

Azad ajwain-1 : a new high yielding disease resistant variety

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ABSTRACT

The varietal improvement programme of Ajwain was successfully undertaken at Department of Vegetable Science, Kalyanpur, C.S. Azad University of Agriculture and Technology, Kanpur. The available pure genetic stocks of ajwain were thoroughly screened for various yield contributing character and other desirable traits including major diseases. Based on the earliness, yield potential and disease reaction the accession 9401 was found most promising by giving 15 days earlier yield of 11.74 q/ha, 56.74 per cent higher over the check. It was also found resistant to *Sclerotinia sclerotiorum* infection under artificial epiphytotic conditions. However, the accession 9401 released as a variety with the name of Azad Ajwain-1 in year 2001 by the U.P. State Variety Release Committee.

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Ajwain (*Trachy spremum ammi* L.) is an important seed spice grown extensively in Uttar Pradesh during winter season. It is commonly cultivated for its seed as well as thymol extraction, which is of great medicinal value. Seeds also yield essential at 1-4 per cent, which is used as antiseptic and perfuming agent. From Ajwain 20 tons essential all was produced in India in the year 1997 (Maiti, 2000). It has therapeutic uses in piles, stomochic, cough, indigestion, urticaria, tonsillitis, rheumatic and neuralgic problems. The vermifugal effect of leaves and diuretic and cerminative properties of root are also valuable. The low yield and quality of this crop is attributed due to lack of improved variety and poor quality of seeds used. Although, it is an important spice and medicinal crop included in the IPC. The herb is severely affected by sclerotinia color rot (Sattar and Alam, 1993) and has a resistant variety.

The present paper reports the findings of the work done on the improvement in yield and resistance of *S. sclerotiorum* infection in this crop.

MATERIALS AND METHODS

Based on the yield and other ancillary traits seven promising lines viz., 9401, 9402, 9101, 9001, 9202, 9301, 9003 along with one local check were sown. The bulk seed of selected plants was sown during 1994-95 and again promising plants were selected. The cycle was repeated during 1995-96 and 1996-97. finally the bulked seed of these promising lines were procured for conducting the yield evaluation trail. Thus a trail consisting of 7 lines and a check was sown in randomized block design with four replication repeatedly for 4 years 1997-2000 at Deptt. of Vegetable Science, Kalyanpur. The location trail was

also conducted during 1998-99 both at Kalyanpur and Saharanpur.

These lines in addition to yield were also evaluated for their reaction against root and stem rot disease caused by *Sclerotinia sclerotiorum* in natural and in disease sick plot. Hundred plants were randomly selected and were tagged. These were scored finally for their reaction against the disease following the grades described as below: 0=no infection-free(F), 1=1-5 branches infected-Resistant(R), 2=6-10 branches infected-Moderately resistant (MR), 3=11-25 branches infected-Moderately susceptible (M>S) 4=26 and above branches infected-susceptible(S) and 5=stem/root infected-Highly susceptible (H.S.).

RESULTS AND DISCUSSION

The performance of seven selected lines from the collection of pure genetic stock of ajwain revealed that line 9401 has given maximum average seed yield of 11.74 q/ha which was significantly higher than check yielding 7.49 q/ha registering an increase of 56.74 per cent over a period of 4 years. It has also given highest seed yield of 11.74, 11.69, 11.56, 12.66 q/ha during 2000-2001, 1999-2000, 1998-1999 and 1997-98, respectively. Similar results were obtained by Srivastava *et al.* (2000) in nigella. It has yielded 3.33 q seed per ha. which was higher than other varieties at Saharanpur, though the level of yield was poor due to adverse weather conditions. Besides, it was 15 days earlier in seed maturity and produces bold seed which contribute to enhance the market value of the variety. The variety has profuse branching with higher number of umbels per plant (40-45) and seeds per umbel (140-160). The high seed return was achieved under application of 50 kg each of nitrogen and phosphorus per

Table 1 : Important characteristics feature of variety Azad Ajwain-1

Sr.No.	Characteristics features	9401	Local Check
1.	Days to flower	90-100	100-110
2.	Days to maturity	155-165	170-180
3.	Plant height (cm)	90-100	100-110
4.	Number of primary branches	7-8	5-6
5.	Number of secondary branches	30-35	25-30
6.	Number of umbles per plant	40-45	30-35
7.	Number of umbellets/umbel	15-18	10-12
8.	Number of seeds/umbel	140-160	125-145
9.	Average yield (q/ha)	11-12	7-8

Table 2 : The yield performance of selected promising lines during 1997-2001

Lines	Average Yield q/ha					% Increase over check
	2000-01	1999-2000	1998-99	1997-98	Average	
9401	11.00	11.69	11.56	12.66	11.74	56.74
9402	10.66	10.93	10.75	10.76	10.77	43.79
9101	9.06	9.53	8.66	9.16	9.10	21.49
9001	9.20	8.69	8.16	7.83	8.7	16.15
9202	8.67	8.49	7.33	8.33	8.20	9.47
9301	8.40	8.16	7.93	7.34	7.95	6.14
9003	7.20	6.96	6.51	5.99	6.66	(-)11.08
Check	8.53	7.54	6.83	7.8	7.46	-
C.D. (P=0.05)	0.67	0.90	3.08	1.91	-	-
C.V.%	5.50	6.78	24.61	13.73	-	-

ha, at spacing of 30cm and seed rate of 5 kg per ha.

The result of natural screening of Azad Ajwain-1 revealed that average incidence percentage of sclerotinia root and stem rot of ajwain was 2.00. In artificial inoculation disease intensity was recorded 4.6 per cent, while it was 35.4 per cent in most susceptible check 9301 consequently Azad Ajwain-1 was found resistant to

Table 3 : Natural screening of Azad Ajwain-1 alongwith seven lines including check against root and stem rot disease caused by Sclerotinia sclerotiorum

Lines	No. of plants	Disease % Incidence		Total	Average % Incidence	Reaction
		97-98	98-99			
Azad Ajwain-1	100	3.00	1.00	4.00	2.00	R
9402	100	7.00	10.00	17.00	8.50	MR
9101	100	12.00	10.00	22.00	11.00	MS
9001	100	20.00	23.00	43.00	21.00	MS
9202	100	23.00	26.00	49.00	24.50	MS
9301	100	25.00	21.00	46.00	29.00	S
9003	100	32.00	25.00	57.00	28.50	S
Check	100	18.00	15.00	33.00	16.50	MS
Local						

Table 4 : Reaction of root and stem rot disease caused by Sclerotium against Azad Ajwain-1 under artificial condition

Variety	No. of plants	F	R	MR	MS	S	HS	Disease intensity %
Azad Ajwain-1	100	98	5	3	0	3	0	4.6
9301 (Susceptible line)	100	41	15	6	10	20	8	35.4

Sclerotinia root and stem rot in natural as well as in artificial conditions.

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