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Analysis for causes of low productivity, measures for yield sustainability for cumin in Barmer district of Rajasthan

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Abstract

Present studies done to analysis for causes of low productivity, measures for yield Sustainability for Cumin in Barmer District of Rajasthan. Present finding shows that Inadequate crop stand of seed spices caused by poor and late germination, Practice of mono-cropping, Lack of high yielding variety seed, Short stature and slow initial growth of seed spices, Prolonged cloudy weather coupled with higher atmospheric humidity and application of excessive irrigation/ rainwater during reproductive phase, Excessive application of nitrogen and irrigation these are main causes of low productivity of seed spices.

Keywords: low productivity, high yielding variety, mono-cropping, seed spices

Introduction

The seed spices constitute an important group of agricultural commodities and play a significant role in our national economy. India alone produces about 2.5 million tones of spices valued at about 7000 crores but our strong domestic demand absorbs over 90% of the total production. Seed spices are also export oriented commodities and about 8% of total produce are being exported to abroad. 10% domestic production of seed spices is sufficient to meet the 55% demand of world. Seed spices are extensively used as flavoring agents in various food products and in pharmaceutical industry, especially in the preparation of Ayurvedic medicines. Seed spices are also used very frequently in home made medicines for different ailments. Now a days value added products such as the volatile oils and oleoresins obtained from spices are also in large demand in the international market. These volatile oils are also used in flavouring liquors and absorbing unpleasant smell of medicines.

Rajasthan and Gujarat states have emerged as "Seed spices Bowl" and together contribute more than 80 per cent of the total seed spices produced in the country. The crop covered as major seed spices are coriander, cumin, fennel and fenugreek whereas Ajwain (Bishop weed), Dill (Sowa), celery and kalonji (Black cumin) constitute minor group of seed spices.

Rajasthan alone contributes about 50% of coriander, 60% of cumin, 51% of fenugreek and 10% of fennel production of the country. Cumin plays a major role in export oriented crop production in barmer district as well as in Rajasthan. These crops have specific agro-climatic requirements for their successful cultivation. A cloud free bright weather with low atmospheric humidity particularly during grain formation period and well drained soils are crucial factors for both production and quality of cumin.

Since, climatic conditions prevailing in the State of Rajasthan meet these requirements, therefore, the State has great potential for development of spices having an average area of 10.04 lac ha. with annual production 13.91 lac tones.

The cropwise contribution of Rajasthan State in area, production and productivity of different seed spices (2016-17).

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Table 1: The cropwise contribution of Rajasthan State in area, production and productivity of different seed spices (2016-17)

Seed spices	India		Rajasthan		%state share (production)
	Area (ha)	Production (tone)	Area (ha)	Production (tone)	
Coriander	665190	866800	181710	206960	23.88
Cumin	780950	500380	500140	206940	41.36
Fenugreek	219720	311280	129710	157930	50.74
Fennel	89580	148640	45200	56240	37.84

Source: State Agri/Hort. Departments/DASD Kozhikkode

Thus, Rajasthan had contributed a major share in area as well as production of Coriander, Cumin & Fenugreek but the productivity of the Cumin & Fennel is still far below the National level. The average productivity and quality

components of Indian seed spices is very low. However, research evidence show that the yield and quality components of these seed spices can be improved by adopting improved agro- techniques.

Table 2: The major seed spices producing districts in Rajasthan

Coriander	Baran, Jhalawar, Kota, Bundi, Chittorgarh
Cumin	Jalore, Barmer, Nagaur, Pali, Jodhpur, Ajmer, Bhilwara, Tonk
Fenugreek	Jaipur, Nagaur, Sikar, Jhunjhunu, Kota, Baran, Jhalawar Chittorgarh
Fennel	Sirohi, Tonk, Ajmer, Jodhpur, Pali

Rajasthan, being a major producer of seed spices, its share in export is certainly high but unfortunately the commodities produced in the State are being routed through the Unjha Mandi of Gujarat & therefore, the exact share of Rajasthan in export of seed spices is not being properly reflected at National level. However, a brief resume of export made directly from Rajasthan during last few years is given below:

Year	Export quantity (tones)
1996-97	60
1997-98	80
1997-98	541
1998-99	541
99-2000	425

Upal Mandis are being promoted exclusively for export marketing of spices

Mandi	crop
Mertacity	Cumin
Ramganj	Coriander
Sumerpur/Rani	Fenugreek
Jodhpur	Fenugreek, Chilli
Abu Road/ Raedor	Fennel
Jaipur, Sikar	Fenugreek, Cumin

Constraints for low yield and measures to augment their productivity

1. Inadequate crop stand of seed spices caused by poor and late germination which is mainly due to quick drying of upper surface on account of low native organic matter content and poor water holding capacity of the spices growing soils. It is, therefore, of utmost importance to apply 10-15 tones of FYM or 10 q/ha of organic amendments like mustard/ neem/ castor cake for obtaining uniform plant population.
2. Practice of mono-cropping may lead to severe invasion of fungal inoculum in the soil which may persist for longer period of time. Therefore, follow three year rotation accommodating seed spices once in three years. Furthermore, it is recommended to do summer ploughing where ever possible, for exposing soil to sunlight for destroying soil insects- pests, fungal spores and weed seeds.
3. Lack of high yielding variety seed in adequate quantities

is another factor of low productivity. Presently one or two varieties of each seed spices are available for cultivation in the State. The non-availability of certified seeds of these varieties in required quantity is major constraints of low seed replacement rate. Only small quantity of TFL seed of RCr 41 of coriander, RZ 19 & GC-4 of cumin and RMt 1 of fenugreek is being made available by seed producing agencies in the State. Thus, concept of own seed production at village level may alleviate the problem to certain extent.

4. Short stature and slow initial growth of seed spices like cumin and coriander face severe early crop-weed competition as weeds emerge out earlier than the crop plant. Weeds not only compete for moisture and plant nutrients but also act as alternate host for harborium insects and pathogens. It is, therefore, essential to control the weeds by applying pre-emergent herbicide. Surface/ sprinkler irrigation applied 10 days after sowing for obtaining uniform germination, would cause soil compaction which, in turn is not congenial for better growth and development of the crop plant. To combat this problem, one hoeing at 30-35 DAS should be super imposed to herbicidal application for better soil aeration.
5. Prolonged cloudy weather coupled with higher atmospheric humidity and application of excessive irrigation/ rainwater during reproductive phase may accelerate invasion of pests and diseases, thereby resulting in poor seed yield. Therefore, seed spices should be sown at the recommended time coinciding seed formation stage with cloud free weather with low atmospheric humidity. Proper irrigation schedule should be adopted.
6. Excessive application of nitrogen and irrigation water may lead to more succulency in the foliage parts, which are prone to higher infestation of pests and diseases. Balanced fertilization (NPK) should be given as they create in-built resistance in the plant against diseases and pests due to proliferation of root and shoot growth. They also help in better partitioning of the source to sink for producing quality seed.
7. Some of the diseases like wilt and blight in cumin, root rot in fenugreek, stem gall in coriander and gummosis in fennel have so far evaded effective control measures. Breeding programme for resistant for these diseases

needs to be initiated.

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1. Efforts to bred high yield potential, disease resistant varieties suitable for different agro-climatic conditions of the State should be accelerated.
2. Mutation breeding programme to enhance more variability is desirable.
3. Quality of produce pertaining to oil content, size and luster of grain, needs special emphasis to enhance export of seed spices.
4. Seed spices based cropping system research work must be undertaken.
5. Extending research activities on ajwain, suwa and kalonji in the State are needed as these crops are being grown in sizable area.
6. Development of organic farming production technologies.
7. Development and perfection of the IPM module for different seed spices needs to be stressed.
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