



Shalimar Kala Zeera-1: First Variety of Black Gold from Kashmir

(*Ajaz A. Lone¹, M.H. Khan², B.A. Alie², Z.A. Dar¹, G.H. Mir², AMI Qureshi², N.A. Dar² and S.A. Dar¹)

¹Dryland Agriculture Research Station, Srinagar

²Advance Research Station for Saffron and Seed Spices, Pampore

(Sher-e-Kashmir University of Agriculture Sciences & Technology of Kashmir)

* ajazlone@skuastkashmir.ac.in

Since ancient times, herbs and spices have been added to food to improve the flavor and organoleptic properties, but also as preservatives. In recent years, the essential oils and the herbal extracts from various species of edible and medicinal plants have attracted a great deal of scientific interest due to their potential as a source of natural agents to increase the safety and shelf life of foods and of natural biologically active compounds. Black caraway (*Bunium persicum* Boiss.) is a perennial aromatic and medicinal herb, distributed across temperate areas of the world and mostly restricted to the sub- alpine mountain slopes (Dar *et al.*, 2011). The black seed is used for culinary purposes and for flavoring foods and beverages. It is a temperate plant, economically important, naturally occurring in the dry temperature and elevated regions where the winter is severe and the ground is under snow in winter, because a long chilling period is essential for germination of seeds. At present, seeds of this valuable medicinal spice plant are extensively collected from natural habitats spread across potential niches spread in forests and grasslands in India, at higher elevations including arid zones ranging from 1600 m to 3300 m above sea level. The crop mostly grow as wild under natural conditions in mountain, open hilly grassy slopes, low alpine and table lands, as sub – populations, mostly across the hilly areas. The sub-populations across the state represent a great diversity of this plant species which is naturally maintained as valuable germplasm repositories and are the sources of high genetic variability.

The main depletion factor has been found to be the thoughtless and unscientific commercial collection of its seeds for rapid financial gains in poor rural foothills particularly. The competition for its seeds is so severe that, instead of collecting the ripe seed, the entire plant is removed even when the seeds are immature. The potential threat to this precious crop is posed by relentless extraction of seeds obtained from wild habitats like Gurez, Charisharief and Khrew belts of Kashmir. Its species grow wild in North Himalayan regions of India, Iran, Pakistan and generally it is native to central and Southern parts of Asia, with a wide geographical distribution in Iran.

One of the primary objectives of breeders is to increase the seed yield. Generally, yield represents the final character resulting from many developmental and biochemical processes (Mishra and Tewari, 2014), which occur between germination and maturity. Before yield improvements can be realized, the breeder needs to identify the causes of variability in yield in any given environment. Since fluctuation in environment generally affects yield

primarily through its components. Grafius (1960) suggested that individual yield components may contribute valuable information in breeding for yield.

Sher-e-Kashmir University of Agriculture Sciences & Technology of Kashmir during 2020 released first high Kala zeera variety with enriched aromatic essence. Till date kalazeera is mostly confined to natural habitat (forests) and is not in regular farming system in any of the agricultural systems. The reason being lack of high yielding variety with inbuilt tolerance to diseases so that it can adopt well as a regular commercial farming system in non-traditional plains of Kashmir. Reference variety (Natural Population – Kanzalwan selection) is highly susceptible to leaf blight and tuber rot as compared to candidate variety Shalimar Kalazeera - 1 exhibiting moderate resistance with an added advantage of high yield and high quality. The Shalimar Kalazeera -1 fits well to the regular farming system under non-traditional areas of Kashmir and exhibits distinct yield superiority over Natural Population (Kanzalwan selection) in all executed station, multi- environment & minikit trials revealing significant increase of 24.49% superiority over years and over locations in the target environment of Kashmir valley (Table 1). The benefit cost ratio of experimental variety Shalimar Kalazeera-1 is 1:5.14 against 1:3.59 of Natural Population (Kanzalwan selection) under Seed to tuber & 1:4.32 against 1:2.98 of Natural Population (Kanzalwan selection) under Tuber to tuber.

Table 1:- Performance of Shalimar Kalazeera-1 for seed yield over years

Genotype	Seed Yield (kg/ha)				Mean	% superiority over the check
	Year 1	Year 2	Year 3	Year 4		
Shalimar Kalazeera-1	380.0	410.0	393.0	396.00	394.75	24.49
Natural Population	281.0	315.0	300.0	296.16	298.04	
% increase	26.05	23.17	23.66	25.21		
CD (0.05)	13.10	11.20	16.16	14.50		
C.V %	7.10	8.90	5.30	4.90		



Fig:1 Different crop growth stages of Shalimar Kalazeera-1

The variety reveals moderately resistant reaction to Blight disease (*Alternaria* sp.) and tuber rot caused by *Fusarium* sp. over natural population (Table 2). Disease occurrence was the major obstacle for mass adaptation by the farming community. The variety also showed resistant reaction to Aphids and Semiloppers.

Table-2 Disease Reaction of Shalimar Kalazeera-1 to tuber rot caused by *Fusarium* sp. and Blight disease (*Alternaria* sp.) under field conditions

Variety	Tuber rot incidence (%)	Disease Reaction	Blight disease (<i>Alternaria</i> sp.) (%)	Disease Reaction
Shalimar Kalazeera-1	17.5	Moderately Resistant	11.9	Moderately Resistant
Natural selection (Kanzalwan selection)	39.0	Moderately Susceptible	30.5	Susceptible

Quality wise Shalimar Kalazeera-1 possess very good content of essential oils (Table-3) which makes it a precious spice and this makes it possible to fetch premium price for kala zeera as compared to the ordinary one available widely

Table-3: Essential Oil (%) content of Shalimar Kalazeera-1

S No	Genotype	Essential oil (%)					
		Seed	Primary umbels	Secondary umbels	Tertiary umbels	Stalk	Straw
1.	Shalimar Kalazeera-1	9.3	10.10	8.20	9.0	2.4	0.75
2.	Natural Population	7.5	8.10	6.45	7.25	1.91	0.68

Shalimar Kalazeera-1 is suitable to grow in a wide range of environments and presented the same major essential oil compounds in slightly varying proportions. This new variety shall serve as basis for the domestication of this plant with the aim to optimize essential oil yield with a high proportion of aldehydes. As Kala zeera has emerged as a potential high value crop for the hilly areas of the Himalayan region including the high altitude areas of the Kashmir valley. Domestication will lead to block relentless harvest of seeds encouraging its long lasting existence in Himalayan foothills. There is need to effectively pursue conservation efforts to save this high value medicinal plant besides niche specific deployment of this variety. Efforts are underway at SKUAST-K and elsewhere to effectively standardize the crop management practices as well as technological interventions to harness the potential of this crop across valley. The positive impact of the kalazeera value chain will not only provide income generation but will assure a quality product for our consumers thus providing sustainability to kalazeera farming system.

References

- Mishra, A. & Tewari, N. (2014). Effect of Date of Sowing on Yield and Yield Components of Castor (*Ricinus communis* L.) Cultivars under Irrigated Condition in Central Region of Uttar Pradesh. *International Journal of Modern Plant & Animal Sci-ences*, **2**: 26-32.
- Dar, Z.A., Zeerak, N., Wani, S.A. & Khan, M. (2011). Morpho-characterization of different populations of black caraway (*Bunium persicum* Bioss. Fedts) with respect to yield and yield traits across im-portant growing sites of Kashmir Valley. *Journal of Agricultural Biotechnology and Sustainable Devel-opment*, **3**: 60-64.
- Grafius, J. (1960). Does overdominance exist for yield in corn? *Agronomy Journal*, **52**.