



Germplasm Identified for Registration

Reviewed by

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UFSD-30 : Semi-dwarf fennel genotype for future breeding

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Tall fennel (*Foeniculum vulgare*) varieties are prone to lodging due to their excessive height, vigorous growth and hollow stems, especially under windy conditions or following irrigation at maturity. These challenges are compounded by the plant's high water requirement during early growth stages, which poses difficulties for cultivation in semi-arid regions. Additionally, developing an ideal fennel variety suited for limited spaces, urban gardening, intercropping and commercial-scale production has long been a challenge. Addressing these limitations, researchers at the Jobner center of the ICAR–All India Coordinated Research Project on Spices has identified a promising solution during 2018–19 and evaluated during 2020-21 to 2024-25. A semi-dwarf fennel genotype, standing at 70–75 cm, emerged through natural selection from the UF-30 germplasm. This genotype offers improved resistance to lodging, better adaptability to water-limited environments and suitability for both urban gardening and commercial-scale production, filling a critical gap in fennel cultivation.

The weighted mean grain yield of five plants of this genotype ranged from 90 g to 110 g recorded under moisture stress conditions of Zone III of Rajasthan during last five years (Table: 1). This genotype has high adaptability and can be cultivated under both conventional and drip irrigation systems. It exhibits a spreading growth habit with dense, dark green foliage. It has strong and profuse root system. It is a late-flowering type, with 50% flowering observed between 120–125 days with shiny anthers with abundant pollens. The plants are highly branched, producing 12–15 branches with 80–85 umbels per plant and 16–20 umbellets per umbel, ultimately 350–375 seeds per umbel. Besides, no symptoms of Ramularia blight disease were observed.

Fennel breeding has traditionally relied on conventional selection methods, which are often limited by narrow genetic variability, small floral structures, tall plant types and cross-pollination tendencies driven by protandry. In particular, the genetic base for traits like short duration and dwarf or semi-dwarf stature has been notably limited.

Harvesting operations of harvesting are generally carried by the farm women and have less height, so dwarf fennel has additional

advantage of easy harvesting in standing crops by the farm women.

Extensive field evaluation has shown that UFSD-30 performs exceptionally under resource-constrained and moisture-deficient conditions. Its compact, highly branched architecture provides natural resistance to

lodging and ensures dense floral output, contributing to a high seed yield potential. Additionally, its adaptability to both traditional and water-efficient farming systems supports sustainable agriculture in semi-arid zones. The only challenge is the segregation in height.



Fig-1 Photographs depicting semi dwarf fennel genotype UFSD-30

Table 1: Characteristics of fennel germplasm UFSD-30 and check varieties recorded during 2020-21 to 2024-25

S.No.	Characters	2020-21	2021-22	2022-23	2023-24	2024-25	Range
UFSD-30							
1	Days to 50% flowering	120	121	122	125	123	120-125
2	Branches/plant	13	12	15	13	14	12-15
3	Umbels/plant	80	82	84	85	83	80-85
4	Umbellets/umbel	20	18	17	16	18	16-20
5	Seeds/umbel	350	350	360	365	375	350-375
6	Yield/ 5 plant (g)	90	105	110	95	100	90-110
7	Plant height (cm)	75	70	72	75	72	70-75
RF-101 (Check 1)							
1	Days to 50% flowering	116	108	127	125	128	116-128
2	Branches/plant	8	9	10	8	10	8-10
3	Umbels/plant	29	16	30	29	28	16-30
4	Umbellets/umbel	19	24	14	15	18	14-24
5	Seeds/umbel	335	390	275	340	295	275-390
6	Yield/ 5 plant (g)	102	115	98	102	95	95-115
7	Plant height (cm)	125	127	105	102	112	102-127
RF-125 (Check 2)							
1	Days to 50% flowering	120	128	126	125	124	120-128
2	Branches/plant	10	16	16	14	14	10-16
3	Umbels/plant	22	20	18	17	20	17-22
4	Umbellets/umbel	21	15	15	14	18	14-21
5	Seeds/umbel	389	398	315	375	395	315-398
6	Yield/ 5 plant (g)	92	95	118	110	105	92-118
7	Plant height (cm)	120	105	98	94	100	94-120