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Stem gall resistant coriander variety ACr-1 grown as relay cropping with safed musali – A success story

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Coriander is grown as seed spices purpose in rabi season and leafy vegetable purpose in summer and rainy season in Baran district of Rajasthan. Seed spices, an important group of horticultural crops, are defined as vegetable products or mixture thereof, free from extraneous matter, primarily used for flavouring, seasoning and imparting aroma to foods. Rajasthan and Gujarat have been emerged as "Seed spice bowl" and together contribute more than 80% of total seed spices produced in the country (Lal *et al*., 2012) and to some extent grown in Andhra Pradesh, Gujarat and Madhya Pradesh. Among the seed spices coriander is the main seed spice crop of Baran district of Rajasthan. The coriander is sold in market in the nick name of *'haroti dhania'*. The bold seed size is the prime liking of the district farmers.

Baran district of Rajasthan is famous for coriander cultivation account for 52781ha land during the year 2014-15 and highest acreage of 85432 ha covered in the year 2011-12. The other spices like fenugreek, fennel, nigella, ajwain grown to some extent. Natural resources are changing day by day due to the changing of earth revolution, light radiation, moon shining, earth gravitational force, wind velocity, temperature and rainfall etc (Singh, *et. al.,* 3). The production and productivity of coriander was drastically reduced (7.0q/ha) during the year 2013-14 and 2014-15 due to the severe incidence of stem gall disease in commercial cultivated varieties Rcr 436 and CS 6. In winter season about 40-45 days were fogginess and lacking of sunshine during the year 2013-14 and 2014-15.

The variety Acr 1 can be grown as relay cropping in safed musali medicinal plant. Cultivation of secondary crop in standing condition of main crop in field is called *'relay cropping'*. Safed musali is grown successfully in Baran district and the occurrence of wild safed musali is common in forest area of Kisanganj and Shahabad tehsil. The main crop safed musali is sown in the month of June-July and harvested in the month of January-February for processing purpose and March- April for seed production. In winter season the main crop become dormant with the drying of leaves. The dormant period is suitable for the sowing of coriander during the month of October-November. The cultivation of coriander as a rely cropping was in operation in Garpat Lal Nagar safed musali field since 2009-10 and his field was visited by Honerable Vice Chancellor of M.P.University of Agriculture and Technology, Udaipur (Fig.1).The digging of safed musali was done after the harvesting of coriander i.e. last week of October. The dormant period of safed musali is successfully utilized by the cultivation of coriander crop in minimum irrigation requirement.

Garpat Lal Nagar is a progressive farmer grows commercial cultivation of safed musali and other medicinal plants since a decade. He started the cultivation of safed musali from 0.5 ha in 2001-02 and increased to 2.5 ha during the year 2014-15. His farm is situated 10 kilometres away from the Krishi Vigyan Kendra, Anta on NH76 Kota-Baran road. Now he processed the musali in different products like dried musali, musali pak, musali powder and msali granules etc. He received the national level prestigious ICAR Jagjeevan Abhinav awards-2011 for the commercialization of safed musali cultivation and its processing and innovation of safed musali peeling machine and Mahindra and Mahindra award-2012.His products of medical plants are also found best in different competition and got first prize in different national, state and district level exhibition, kisan mela and shows etc. at different places in India. He installed the drip irrigation system in 2.0 ha piece of land with solar pump were selected for the cultivation of safed musali along with the relay cropping of coriander.

The NRCSS, Ajmer demonstration of coriander was started since 2009-10 in Baran district of Rajasthan. The coriander variety ACr-1 was tested at four farmer's field in 2.0 ha piece of land in Bagli, Chatrapura, Udpuria and Bhawargarh village of Baran district of Rajasthan during the year 2013-14 in collaboration of NRCSS, Ajmer. The yield of coriander was found better and resistance of stem gall disease and due to its better performance the demand of this variety was drastically increased in the

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year 2014-15. Our centre conducted the front line demonstration of coriander variety ACr-1 in 20 ha land at 100 farmers field and Kisan Call Centre, Anta demonstrated the same variety in 10 ha land at 50 farmers field for seed production during the year 2014-15 covering whole district area.. About 10 q seed of coriander produced by four farmers during the year 2013-14 were distributed to other district famers for cultivation in 2014-15. The coriander seed were sown in last week of October and harvested in last week of March in both the year. All cultural operations were carried out as per schedule of package of practices. The performance of front line demonstration variety ACr-1 were compared with local varieties grown by farmers are RCr-436 and CS-6. The progressive farmer's of the district were perceive the latest technologies and live demonstration from NRCSS, Ajmer through kisan mela, trainings , workshops and symposium since 2009-10. The total of 16 .10 q seed was distributed among the 300 farmers in whole district during the year 2014-15 (table 1).

Table 1: Area and distribution of coriander seed Variety ACr-1 during the year2014-15.

SNo.	Seed Distribution Agency	Quantity (Q)	Area Covered (ha)	No of farmers
1.	K.V.K.,Anta	4.10	20	100
2.	Kisan Call Centre	2.00	10	50
3.	Farmers own seed	10.00	50	150
	Total	**16.10**	**80**	**300**

Performance of coriander variety ACr-1 was better than commercially grown varieties RCr-436, CS-6 and local in whole Baran district of Rajasthan during the year 2014-15 (Table-2). The height of coriander variety RCr-436 was recorded lowest (55.37cm) only due to the severe incidence of stem gall disease and the plant growth is affected. Boldness of the variety RCr-436 was higher than ACr-1. Highest yield (11.98q/ha) of variety ACr-1 was recorded in field of Garpat Lal Nagar during the year 2014-15. Similar increase in yield of coriander variety ACr-1 was also reported by Lal *et.al* (1) due to the resistant os stem gall disease in Baran district of Rajasthan. The increase of yield was due to the increase the number of branches per plant. Although the yield performance and seed boldness of the variety RCr-436 and CS-6 was liked by the whole district of the famers but incidence of disease failure the crop yield. Vegetative growth and seed of the variety RCr-436 and CS-6 was severely affected by stem gall disease during the year 2014-15. The highest yield performance of ACr-1 was due to the free from the stem gall disease and minimum injury against frost to the plant (Fig 2). Lower yield of coriander was due to occurrence stem gall disease and frost injuries during vegetative growth and flowering period. However, the variety grown by the farmers under the demonstration programme of NRCSS, Ajmer was found resistant against stem gall disease and it is also used by the farmer for green leaves purpose.

Farmer's reaction: The farmer's response of the variety ACr-1 is given below:

1. It is resistant to stem gall disease.
2. It is useful for seed as well as leafy vegetable purpose.
3. Seed size is small. The district farmer requires bold seed varieties.
4. It takes about 140-145 days to maturity.
5. The height of plant increased up to 123 cm but lodging was not occurred.
6. Yield performance of this variety ACr-1 was superior to other variety during both the year.

Extension Activities: First time only progressive farmers are adopted the variety for cultivation. The other farmers are not interested to sown the seed due to the small seed size. Since two years the occurrence of continuous humidity up to 45 days during the December-January and the coriander crops are severely affected with the diseases. The variety ACr-1 was only safer under such condition. A field day was organised at Bagli during the year2013-14 and an oil extraction company representative was also visited in the field of coriander grower farmer Arjun Lal Nagar. During the year 2014-15 the cultivation of coriander was become highlighted in Rajasthan Assembly due to the severe incidence of stem gall disease and Honourable Agriculture Minister Shri Prabhu Lal Saini visited several times to the field of coriander. In this situation he instructed to the government

agency to supply resistant coriander variety ACr-1 to the farmers. This variety was also discussed in SAC meeting of Krishi Vigyan Kendra, Anta, ZREAC meeting at ARS, Kota and other different plate form. Its performance was also coverage in different news papers for long time. A field day was also organised during the year 2014-15 at village Balapura and convey to the farmers to save the produce as a seed for the year 2015-16.

Table 2: Performance of coriander variety ACr-1 during the year 2014-15

Treatment	Plant height(cm)	No of branch	Root		No of umbellets umbel^{-1}	No of seed umbel^{-1}	1000 seed wt.(g)	Yield q ha^{-1}
			Number	Length (cm)				
ACr-1	123.14	39.39	18.27	18.40	7.1	59.33	11.32	11.98
RCr-436	55.37	29.78	10.43	11.01	7.0	43.02	15.26	6.32*

The yield of coriander variety RCr-436 was low only due to the severe incidence of stem gall.

Fig 1: Demonstration field of coriander variety ACr-1

Fig 2: Inter cropping of coriander in standing musali crop

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