

Original Research Article

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OL 12: A New High Yielding Fodder Oat Variety Released for Punjab State, India

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ABSTRACT

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OL 12 is a single cut fodder variety released by State Variety Approval committee for general cultivation in Punjab state during the year 2018. This variety has been developed from the cross between Kent x OL 125 through pedigree method of selection. Its plants are tall with profuse tillering and leafy growth. The leaves are longer and broader (Fig. 1). The salient morphological characteristics of this variety are presented in Table 1. On an average, it attains plant height of 138 cm. It has higher leaf to stem ratio, stem thickness and bears more number of tillers per plant. It takes about 135 days from sowing to last cut. Being a high yielding oats variety it will help farmers of Punjab state in reaping rich benefits in terms of higher forage tonnage as well as higher milk yield.

Introduction

The genus *Avena* belongs to the grass family Poaceae. It comprises of about seventy species, although mainly *A. sativa*, *A. nuda* and *A. byzantine* are those most commonly cultivated on a commercial scale. *A. sativa* is an economically important crop and ranks sixth in world cereal production after wheat, maize, rice, barley and sorghum (FAO, 2012). It is an important winter forage crop in many parts of the world and is also grown as multipurpose crop for grain, pasture and forage. It is considered to be one of the best dual purpose cereal crops that fit well into the

platter of human and cattle as well. Consumption of oat bran (outer casting of oat) is believed to lower down LDL cholesterol and possibly to reduce the risk of heart diseases. In India, oat is grown as fodder crop during *Rabi* season in north western and central parts of the country and is now even extending to eastern region as well. In Punjab, oat is grown as fodder crop on 1.0 lac hectares with annual production of 33.6 lac ton (Anonymous, 2018). In recent years, with the advent of exaggerated dairy industry in our country, oat has fascinated the attention of breeders for its improvement due to its nutritious quality fodder for livestock and its

grains as animal feed with high net energy gains (Ruwaliet *al.*, 2013). More nutritious and high yielding fodder varieties are needed to run an efficient livestock industry on which dependence of increasing population is taking ride.

Materials and Methods

The Oats variety OL 12 is a derivative of the cross between Kent x OL 125, where Kent is an old introduction of oats from USA into India during late 80s and OL 125 is a zonal check of NWZ in AICRP (FCU) trials. The variety has been developed through pedigree selection by combining high green fodder yield as well as better fodder quality. It was tested with the name of 1802-1 in state as well as national AICRP(FCU) trials. The crossing programme was initiated during Rabi 2008-09 at Forage Research Farm, PAU, Ludhiana.

The segregating progenies were selected and advanced during 2010-20014 and the homozygous culture OL 1802-1 was evaluated in Station trials with the local checks OL 11, OL 9 and Kent since 2014. It was tested in Multi-location trials in different research Stations of PAU, Ludhiana in 4 locations between 2014 and 2018. Based on its superior

performance over check varieties, this variety was assessed in Adaptive Research Trials during Rabi 2017-18 in 52 locations spreading over different oats growing districts in Punjab. Field Screening was carried out for its reaction to pests and diseases. Quality parameters were also assessed for this culture in comparison with the standard varieties. Based on the superiority over the station, MLT, ART, AICRP(FCU) it was proposed for release as OL 12. In 2018, the State Variety Release Committee approved and released it as Oats fodder variety OL 12.

Results and Discussion

OL 12 has been extensively tested in various research and adaptive trials throughout the state (Table 2). On the basis of 11 Research trials, OL 12 recorded green forage yield of 759.5 q/ha against 702.3 q/ha of OL 11, 612.9 q/ha of OL 9 and 614.4 q/ha of Kent (checks) with advantage of 8.1%, 23.9 and 23.6% respectively. Likewise, on the basis of 11 Research trials, OL 12 recorded dry matter yield of 146.9 q/ha against 125.8q/ha of OL 11, 110.8 q/ha of OL 9 and 110.8 q/ha of Kent (checks) with advantage of 16.8%, 32.6% and 32.6% respectively.

Table.1 Morphological characteristics of OL 12 and the check varieties of oats

Characters	Varieties			
	OL 12	OL 11	OL 9	Kent
Plant height (cm)	138.7	128.5	122.4	124.7
Leaf length (cm)	41.2	38.1	36.5	35.2
Leaf width (cm)	2.93	2.51	2.45	2.39
Leaf: stem ratio (LSR)	0.88	0.66	0.57	0.66
Stem thickness (cm)	0.78	0.74	0.70	0.66
No. of tillers/plant	15.8	13.2	11.2	11.8
No. of leaves/plant	64.8	56.5	50.6	50.2
Number of days from sowing to harvesting	135.0	128.0	130.0	129.0

Table.2 Overall performance of OL 12 and the check varieties in different trials

Trials	Green Fodder Yield (q/ha)			
	OL 12	OL 11	OL 9	Kent
Research trials (11)	759.5	702.3	612.9	614.4
% increase		8.1	23.9	23.6
Adaptive trials (52)				
FASS & KVK (50)	619.8	573.2	550.0	529.7
Deptt. Agriculture (2)	638.8	592.5	531.3	471.3
Mean of 52 trials	620.5	573.9	549.3	527.5
% increase		8.1	13.0	17.6
Mean of 63 trials	644.8	591.0	560.4	542.6
% increase		9.1	15.1	18.8

Table.3 Incidence of leaf blight severity on OL 12 and the check varieties under natural conditions

Variety	2015-16		2016-17		Average	
	Leaf blight severity (%)	Disease Score	Leaf blight severity (%)	Disease Score	Leaf blight severity (%)	Disease Score
	OL 12	34.55	MS	23.33	MR	28.94
OL 11 (check)	40.00	MS	24.33	MR	32.17	MS
OL 9(check)	54.67	S	49.67	MS	52.17	S
Kent (check)	55.52	S	51.33	S	53.43	S

Disease Score: (<10%): Resistant; (10.1-25.0): Moderately Resistant; (25.1-50.0): Moderately susceptible; (50.1-75.0): Susceptible; (> 75.0%): Highly susceptible

Table.4 Incidence of oat aphid, *Rhopalosiphumpadi* on OL 12 and check varieties under natural conditions

Entry	*No. of aphids/tiller	No. of tillers/plant
OL 12	3.33	13.33
OL 11	2.33	12.66
OL 9	2.00	9.33
Kent	2.33	11.00

Figures in parentheses are square root transformations

Table.5 Quality parameters of OL 12 and check variety evaluated in metabolic trial conducted by Deptt. of Animal Nutrition, GADVASU, Ludhiana

Trait (%)	Proposed variety	Check Varieties		
	OL 12	OL 11	OL 9	Kent
Crude Protein –CP	8.1	7.7	7.7	7.9
Acid Detergent Fibre -ADF	44.1	44.8	44.4	44.2
Neutral Detergent Fibre- NDF	65.4	65.9	67.5	65.6
In vitro Dry Matter Digestibility- IVDMD	56.9	55.7	56.1	56.5
NO ₃ ⁻¹ N content (ppm) *	410	400	700	680

Fig.1 OL 12: a new high yielding fodder oats variety



In 52 adaptive trials OL 12 out yielded the checks OL 11, OL 9 and Kent by 9.1%, 15.1% and 18.8% respectively for green fodder yield. It was also tested in the All India Coordinated Research Project on Forage Crops trial conducted during Rabi 2014-15 to 2016-17 in NWZ under the name OL 12 and out yielded both the national checks viz; OS 6 and OL 12 gave moderately susceptible reaction to leaf blight under natural conditions (Table 3).

Regarding the insect pests, non-significant incidence of number of aphids/tiller (Table 4) was observed under natural conditions on OL 12. The green fodder quality characteristics of OL 12 have been given in Table 5. Its fodder quality is superior in terms of total digestible

nutrients (TDN) and digestible crude protein (DCP) than checks viz; OL 11, OL-9 and Kent.

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