



Assessment of Cumin (*Cuminumcyminum* L.) Diversity in Arid Region of Rajasthan

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Cumin (*Cuminum cyminum* L.), one of the oldest seed spice, is believed to be a native from the east Mediterranean to east India. Originally cultivated in Iran and Mediterranean region, today it is mostly grown in Iran, Uzbekistan, Tazikistan, Turkey, Morocco, Egypt, India, Syria, Mexico, Bulgaria, Cyprus and Chile. It is the second most popular spice in the world after black pepper. Within India, it is extensively cultivated in Rajasthan, Gujarat and in some parts of Madhya Pradesh as rabi crop. The climatic conditions found in the two states of Rajasthan and Gujarat are more favorable for cumin cultivation, these two states contributes more than 80% in National area and production status. Cumin crop is grown in October - November and harvested in March – April, it is only grown for seed purpose as a cash crop, and the seeds also bear very high export value. It is also used in food and beverages industry as spice and condiment. Cumin seeds are used as spice for their distinct aroma, traditionally added to chilli, curries and other food preparations. India is the largest producer and consumer of cumin seed in the world. ICAR-NBPGR, New Delhi regularly conduct exploration to based on gap analysis to cater maximum diversity of cumin crop for widening the gene pool. The exploration and conservation of spices germplasm is the prime need of hour for searching the gene for the crop improvement programme. Germplasm are the key sources for incorporating the trait of interest in the cultivated varieties. Evaluation of germplasm resources is necessary to identify the appropriate germplasm with a target trait for their further utilization. Along with the explosion in the population, climate change also demanding more from agriculture. Under such context germplasm of crops, which could withstand better under biotic and abiotic pressures, are the keys for sustainability in agriculture.

Table1: Nutritional value of cumin seed

Sr. No.	Nutrient	Value/ 100g
1	Energy	1500-1700 kcal
2	Carbohydrates	42-46 g
3	Sugars	2-2.5 g
4	Dietaryfiber	9-11 g
5	Fat	21-24 g
6	Saturated	1-2 g
7	Protein	16-18 g
8	Water	7-9 g
9	Vitamin A equiv.	62-64µg(7%)

10	Riboflavin(Vit.B2)	0.3-0.35mg
11	Niacin(Vit. B3)	4-5 mg
12	VitaminB6	0.4-0.45mg

Source: Sowbhagya et al. 2008

Table2: Area and production of cumin 2021-22

Name of Crops	Scientific Name	Family	Variety	Area (000,Ha)	Production (000,Tonnes)	Yield (Kg/Ha)
Cumin	<i>Cuminum cyminum</i> L.	Apiaceae	RZ-19,RZ -209,RZ -223, RZ-345, GC-1, GC-2, GC-3,GC -4	1241.2	856.5	690

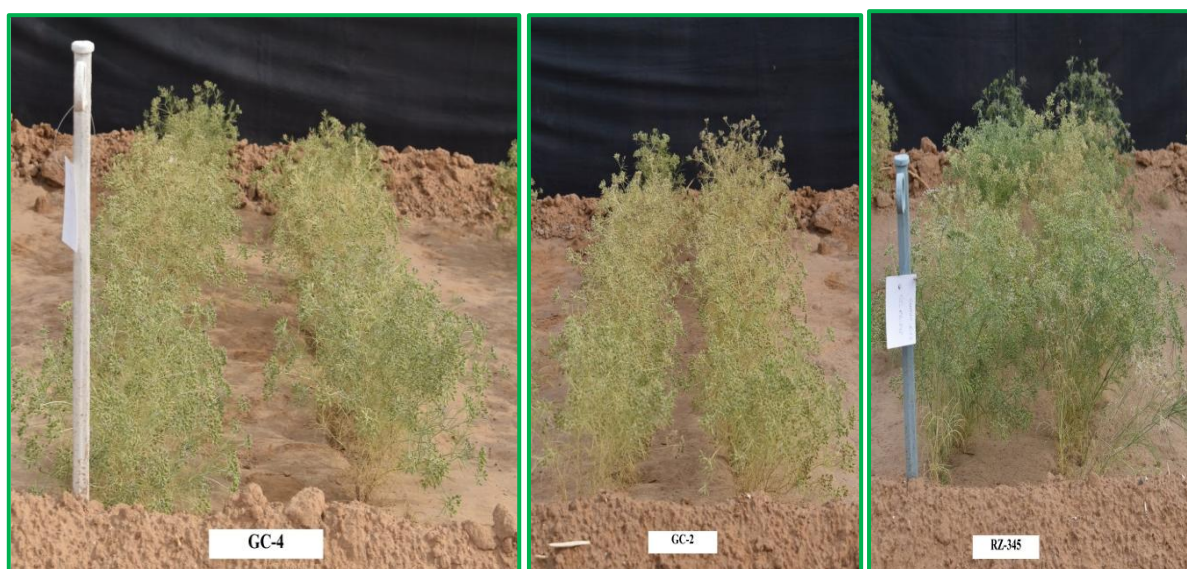
Source: Area& Production from , DASD, Calicut June 2021

Table 3 Salient features of cumin popular varieties

Sr. No.	Variety	University developed	Maturity days	Yield q/ha	Distinguish character
1.	RZ-19	SKNAU, Jobner, Raj.	120-140	5-6	It was developed through recurrent single plant progeny selection from local collection of Kekri (Ajmer).
2.	RZ-209	SKNAU, Jobner, Raj.	140-150	6.5	It was developed through recurrent single plant progeny selection in a local collection from Ahore (Jalore). The plants are erect in growth behaviour, bear pink coloured flower and bold grey pubescent grains.
3.	RZ-223	SKNAU, Jobner, Raj.	120-130	6.0	It was developed through mutation breeding in UC-216. The plants are bushy, semi erect and long bold attractive seeds. It has wider adaptability.
4.	RZ-345	SKNAU, Jobner, Raj	120-130	6.07	The variety has been developed through recurrent selection based on individual plant progeny performance in accession 345. The plants are bushy and semi-erect with long and bold seeds, attractive, higher volatile oil content with lesser Infestation of wilt, blight and powdery mildew. This variety is most suitable or Rajasthan and Gujarat.
5.	GC-1	SDAU, Jagudan, Gujarat	105-110	7.0	The variety has been developed from local germplasm. The plants are bushy and spreading with pink flowers, grains bold, linear oblong, withstands shattering and lodging.

6.	GC-2	SDAU, Jagudan, Gujarat	100	7.0	This variety has been developed through pure line selection. The plant are bushy with good branching habit, grains bold, medium sized, lustrous grain. It is moderately tolerant to wilt and blight and is suitable for late sowing season.
7.	GC-3	SDAU, Jagudan, Gujarat	100	7.0	Developed through selection from exotic line. It is also resistant to wilt and frost, suitable for winter season with limited irrigation.
8.	GC-4	SDAU, Jagudan, Gujarat	100	8.7	This variety has been developed through selection from GC-3. This is very popular variety of cumin because of its resistant to <i>Fusarium</i> wilt and higher yield performance.

Source :(Anandarajet al. 2007 & Mohiret al 2021)



Improved varieties of cumin

Evaluation of cumin germplasm

As cumin has limited area and the study of the genetics and inheritance of complex traits (yield, quality, disease and pest) in this crop is very limited. Hence, about 200 accessions of cumin evaluated in augmented block design (ABD) in Rabi 2022-2023 for agro morphological traits. Analysis of variance for agro-morphological characters showed in significant differences among the studied accessions indicating existence of wide variability. Data were recorded Days to germination, plant vigor, Days to flower initiation, Days to 50% flowering, Days to 80% maturity, Plant height (cm), Primary branches, Secondary branches, Umbel/plant, Umbellate/ umbel, No. of seeds/umbellate and 1000 seeds weight(gm). The promising accessions identified were IC 640192 (60days), for early flowering and IC612023 early maturity(104 days) respectively. IC611996 and IC632089 identified for hairy seeded while IC 574097 for higher no umbel per plant(112).



Field view of experiment



Superior accession identified for hairiness IC632089



**Promising accession for early maturity
IC640192**



**Identified accession for higher no of
umbel per plant IC 574097**

Future Prospects

The seed spices are low volume, high value and export oriented agriculture commodity. Among the seed spice cumin is an important crop and plays key role in human nutrition. Therefore it is necessary that more emphasis has to be given for collection of diversity with wild relatives for identify the source of resistance to wilt and blight the major disease in Rajasthan besides improving the productivity.