 108, 110, 115, 101, 125, 52, 182, 132	27.6 - 20.4

On the basis of yield the accession no. 95, 263, 248, 181, 225, 203, 221, 219, 260, 254 recorded highest yield ranging from 1.667 - 0.908 Kg per square meter. The accession no. 225 was found to be moderately resistant to thrips as well as eriophyid mites.

Table 8 : Performance of selected genotypes

Acc.No.	Yield / m ² (Kg)	Av. wt. of Bulb (g)	No. of Cloves/Bulb	No. of leaves	Plant Height (cm)
95	1.667	12.30	11.5	7.60	36.80
263	1.389	18.41	10.4	9.60	45.35
248	1.041	14.53	6.7	9.25	57.15
181	1.033	17.71	13.3	8.20	45.20
225	1.013	18.00	19.1	7.25	45.40
203	0.938	14.48	8.9	7.35	49.05
221	0.917	1.75	14.6	8.30	53.15
219	0.917	1.79	9.6	8.65	43.35
260	0.917	14.47	15.8	8.80	47.15
254	0.908	13.29	12.7	8.75	48.40

Varietal Evaluation in Garlic

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

During *rabi* 1998-99, four varieties were evaluated for yield and yield contributing characters. Among the four varieties G-41 recorded significantly higher yield at 67.7 q/ha than other varieties. The increased yield was mostly due to bigger bulbs and bigger cloves. The bulbs had good storability. G-41 has been already released as national check. The second best variety was G-282.

Table 9 : Performance of garlic varieties

Date of sowing	:	08.12.98
Date of harvesting	:	18.04.99
Spacing	:	10 x 15 cm
Plot Size	:	3 x 2 m

Variety name	Yield (q/ha)	Avg. Wt./Bulb (g)	No. of cloves	Avg. Wt. of cloves (g)	Polar dia. of bulb (cm)	Equ. Dia. of Bulb (cm)	Plant Height	No. of leaves	Neck Thickness (cm)
G-282	53.10 ^{ab}	9.66	12.3	0.70	2.30	2.50	51.08	7.0	0.45
G-41	67.70 ^a	14.43	8.08	1.10	2.63	2.32	42.00	9.16	0.46
G-1	37.70 ^c	8.46	6.23	1.13	2.69	2.58	42.83	9.50	0.53
G-50	46.70 ^{bc}	10.54	8.78	1.18	2.50	2.70	43.70	9.53	0.58

CD at 5% for yield : 15.20



3.2 CROP PRODUCTION

Effect of Micronutrients on Yield of Onion and Garlic

Aziz Qureshi and K.E.Lawande

A study was initiated to know the effect of foliar application of different micronutrients on the yield of onion and garlic during *rabi* 1998. Since, the soil science laboratory was under establishment, the detailed analysis of soil and plant samples could not be attempted. However, field experiment with 16-treatment combinations comprising of different micronutrients were sprayed at 30 and 60 days after transplanting onion and dibbling garlic cloves respectively. Spray volume of 300 l/acre was applied. Each treatment plot measured 6m² area. All the standard package of practices were followed for both onion and garlic crop.

Table 10 : Foliar effect of micronutrients on the yield of onion and garlic during *rabi* season 1998

Treatments (0.5% concentration)	Yield (q/ha)	
	Onion	Garlic
T1 Control	383.17	52.00
T2 Fe	370.67	49.70
T3 Mn	362.91	49.14
T4 Zn	393.72	46.37
T5 Cu	400.11	47.19
T6 Fe+Mn	349.30	49.42
T7 Fe +Zn	402.33	44.74
T8 Fe+Cu	377.06	38.59
T9 Mn+Cu	406.51	41.64
T10 Mn+Zn	413.72	38.59
T11 Zn+Cu	379.84	42.25
T12 Fe+Mn+Zn	368.73	44.97
T13 Fe+Mn+Cu	345.41	49.97
T14 Fe+Zn+Cu	368.46	52.19
T15 Cu+Zn+Mn	416.77	59.19
T16 Fe+Mn+Zn+Cu	348.19	52.41
CD at 5%	015.19	05.31

It is observed from the results presented in Table 10 that treatments T5, T7, T9 and T15 were significantly superior over control in onion. But, treatment T15 a combination of Cu, Zn & Mn was overall outstanding over all other treatments in both onion and garlic.

Effect of Potassium and Sulphur on Yield of Onion and Garlic Bulbs.

Aziz Qureshi and K.E.Lawande

It is well known that K and S are the major nutrients that influence the quality of onion and garlic bulbs. Similarly evidence of increasing the yield due to these nutrients have also been reported.

A study was conducted to know the effect of different levels of K and S on the yield performance of onion and garlic during *rabi* season 1998. Two sources of K i.e. KCl and K_2SO_4 were selected for this study. K_2SO_4 was also used as a source of S. The common package of practices were followed for all the treatment combinations. The standard dose of 150 kg N and 50 kg P were uniformly applied to all the treatment combinations. The experiment was laid out in simple RBD in the black soils of the centre.

Table 11 : Effect of different levels of potassium and sulphur on the yield of onion and garlic during *rabi* 1998.

Treatments (Kg/ha)	Yield (q/ha)	
	Onion	Garlic
T1 150 KCl	389.28	74.41
T2 100 KCl	422.05	70.52
T3 50 KCl	419.82	67.19
T4 150 K_2SO_4	379.61	70.52
T5 100 K_2SO_4	372.62	64.41
T6 50 K_2SO_4	352.63	61.08
T7 Control (only N & P)	319.31	65.24
CD at 5%	013.23	NS

The results presented in Table 11 showed that yield of garlic crop was not influenced by K and S. The poor performance of garlic crop may be due to heavy infestation of mites and this could be the reason for no clear cut difference among different treatments. However, in onion crop, the levels of K & S were found significant over control (only N+P). The highest increase in yield of onion bulbs was found due to application of 100 kg KCl/ha.

It is also seen from the results that KCl had more influence on onion than K_2SO_4 . Though K_2SO_4 as a source of sulphur had increased yield over control, however, it was non-significant in comparison to KCl.

Further, detailed studies have to be taken up to investigate the effect of KCl and K_2SO_4 on the performance of onion & garlic.

3.3 CROP PROTECTION

3.3.1 PLANT PATHOLOGY

Study of Airborne Spores of Purple blotch and Stemphylium Blight in Onion Field

Mrinalini N Maholay and K.E.Lawande

The spores of *Alternaria porri* (purple blotch) and *Stemphylium vesicarium* (stemphylium blight) are wind borne, initiating the respective diseases on the leaves of the onion crop. To study the effect of the weather conditions on the development of these spores in air, an experiment was initiated by using vertically hanging slides, coated with glycerin, kept at five different heights i.e., 1, 2, 3, 4 and 5 ft. above the ground level from the month of July, 1998 till April, 1999.

There was no correlation between the number of spores and the height of the slide. The spores of *A. porri* started appearing on the slide from the middle of October, 1998. In November, 1998 also the spores appeared for a total of six days (Table 12). After that, *A. porri* spores did not appear. In February, 1999 spores of *S. vesicarium* appeared on the slide for only two days, in March for four days and in April, spores were recorded on every alternate days. (Fig. 3 & 4)



Spore trapping by slides

Table 12: Number of spores of *A. porri* and *S. vesicarium* during different months / cm²

Date	<i>A. porri</i>	Date	<i>S. vesicarium</i>
10.10.98	147	10.02.99	2
15.10.98	14	20.02.99	1
29.10.98	21	24.03.99	6
31.10.98	500	25.03.99	18.0
06.11.98	1.0	27.03.99	0.8
09.11.98	251.0	31.03.99	1.0
16.11.98	0.6	01.04.99	54.40
19.11.98	400.0	03.04.99	11.00
20.11.98	1.0	06.04.99	4.4
21.11.98	2.4	07.04.99	81.60
23.11.98	5.2	08.04.99	60.40
		12.04.99	80.00
		13.04.99	142.00
		16.04.99	8.8
		17.04.99	77.0
		19.04.99	9.0
		21.04.99	1.7
		22.04.99	6.0
		23.04.99	5.0
		24.04.99	1.0
		26.04.99	7.0
		27.04.99	13.0
		29.04.99	8.4

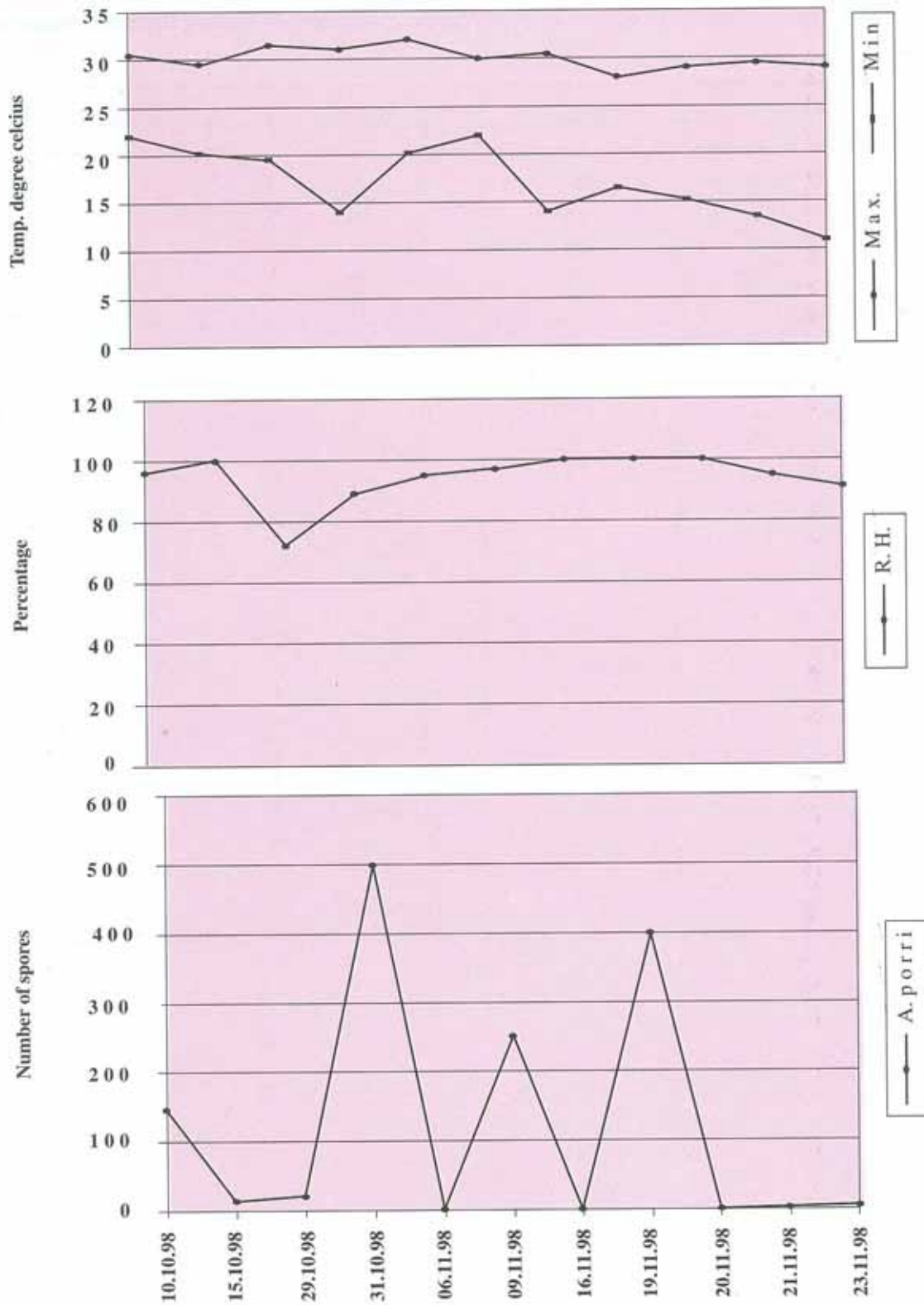
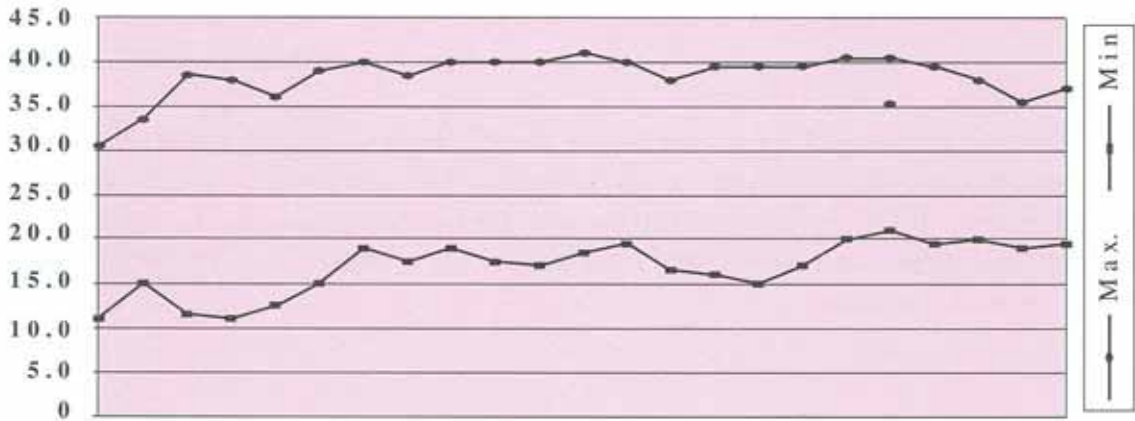


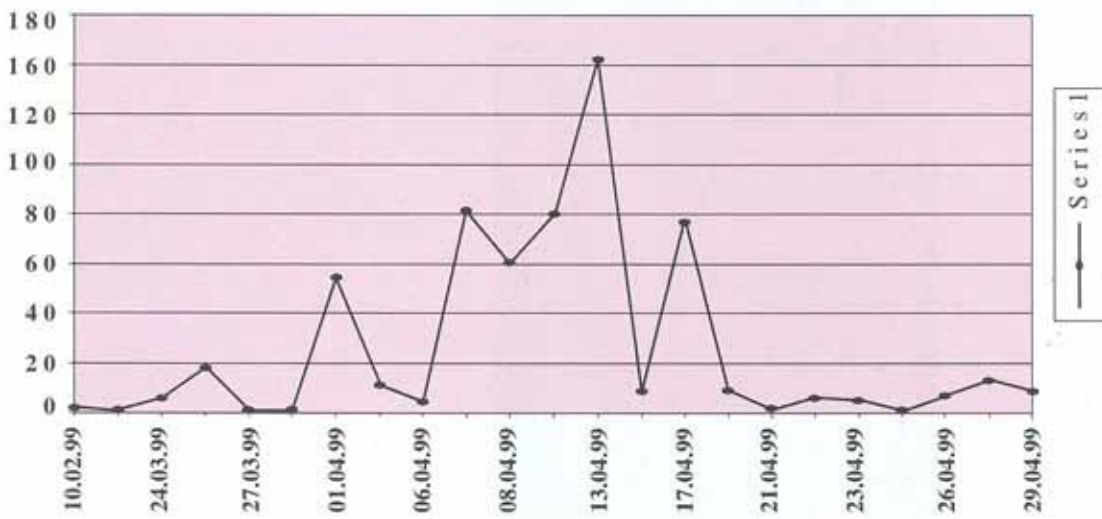
Fig. 3 : Relationship between *A. porri* , temperature and relative humidity



Degree celcius



Percentage



Number of spores

Screening of Onion and Garlic Germplasm for Different Fungal Diseases

Mrinalini N Maholay and K.E.Lawande

Some fungal diseases like purple blotch, stemphylium leaf blight, white rot, anthracnose, etc., cause severe losses in onion and garlic crops. To locate resistant varieties, screening of germplasm of these two crops was taken up in the field conditions during *kharif* season for purple blotch and anthracnose and for stemphylium in *rabi* season. The disease rating was done on the 0-5 scale.

Grade	Intensity	Reaction
0	No disease	Highly Resistant (HR)
1	1 – 10	Resistant (R)
2	11 – 20	Moderately Resistant (MR)
3	21 – 30	Moderately Susceptible (MS)
4	31 – 50	Susceptible (S)
5	51 – 100	Highly Susceptible (HS)

1. Screening of germplasm of onion for purple blotch (*Alternaria porri*) during *kharif* season:

Total of 127 lines (Acc. No. 310 – 437) were screened. None of the lines were resistant. Three lines viz., Acc No. 342, 352 & 360, were found moderately resistant.



Purple Blotch

2. Screening of onion germplasm for anthracnose (*Colletotrichum gloeosporioides*) during *kharif* season:

Total of 127 lines (Acc. No. 310 – 437) were screened. Only Acc. No. 325 was found resistant and Acc. No. 329 was moderately resistant.



Anthracnose

3. Screening of onion germplasm for stemphylium blight (*Stemphylium vesicarium*) during *rabi* season:

- Hundred and forty seven accessions were screened for the disease, of which 19 accessions were resistant but these will be tested again in the next year (Acc. No. 5, 9, 11, 74, 77, 110, 121, 129, 130, 139, 141, 143, 105, 52, 61, 68, 69, 83, 114).
- Acc. No. 256 to 322 of exotic germplasm of onion were screened for stemphylium blight. None of the lines was resistant. Only one line, Acc. No. 259 was moderately resistant.
- Overall, the disease intensity ranged from 4 to 41%.



Stemphylium Blight

4. Screening of garlic germplasm for stemphylium blight

- Acc. No. 1 to 267 of garlic germplasm were screened for stemphylium blight during *rabi* season. Four lines i.e., Acc. No. 225, 214, 226 & 241 were resistant.

Survey for Fungal Diseases of Onion and Garlic in Maharashtra

Mrinalini N Maholay and K.E.Lawande

Purple blotch, anthracnose, white rot, damping off and stemphylium blight are some of the important diseases reported in onion and garlic. For studying disease incidence and disease intensity in different parts of the onion growing areas, a survey was conducted in some Talukas of Pune and Ahmednagar during *kharif* as well as *rabi* season. The details are given below:

- Stemphylium blight and Anthracnose** : Due to heavy rains during September – October 1998, incidence of purple blotch and anthracnose was noticed in some of the farmer's field and also in NRC farm at Rajgurunagar. Therefore, a survey was conducted in ten villages in the Eastern side of Taluka – Khed. Villages covered were: Manjarwadi, Kharpudi, Nimgaon, Davdi, Donkharvadi, Koyali, Salgaon, Bhose, Khalumbre and Yelvadi on 15 and 16 October, 1998. The incidence of purple blotch (*A. porri*), ranged from 1 – 100% with average intensity of 34%. The incidence of anthracnose (*C. gloeosporoides*) was 3 – 100% with 12 – 60% intensity. None of the village was free from these diseases.
- Nematode** : Nematodes belonging to *Ditylenchus sp.* cause elongation of neck after transplanting, coiling of leaves and yellowing of leaves in initial state. Later on there is rotting of basal portion which do not form well developed bulbs. The mortalities due to nematodes (*Ditylenchus sp.*) were 50 – 60% in the fields of farmers of Kharpudi and Koyali villages.



Bulbs affected by
Ditylenchus sp.

- c. **Stemphylium blight** : The incidence of stemphylium blight was noticed in the NRC farm and nearby villages of Rajgurunagar on onion crop during January, 1999. Therefore survey work was conducted to record the disease incidence in about 46 villages of Pune and Ahmednagar Districts during February and March, 1999. The number of villages from different Talukas surveyed are given below.

District	Talukas	No. of villages
Pune	Khed	12
	Shirur	2
	Maval	2
	Haveli	7
	Ambegaon	4
	Junnar	3
Ahmednagar	Parner	2
	Rahuri	9
	Shrirampur	1

The disease was found in all the fields with 100% incidence except in two places in Waki (Tal - Khed) and Phursungi (Tal -Haveli), where incidence and intensity was 12 & 27% and 7 & 15 %, respectively. The disease intensity ranged from 17 - 95 %. The disease intensity was more in case of crop transplanted during October 98 i.e.65.8% and reduced to 53 % when transplanting was done in November and to 46 % when transplanting was done in December and January, 1999. Flower stalks of seed crops were affected in Bhangarwadi (Tal.-Rahuri) (10%) and Vambori (Tal.-Rahuri, 2%). Mortalities due to nematodes were 27 % in village Khalumbre (Tal. - Khed).

Integrated Management of Stemphylium Blight of Garlic

Mrinalini N. Maholay and K.E.Lawande

The trial was conducted to study the effect of fungicides and botanicals to control stemphylium leaf blight (*Stemphylium vesicarium*) on garlic. Treatments used were Mancozeb (DM - 45) 0.2 %, Propioconazole (Tilt 25%EC) - 0.1%, Difenoconazole (Score) - 0.1%, leaf extract of calotropis (CLE - 5%), leaf extract of ocimum (OLE) 5%, Mix. of DM45 & CLE (1:1), DM45 & OLE (1:1), DM45, CLE and OLE (1:1:1), CLE and OLE (1:1) and control without treatment. Four replications of each treatment were maintained. Three sprays were given at 15 days interval, starting from 25 days of dibbling of cloves. The disease intensity was recorded on 0-5 scale. Percentage of leaves infected per plant were recorded separately.

Table 13: Efficacy of different fungicides & botanicals on the control of stemphylium blight of garlic :

Treatments	% of leaves infected	% disease intensity	Yield (q/ha)
Mancozeb	60.90	26.00	41.66
CLE	60.54	27.50	38.33
OLE	61.39	22.75	36.66
Manc. + CLE	63.10	26.60	38.31
Manc. + OLE	68.76	26.00	39.66
OLE + CLE	64.26	24.00	39.99
Manc. + OLE+ CLE	63.18	24.20	36.33
Propioconazole	64.47	30.20	39.49
Diphenconazole	62.24	24.20	48.49
Control	66.96	28.80	34.66
NS			

Although the results were non significant, the data from the above table indicated that percentage of leaves infected ranged from 61 to 69%. The disease intensity ranged from 23 to 30%. The higher yield (48.9 q/ha) was obtained from treatment of Diphenconazole as against control.

4.3.2 ENTOMOLOGY

Screening of Garlic Germplasm against Thrips and Eriophyid Mites

Satya Srinivas, P. and K.E. Lawande

Garlic plants infested with thrips (*Thrips tabaci*) and eriophyid mite (*Aceria tulipae*) were found in *rabi* season during the year 1998. The damage caused by mites was more conspicuous with symptoms such as stunting, twisting, curling and yellow mottling of leaves than the damage caused by thrips.

All the 254 lines of garlic were preliminarily screened for their reaction against both thrips and mites by awarding rating on a 1-4 scale depending upon the intensity of damage and symptoms caused. The lines rated on higher side (i.e. 3 and 4) were considered susceptible. The reaction of the lines were categorized for thrips and mites separately.

The accession No. 51, 29, 30,92, 31, 225,231 and 224 were found least damaged by thrips with average rating ≤ 2 .

Lines 1,3,7,114, 219,225, 183, 201 were observed free from damage caused by mites. Garlic lines, which have shown highly susceptible reaction, were 82, 122, 130, 129, 127 and

170. Other lines viz., 78, 80, 97, 67, 121, 103, 112 and 134 have shown susceptible reaction to eriophyid mites.

3.4 Contract Research:

Under the contract research programme following organizations availed the services of the centre to carry out studies of their products on different aspects of onion and garlic.

	Name of the project/programme	Organisation
1.	Effect of Terracare a soil conditioner on yield and quality of Onion (<i>Allium cepa.</i>) var. N-2-4-1	M/s. Agri-Science (India) Ltd., Pune
2.	Foliar effect of Nitrophoska solub and Fetrilon Combi-II (water soluble fertilisers) on the yield of onion & garlic	M/s. Vardhaman Fertilisers Pvt. Ltd., Pune
3.	Effect of Rostab - Soil pH modifier on the yield of Onion	M/s. Rahul Pesticides and Chemical Pvt.Ltd.,Mumbai

4. HUMAN RESOURCE DEVELOPMENT

4.1. Trainings:

- Dr. (Ms.) M.N.Maholay, Sr. Scientist (Pl. Pathology) and Ms. Asha Devi, A. , Scientist (Genetics) underwent training programme on VAM and Tissue culture aspects for one week at IISR, Calicut from 27 May to 5 June, 1998.
- Ms. Asha Devi, A., Scientist (Genetics) underwent NAARM training in the 64th FOCARS w.e.f. 21 July , 1998 to 13 Nov., 1998 at NAARM, Hyderabad.
- Ms. A.Asha Devi, Scientist (Genetics), Sh. G.S.S.R. Krishnan, S.L.A and Sh. H.S.C. Shaikh, T-II-3 (Computer) has undergone a three day training programme entitled "NICNET and Internet", at N.I.C, Pune from 28 January, 1999 to 30 January, 1999.
- Sh. G. Sivasankararamakrishnan, S.L.A, attended a course on "MS Office 97" at NIC, Pune for a period of one week from 8 March,1999 to 13 March, 1999.

4.2. Paper Presentations / Publications:

- Dr. K.E. Lawande, Director attended training programme and delivered presidential address at Yashwantrao Chavan Mukta Vidyapeeth, Nasik on 01.06.98.
- Dr. K.E. Lawande, Director delivered lecture on "Onion production" at Summer Institute, Agricultural College, Kolhapur on 24.06.98.
- Dr. K.E.Lawande, Director attended a consultancy seminar organised by IIHR, Bangalore from 7 - 8 August, 1998 and presented a paper on "National Consultation on Horticulture Research Development and Export in Respect of Onion and Garlic"
- Dr. K.E. Lawande, Director attended seminar on "Onion Storage" at Gultekadi Market Yard , Pune on 28.08.98 organised by Maharashtra State Agricultural Board, Pune and presented paper on "Onion Storage".
- Dr. K.E.Lawande, Director, has published a popular article, "Kanda Utpadan Ek Avahan", in the Marathi newspaper, Arthamanthan, Sakal, Pune 30 Nov. to 6 Dec., 1998 issue.
- Dr. Md. A. Aziz Qureshi, Scientist (Soil Science) attended a two day seminar on

"Recent Trends in Nutrient Management of Horticultural Crops" from 11-12 Feb. 1999 at K.V.K., Dapoli and presented a poster titled, "Soil Fertility Status in Onion Growing Areas of Nashik District".

- Shinde, K.G, K.E.Lawande, B.T.Patil and S.V.Nirmal (1998). Correlation studies in pea (*Pisum sativum* L.) *Ad. Plant Sci.* 11(2): 177-180.

4.3 Participation in Seminars / Symposia / Meetings etc.

- Dr. K.E. Lawande, Director attended "Chick Pea" workshop at NCL, Pune on 12.09.98 organised by NCL, Pune.
- Dr. K.E.Lawande, Director participated in the Horticultural Conference organised by Horticulture Division, Govt. of India, Min. of Agriculture (DARE), Krishi Bhavan, New Delhi from 20 - 21 Nov. 1998.
- Dr. K.E.Lawande, Director delivered a lecture on 'Vegetable Cultivation' in the farmers' training and visit programme organised by KVK, Sharadanagar, Tal. Baramati, Dist. Pune on 26 Nov. 1998.
- Mr. Anil Khar, Scientist (Horticulture) participated in " National Symposium on Emerging Scenario in Vegetable Research and Development" organised by Indian Society of Vegetable Science and Project Directorate of Vegetable Research, Varanasi from Dec. 12 - 14, 1998.
- Dr. K.E.Lawande, Director attended the first meeting of the Expert Group on Onion at the Maharashtra State Agricultural Marketing Board, Pune on 16 Dec. 1998.
- Dr. K.E. Lawande, Director attended 14th group meeting of AICRP on Floriculture at College of Agriculture (MPKV), Pune on 08.01.99.
- Dr. K.E. Lawande, Director attended the meeting with DDG (H), ICAR on "Quality Seed of Onion & Garlic in the country" at ICAR Hqrs., New Delhi on 09.02.99
- Sh. H.S.C.Shaikh , T-II-3 (Computer) attended 2nd ARIS Incharge workshop and seminar on Linux at NBPGR auditorium, New Delhi from March 5 - 7, 1999.

4.4 Radio Talk / TV Programmes:

- Dr. K.E. Lawande, Director, delivered a radio talk at AIR, Pune on "Onion Crop Production" on 15.10.98.
- A television talk was given by Dr. K.E. Lawande, Director, broadcasted on 25 January, 1999 on "Production Problems of Onion" in the Marathi Programme 'Amchi Mati Amchi Manas'.

4.5 Distinguished Guests:

Visitor	Date
• Dr. Felix Serquens, Onion Breeder Dr. S.K. Tikoo, Research Manager, Sun Seeds, USA.	28.03.98
• Dr. G. Kalloo, Project Director, PDVR, Varanasi.	11.04.98
• Dr. C.S. Pathak, Onion Breeder, AVRDC, Taiwan.	14.04.98
• Dr. S.P.Ghosh, DDG (Hort.), ICAR, New Delhi.	18.08.98
• Dr. Y.S.Nerker, Vice Chancellor, MPKV, Rahuri.	03.09.98
• Dr. C.R. Hazera, Agricultural Commissioner, Ministry of Agriculture.Govt. of India.	11.09.98
• Dr. H.P.Singh, Commissioner of Horticulture, Govt. of India, New Delhi.	26.09.98
• Dr. Roman Signer, Innovest Ltd., Switzerland.	01.01.99
• Dr. M.L. Pandita, Advisor, F & V Project, NDDDB, Mangolpuri, New Delhi	15.02.99

- Dr. B.S. Dhankar, ADG(VC), 15.02.99
Indian Council of Agricultural Research.
- Dr. U.B. Pandey, Director, 15.02.99
NHRDF, Nasik.
- Dr. P.N. Kale, Ex. Head, 15.02.99
Department of Horticulture, M.P.K.V, Rahuri.
- Dr. S.S. Magar, Director of Instruction and Dean FIA, 16.02.99
MPKV, Rahuri.
- Sh. D.B. Sabharwall, Secretary, Agricultural and 22.03.99
Processed Food Export Development Authority (APEDA),
M/o Commerce, New Delhi.



5. Institutional Activities

5.1 RAC

The first RAC meeting of the centre was held on 15 February, 1999 at the conference hall of NRCO&G under the chairmanship of Dr. M.L. Pandita, Advisor, Fruits and Vegetable Project, NDDB, New Delhi. The other members included Dr. B.S. Dhankar, ADG (VC), Dr. U.B. Pandey, Director, NHRDF, Nasik, Dr. P.N. Kale, Former-Head, Dept. of Hort. MPKV, Rahuri and Dr. B.N. Shinde, Head, IFWM, MPKV, Rahuri. Major emphasis was given to finalisation of research programme commensurate to mandate of the centre.



5.2 Sports Meet

The centre participated in the Inter Zone Sports meet of ICAR held at Nagpur for the first time. The team of ten members was led by Dr. Md. A. Aziz Qureshi as Chief-de-Mission and Sh. S.C. Sharma as Manager.

6. Financial Position

Head	1997-1998		1998-1999	
	Budget (lakhs)	Expenditure (lakhs)	Budget (lakhs)	Expenditure (lakhs)
1. Estt.	10.94	10.94	25.90	25.90
2. T.A.	1.40	1.40	3.19	3.19
3. Other Charges	17.56	17.56	38.87	38.87
4. Works	—	—	12.04	12.04
Total	29.90	29.90	80.00	80.00

7. STAFF POSITION

Sanctioned posts at NRCOG, Rajgurunagar

SrNo	Category	Post Sanctioned as on 31.03.99	Filled as on 31.03.99	Vacant as on 31.03.99
1.	Director	01	01	--
2.	Scientific	10	05	05
3.	Technical	08	08	--
4.	Administrative	09	09	--
5.	Supporting	07	07	--
	Total	35	30	05

Staff Strength of NRCOG, Rajgurunagar as on 31.03.1999

Sr.No.	Name	Designation
SCIENTIFIC		
1.	Dr. K.E. Lawande	Director
2.	Dr. M.N. Maholay	Sr.Scientist (Pl. Patho.)
3.	Dr. Md. A. Aziz Qureshi	Scientist (Soil Sci.)
4.	Ms. Asha Devi, A.	Scientist (Genetics)
5.	Sh. Anil Khar	Scientist (Hort.)
6.	Sh. P.S. Srinivas	Scientist (Entomology)
TECHNICAL		
7.	Sh. G.S.S.R. Krishnan	S.L.A.
8.	Sh. N.L. Gore	Tech.Asstt. T-II-3(Field)
9.	Sh. A.P. Trivedi	Tech.Asstt. T-II-3(Field)
10.	Sh. H.S.C. Shaikh	Tech.Asstt. T-II-3 (Computer)
11.	Sh. D.M. Panchal	Tech.Asstt. T-1 (Field)
12.	Sh. R.B. Baria	Tech.Asstt. T-1 (Field)
13.	Sh. S.P. Yeole	Jeep Driver T-1
14.	Sh. B.A. Dahale	Tractor Driver T-1

ADMINISTRATION

15.	Sh. B. Sathish	A.A.O.
16.	Sh. S.C. Sharma	A.F.A.O.
17.	Smt. S.S. Joshi	Assistant
18.	Sh. D.B. Mundharikar	Stenographer
19.	Sh. S.P. Kandwal	Sr.Clerk
20.	Sh. P.S. Tanwar	Sr.Clerk
21.	Sh. S.U. Vyas	Jr.Clerk
22.	Sh. Rajan Dedage	Jr.Clerk
23.	Mrs.Neha Gaikwad	Hindi Typist

SUPPORTING

24.	Sh. P.E. Tadge	Lab. Attendant
25.	Sh. P.R. Sonawane	Lab. Attendant
26.	Sh. R.S. Kulkarni	Lab. Attendant
27.	Sh. M.S. Kale	Messenger
28.	Sh. N.H. Sheikh	Messenger
29.	Sh. S.D. Waghmare	Watchman
30.	Sh. Sunil Said	Beldar

सारांश

राष्ट्रीय प्याज एवं लहसुन अनुसंधान केंद्र ४ जुलाई, १९९४ को स्थापित किया गया। केंद्र का १०० एकड़ फार्म निफाड तहसील, जिला नाशिक में था, जो कि नाशिक से ४० कि. मी. दूरी पर था। मई १९९७ तक केन्द्र में सिर्फ एक वैज्ञानिक तथा कुछ प्रशासनिक कर्मचारी मौजूद थे। फार्म की दूरता, सिंचाई की कमी तथा वैज्ञानिकों एवं निदेशक की देरी से नियुक्ती के कारण केन्द्र की स्थापना कार्यन्वित प्रकार से नहीं हो सकी। इन कठिनाइयों के कारण, भारतीय कृषि अनुसंधान परिषद ने इस केन्द्र को नाशिक से केन्द्रीय आलू अनुसंधान संस्था के क्षेत्रिय केन्द्र, राजगुरुनगर जो कि पुना से ४३ कि. मी. दूरी पर पुना नासिक राजमार्ग पर है, १६ जून १९९८ की स्थानांतरित किया गया।

स्थानांतरण के तुरंत बाद, फार्म के विकास, सिंचाई व्यवस्था, पुरानी इमारतों की मरमत, मुख्य मार्ग, पीने के पानी की व्यवस्था, बिजली सम्बंधी सुतनीकरण, नए उपकरणों की खरीदारी इत्यादी पर प्राथमिकता दी गई ताकि सहायक कार्य की शुरुआत हो सके। सहायक वित्त एवं लेखा अधिकारी तथा अन्य अधीनस्थ पद जो कि स्थापना से ही रिक्त थे, उनकी पूर्ति की गई। ६१५ लाख का ई. एफ. सी. लेखापत्र तैयार एवं प्रारित किया गया। प्रशासनिक विभाग तथा प्रयोगशाला की इमारत एवं निवासस्थान का मुख्य नक्शा बनाया गया तथा स्वीकृति के लिये भेजा गया।

टीशयू कल्चर, मृदा विज्ञान और उत्पादन तकनीक, पौध संरक्षण प्रयोगशाला एवं एरिस शाखा की स्थापन जरूरी उपकरणों के साथ किया गया। इसके अतिरिक्त संशोधन कार्यों जो कि हमारे केन्द्र के उद्देश से मेल खाते हैं, पर जोर दिया गया। लाल प्याज में रोग प्रतिकारक किस्मे / संकर का विकास, कम दिन वाले संकरों का विकास, लेट खरीफ मौसम के लिए जाति / संकर का विकास तथा सफेद प्याज में प्रक्रिया के लिए ज्यादा टी. एस. एस. वाले किस्मों के विकास पर मुख्य ध्यान दिया जा रहा है। लहसून में निर्यात के लिए बड़े आकार वाले कन्द जरूरी होते हैं। आमतौर पर बड़े आकार का लहसून उत्तर भारत के पहाड़ी इलाकों में उगाया जाता है। कम तापमान और छोटे दिन वाले इलाके में बड़े कन्द वाले लहसुन उगाने के लिए किस्मे तैयार करना जरूरी है। चूकी लहसुन में कोई बीज नहीं बनता, किस्मों को विकास करना कठिन होता है। बायोटेकनालजी के द्वारा लहसुन में विविधता विकसित करके किस्मों पाई जा सकती हैं। इस कार्यक्रम के उपर खास ध्यान दिया जाएगा।

दोनो फसलों को पर्पल ब्लॉच, कोलेटोट्राइकम, सटेमफीलियम ब्लाइट जैसे फफूंदों और श्रीप्स जैसे कीटों से बहुत नुकसान होता है। कोलेटोट्राइकम और पर्पल ब्लॉच का विस्तार खरीफ और उसके उपरान्त तथा रबी में स्टेमफीलियम ब्लाइट फसलों को अत्याधिक नुकसान पहुंचता है। खरीफ ऋतु में ज्यादा वर्षा, बादल एवं गर्म वातावरण बीमारियों को बढ़ावा देता है जिसके कारण ६०-८० प्रतिशत तक फसलों में नुकसान होता है। खरीफ और रंगडा मौसम के फसलों के खराब होनेसे, घरेलू व्यापार में अक्टूबर - फरवरी जौक प्याज उत्पादन मुख्य समय होता है, उसमें बाधा पहुंचता है। खरीफ और लेट खरीफ फसले देश के प्याज उत्पादन में ४० प्रतिशत योगदान देती हैं। और इस लिहाज से यह दोनो ऋतुओं में प्याज की देखभाल एक अहम भूमिका निभाती है।

एकरूपी आकार, बनावट, रंग एवं एक समय पर पकना के कारण संकर प्याज के किस्मों की मान्यता है। भारत में छोटे दिन वाली और लगभग १०० प्रतिशत खुले संकरणवाली प्याज की किस्में उगाई जाती हैं। प्याज में नर नपुंसकों के द्वारा अच्छे संकरों का विकास करना बहुत जरूरी है।

मुख्य क्षेत्रों को एवं उद्देश को ध्यान में रखते हुए, संशोधन कार्य तैयार किए गए हैं एवं इस दिशा में संशोधनों का रेखाचित्र बनाया गया है। इस साल के प्रतिवेदन में ५३९ प्याज की तथा २६९ लहसून की किस्मों को इकट्ठा किया तथा उनका परीक्षण किया गया। चुनी हुई किस्मों की स्वयं संकरण के द्वारा बढ़ाया / दुगुणा किया गया। खरीफ और रंगडा मौसम के लिए, प्याज में बसवंत ७८० अन्य किस्मों से ज्यादा अच्छा पाया गया। रबी मौसम में एन-२-४-१ और एग्रीफाऊंड लाईट रेड किस्मों में ज्यादा पैदावार पाई गयी जो पहली दी गई हिदायतों को निश्चित करती है। लगभग ६५ विदेशी किस्मों का खरीफ रंगडा और रबी ऋतुओं में परीक्षण किया गया। बहुत सारी विदेशी किस्मों का प्रयोग रंगडा ऋतु में बेहतर पाया गया। मरसीडीज, रियो हॉंडा और एच-९ किस्में अच्छी पैदावार और कंद वजन के अनुसार में अच्छे पाए गए। लहसून की सभी विकसित किस्मों में जी-४१ एवं उसके बाद जी-२८२, अच्छी पायी गई। परीक्षित कि गई सभी किस्मों में से नम्बर १५, २६९, २४८, १८१, २२५ काफी अच्छे पाये गए। एक्शेशन नम्बर २२५ ज्यादा पैदावार वाली और एरीयोफीड माइट एवं थ्रीप्स के लिए प्रतिरोधक पाई गई। पुना और अहमदनगर जिलों के मुख्य प्याज उगानेवाले क्षेत्रों में खरीफ और रबी ऋतु में रोग एवं कीटों की विस्तार के लिए निरीक्षण किया गया। हर ग्राम में खरीफ ऋतु में कोलेटोट्राइकम और पर्पल ब्लॉच ५० प्रतिशत से भी ज्यादा इलाके में पाया गया।

डाइटेल्सिकस सुत्रकृमी का विस्तार भी कई क्षेत्रों में देखा गया। रबी मौसम में सटेमफीलियम और फरवरी में थ्रीप्स कीट का ज्यादा फैलाव पाया गया।

१५ फरवरी, १९९९ को आर. ए. सी. सदस्यों की बैठक हुई जिसमें केन्द्र के उद्देश और अनुसंधान कार्यों का जायजा लिया गया। एवं विस्तृत तकनीकी कार्यक्रमों को अन्तिम स्वरूप दिया गया।





G-50



AGRIFOUND
PARVATI



G-11



G-1



YAMUNA SAFED



MP LOCAL



G-282

राष्ट्रीय प्याज एवं लहसुन अनुसंधान केन्द्र