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HFO 529 : A NEW SINGLE-CUT OAT VARIETY FOR HILL ZONE OF INDIA

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SUMMARY

The new single-cut oat variety, HFO 529, was developed by Forage Section, Department of Genetics and Plant Breeding, CCS Haryana Agricultural University, Hisar. It was released and notified for cultivation under timely sown, normal fertility and irrigated conditions in Hill Zone of the country (Himachal Pradesh and UT of Jammu & Kashmir). It was developed through pedigree method of breeding. This variety gave 274.4 q/ha green fodder yield in Hill Zone which is 4.0% higher than the national check OS-6 (263.8 q/ha) and almost at par with kent (272.5 q/ha) and the zonal check SKO 96 (271.8 q/ha). In case of dry matter yield, the variety HFO 529 (70.6 q/ha) out yielded the national checks OS 6 (63.8 q/ha) by 10.7% and Kent (67.6 q/ha) by 4.4% and the zonal check SKO 96 (66.9 q/ha) by 5.5% in Hill Zone of the country. The variety HFO 529 gave a seed yield of 24.2 q/ha which is almost at par with the best national checks Kent (24.9 q/ha) and OS 6 (23.7 q/ha). This variety is showing 9.7% crude protein which is 6.6% superior to national check Kent (9.1%) and almost at par with the national check OS-6 (9.8%), zonal check SKO 96 (9.5%) and best qualifying variety SKO-240 (9.6%).

Key words : Oat, fodder yield, seed yield, variety, crude protein

Forages are the mainstay of animal wealth and their production is the backbone of livestock industry. The scarcity of green forages and grazing resources in the country has made the livestock to suffer continuously with malnutrition resulting in their production potentiality at sub optimum level as compared to developed nations. At present, India faces a net deficit of 30.7% dry fodder and this value will be around 24.6 and 18.4% during 2030 and 2050, respectively (Anonymous, 2020). This gap may be narrowed down by developing quick growing, high yielding and fertilizer responsive varieties of fodder oat which will perform better under different climatic conditions. It is a fast growing palatable crop which produces significant amount of green fodder in short period about 60-70 days with better nutritional quality (Phogat *et al.,* 2021). There is immense pressure on cultivated land and water resources due to increasing human population, which left us with very limited resources for fodder cultivation. The non-availability of improved varieties of oat with higher fodder yield potential is one of the major issue around the globe. Fodder quality which is the potential of any fodder to produce a desired animal response, also as much important as fodder production because about 80-90% of the nutrient requirement of the livestock are met from the fodder crops. Both fodder availability and quality influences livestock performance *viz*., growth rates, milk production and body condition (Kumar *et al.,* 2021). Oat is commonly used as feed for cattle primarily due to the high concentration of fermentable carbohydrates. Despite their high nutritive composition, local cultivars have not favorable characteristics such as small grain, regular foliage, and high disease susceptibility condition (Luis *et al.,* 2018).

The single-cut oat variety 'HFO 529' was developed by Forage Section, Department of Genetics and Plant Breeding, CCS Haryana Agricultural University, Hisar under AICRP on FCU. It was released by the Central Sub-committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops & notified by Ministry of Agriculture & Farmers Welfare, (Department of Agriculture, Co-operation and Farmer's welfare) vide notification number **S.O. 8**

TABLE 1
Green fodder yield (q/ha): Mean performance in the Hill Zone over three years

Year	No. of locations	Mean performance proposed variety HFO 529	National check		Zonal-check	HZ Qualifying Varieties			
			OS 6	Kent	SKO-96	HFO-718	OL-1896	JO-05-09	SKO-240
1st Year 2017-18 (IVTO (SC)	3	225.4	226.3	221.3	241.4	235.5	220.5	240.8	233.6
2nd Year 2018-19 (AVTO (SC-1)	3	264.4	261.8	262.8	249.7	244.0	277.3	260.8	284.4
3rd Year 2019-20 AVTO (SC-2)	3	333.5	303.4	333.5	324.2	296.1	290.0	300.1	315.0
Weighted Mean		274.4	263.8	272.5*	271.8	258.5	262.6	267.2	277.7*
% superiority									
1st Year		-	-0.4	1.9	-6.6	-4.3	2.2	-6.4	-3.5
2nd Year		-	1.0	0.6	5.9	8.4	-4.7	1.4	-7.0
3rd Year		-	9.9	0.0	2.9	12.6	15.0	11.1	5.9
% superiority		-	4.0	0.7	1.0	6.2	4.5	2.7	-1.2

*=Indicates the best check/best qualifying variety
IVTO (SC): Initial Varietal Trial in Oats (SC); AVTO (SC-1): First Advanced Varietal Trials in oats (SC); AVTO (SC-2): Second Advanced Varietal Trials in oats (SC)

TABLE 2
Dry matter yield (q/ha): Mean performance in the Hill Zone over three years

Year	No. of locations	Mean performance proposed variety HFO 529	National check		Zonal-check	HZ Qualifying Varieties			
			OS 6	Kent	SKO-96	HFO-718	OL-1896	JO-05-09	SKO-240
1st Year 2017-18 (IVTO (SC)	3	46.8	46.8	46.9	51.4	49.0	45.5	50.8	48.1
2nd Year 2018-19 (AVTO SC-1)	3	69.3	62.7	65.5	59.9	57.6	66.6	63.4	68.6
3rd Year 2019-20 AVTO (SC-2)	3	95.6	82.0	90.3	89.4	75.4	79.9	82.5	86.9
Weighted Mean		70.6	63.8	67.6*	66.9	60.7	64.0	65.6	67.9*
% superiority									
1st Year		-	0.0	-0.2	-8.9	-4.5	2.9	-7.9	-2.7
2nd Year		-	10.5	5.8	15.7	20.3	4.1	9.3	1.0
3rd Year		-	16.6	5.9	6.9	26.8	19.6	15.9	10.0
% superiority		-	10.7	4.4	5.5	16.3	10.3	7.6	4.0

*=Indicates the best check/best qualifying variety
IVTO (SC): Initial Varietal Trial in Oats (SC); AVTO (SC-1): First Advanced Varietal Trials in oats (SC); AVTO (SC-2): Second Advanced Varietal Trials in oats (SC)

(E), dated 24.12.2021 for cultivation under timely sown, normal fertility and irrigated conditions in Hill Zone of the country (Himachal Pradesh and UT of Jammu & Kashmir) during *rabi* season. This variety has been registered with NBPGR having national identity number **IC 636764**. It was developed through pedigree method. The variety HFO 529 exhibited superiority over the national check OS 6 by 4% and at par with the best national check Kent, zonal check SKO 96 and almost at par with the best qualifying variety SKO 240 for green fodder yield (q/ha) (Table 1). In case of dry matter yield, this variety exhibited superiority over the national checks OS 6 (10.7%), Kent (4.4%) and zonal check SKO 96 (5.5%) and the best qualifying variety SKO 240 (4.0%) for dry matter yield (q/ha) (Table 2). The variety HFO 529 (24.2 q/ha) was almost at par with the national checks OS-6 and Kent for seed yield (Table 3). The variety HFO 529 exhibited 4.3% superiority over the national check Kent and 12.1% over zonal check SKO-96 and almost at par with national check OS 6 and the best qualifying variety OL-1896 for plant height (Table 4). It is good in nutritional quality as well. It exhibited 6.6 % superiority over the national check Kent and almost at par with the national checks OS-6, zonal check SKO-96 and the best qualifying varieties JO-05-09 and SKO-

TABLE 3
Location wise performance of proposed variety HFO 529 for seed yield (q/ha) against other entries and checks in the Hill Zone during 2019-20

Year	No. of locations	Mean performance proposed variety HFO 529	National check		Zonal-check	HZ Qualifying Varieties			
			OS 6	Kent	SKO-96	HFO-718	OL-1896	JO-05-09	SKO-240
3rd Year 2019-20 AVTO (SC-2)	2	24.2	23.7	24.9	27.9	23.1	21.8	23.5	27.2
% superiority			2.1	-2.8	-13.3	4.8	11.0	3.0	-11.0

AVTO (SC-2): Second Advanced Varietal Trials in oats (Single-Cut).

TABLE 4
Plant height (cm): Mean performance in the Hill Zone over three years

Year	No. of locations	Mean performance proposed variety HFO 529	National check		Zonal-check	HZ Qualifying Varieties			
			OS 6	Kent	SKO-96	HFO-718	OL-1896	JO-05-09	SKO-240
1st Year 2017-18 (IVTO SC)	3	118.1	115.9	111.9	96.1	112.1	112.9	106.8	99.9
2nd Year 2018-19 (AVTO SC-1)	3	125.3	115.6	116.7	110.4	117.1	123.1	122.0	128.3
3rd Year 2019-20 AVTO (SC-2)	2	114.7	138.0	117.5	118.2	124.2	120.7	130.5	129.2
Weighted Mean		120.0	121.3*	115.1	107.0	117.0	118.7*	118.4	117.9
% superiority									
1st Year		-	1.9	5.5	22.9	5.4	4.6	10.6	18.2
2nd Year		-	8.4	7.4	13.5	7.0	1.8	2.7	-2.3
3rd Year		-	-16.9	-2.4	-3.0	-7.6	-5.0	-12.1	-11.2
% superiority		-	-1.1	4.3	12.1	2.6	1.1	1.4	1.8

*=Indicates the best check/best qualifying variety
IVTO (SC): Initial Varietal Trial in Oats (SC); AVTO (SC-1): First Advanced Varietal Trials in oats (SC); AVTO (SC-2): Second Advanced Varietal Trials in oats (SC).

TABLE 5
Crude protein (%): Mean performance in Hill Zone over three years

Year	No. of locations	Mean performance proposed variety HFO 529	National check		Zonal-check	HZ Qualifying Varieties			
			OS 6	Kent	SKO-96	HFO-718	OL-1896	JO-05-09	SKO-240
1st Year 2017-18 (IVTO (SC)	1	9.3	10.5	7.9	9.3	9.6	9.6	8.8	9.8
2nd Year 2018-19 (AVTO (SC-1)	1	9.6	9.6	7.9	8.8	8.8	9.0	10.5	9.9
3rd Year 2019-20 AVTO (SC-2)	2	9.9	9.5	10.2	10.0	9.6	9.4	9.5	9.3
Weighted Mean		9.7	9.8*	9.1	9.5	9.4	9.4	9.6*	9.6*
% superiority									
1st Year		-	-11.4	17.7	0.0	-3.1	-3.1	5.7	-5.1
2nd Year		-	0.0	21.5	9.1	9.1	6.7	-8.6	-3.0
3rd Year		-	4.2	-2.9	-1.0	3.1	5.3	4.2	6.5
% superiority		-	-1.0	6.6	2.1	3.2	3.2	1.0	1.0

*=Indicates the best check/best qualifying variety.
IVTO (SC): Initial Varietal Trial in Oats (SC); AVTO (SC-1): First Advanced Varietal Trials in oats (SC); AVTO (SC-2): Second Advanced Varietal Trials in oats (SC).

TABLE 6
ADF (%): Mean performance in the Hill Zone over three years

Year	No. of locations	Mean performance proposed variety HFO 529	National check		Zonal-check	HZ Qualifying Varieties			
			OS 6	Kent	SKO-96	HFO-718	OL-1896	JO-05-09	SKO-240
1st Year 2017-18 (IVTO (SC)	-	-	-	-	-	-	-	-	-
2nd Year 2018-19 (AVTO (SC-1)	-	-	-	-	-	-	-	-	-
3rd Year 2019-20 AVTO (SC-2)	1	58.8	57.2	57.8	56.6	55.4	56.2	55.8	55.0
Weighted Mean		58.8	57.2	57.8*	56.6	55.4	56.2*	55.8	55.0
% superiority		-	-	-	-	-	-	-	-
1st Year		-	-	-	-	-	-	-	-
2nd Year		-	-	-	-	-	-	-	-
3rd Year		-	2.8	1.7	3.9	6.1	4.6	5.4	6.9
% superiority		-	-2.8	-1.7	-3.9	-6.1	-4.6	-5.4	-6.9

*=Indicates the best check/best qualifying variety.
IVTO (SC): Initial Varietal Trial in Oats (SC); AVTO (SC-1): First Advanced Varietal Trials in oats (SC); AVTO (SC-2): Second Advanced Varietal Trials in oats (SC).

TABLE 7
NDF (%): Mean performance in the Hill Zone over three years

Year	No. of locations	Mean performance proposed variety HFO 529	National check		Zonal-check	HZ Qualifying Varieties			
			OS 6	Kent	SKO-96	HFO-718	OL-1896	JO-05-09	SKO-240
1st Year 2017-18 (IVTO (SC)	-	-	-	-	-	-	-	-	-
2nd Year 2018-19 (AVTO (SC-1)	-	-	-	-	-	-	-	-	-
3rd Year 2019-20 AVTO (SC-2)	1	65.4	64.2	66.4	63.8	66.2	65.4	63.4	64.0
Weighted Mean		65.4	64.2*	66.4	63.8	66.2	65.4	63.4*	64.0
% superiority		-	-	-	-	-	-	-	-
1st Year		-	-	-	-	-	-	-	-
2nd Year		-	-	-	-	-	-	-	-
3rd Year		-	1.9	-1.5	2.5	-1.2	0.0	3.2	2.2
% superiority		-	-1.9	+1.5	-2.5	+1.2	0.0	-3.2	-2.2

*=Indicates the best check/best qualifying variety.
IVTO (SC): Initial Varietal Trial in Oats (SC); AVTO (SC-1): First Advanced Varietal Trials in oats (SC); AVTO (SC-2): Second Advanced Varietal Trials in oats (SC).

240 for crude protein (%) (Table 5). It is at par with the checks and qualifying varieties for ADF and NDF % in Hill zone (Tables 6-7).

CONCLUSION

The variety HFO 529 is having higher green and dry fodder yield potential along with superior nutritional quality. Hence, it is expected that it will prove a boon to the dairy farmers of the Hill Zone of India.

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