CROP BREEDING AND APPLIED BIOTECHNOLOGY

CULTIVAR RELEASE

UFSMFW 2101 - very early black oat cultivar with high yield potential

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Abstract: *The black oat cultivar UFSMFW 2101, recommended for Northwest of the state of Rio Grande do Sul, is very early and can produce high dry matter and grain yields. In rotation systems, an immediate advantage is the very early cycle, with the possibility of anticipated sowing of the subsequent crop.*

Keywords: *Fresh matter, ground cover, seeds*

INTRODUCTION

In Brazil, southern region, black oat (*Avena strigosa* Schreb.) is cultivated on extensive areas but to date, only few cultivars are available on the market. For this reason, producers basically use the seeds they saved, over several generations. The genetic identity of this seed is unknown and the performance with regard to growth cycle, plant height, dry matter yield and disease resistance is irregular (Silveira et al. 2010).

The black oat cultivars available at market is still limited, this fact open new opportunities to breeding programs. Currently, the focus has been on the development of cultivars adapted to specific environments, with uniformity, potential for dry mass productivity, grain yield potential, short cycle and low plant height (Klein et al. 2019).

The Research Group for Plant Breeding (GPMP) of the Federal University of Santa Maria (UFSM) located in Frederico Westphalen/RS, sought to select early cultivars with high grain and dry matter productivity.

BREEDING METHODS

Cultivar UFSMFW 2101 was selected from plants collected in the field in 14 locations in the northwest region of Rio Grande Sul. In 2014, populations were cultivated in the field in the municipality of Frederico Westphalen/RS. The experimental units were composed of six lines of 5 m, with 0.17 m of spacing. By the pedigree method plants were selected, for traits dry matter, grain yield and early cycle. All selected plants were threshed, and seeds sown in individual rows in 2015.

Lines were selected and within these plants. These were threshed and sown in individual rows in 2016. UFSMFW 2101 was obtained of one row evaluated in the population from Palmeira das Missões 1.

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TRAITS AND PERFORMANCE

UFSMFW 2-01 was evaluated in preliminary tests in the year 2017 and in Value for Cultivation and Use (VCU) tests in the years 2018 to 2021 in the municipality of Frederico Westphalen/RS. It was protected by the National Cultivar Protection Service (SNPC), under the name of UFSMFW 2101 (nº 20210020).

The experimental units were composed of six lines of 5 m, with 0.17 m of spacing. The experiments were conducted in a completely randomized block design with three replications. Fertilization, pests, diseases and weeds was carried by the recommended management practices (Comissão 2014).

In the VCU tests, was obtained: days from emergence to flowering and to maturity; plant height (in cm); number of tillers per plant; dry matter per plant (in g); fresh matter, dry matter and grain yield (in kg ha^{-1}).

The same performance was observed for dry matter, in that cv. UFSMFW 2101 performed well in all experimental years. In 2018 and 2021, fresh matter productivity was higher than the mean of controls. Compared to the control cultivars, the mean in all experimental years is higher (Table 1).

Show the high dry matter productivity of cv. UFSMFW 2101 (7488.9 kg ha^{-1}), while the control cultivars mean 7034.1 kg ha^{-1} (Table 1). Nascimento Junior et al. (2015), verified dry matter productivity of 5837.0 kg ha^{-1} for cv. UPFA 21 - Moreninha and 6541.0 kg ha^{-1} for cv. BRS Centauro.

Table 1 shows that cv. UFSMFW 2101 was superior to the control cultivars in all years for grain yield, with 2,497.6 kg ha^{-1}. The maturity was earlier than control cultivars, UFSMFW 2101 can produce more in less time, equivalent to cultivar UFSMFW 2202 (Marchioro et al. 2022). The higher dry matter yield of than controls (Table 2) was due to higher dry matter per plant.

Cultivar UFSMFW 2101 has a shorter cycle than the controls (Table 1). According to Carneiro et al. (2008), black oat protects the soil against weeds and erosion. The early cycle is important in crop rotation, anticipates the subsequent crop and still leaves straw in the soil which is a source of nutrients (Melo et al. 2011).

UFSMFM 2101 was selected for a specific region, being adapted to the region. In this sense, the response to the attack of the main foliar diseases that affect the crop in the region is moderate. Initially indicated for cultivation in the northwest of Rio Grande do Sul, and the partner for seed multiplication is being defined and registered in the process of being forwarded.

OTHER RELEVANT TRAITS

In terms of the distinctive traits, cv. UFSMFW 2101 has a very early cycle, intermediate habit and frequency of plants with recurved flag leaf (blade) medium, while cv. UPFA 21 - Moreninha has a medium-cycle, semi-upright habit and frequency of plants with recurved flag leaf (blade) low.

Table 1. Fresh matter, dry matter and grain yield for cv. UFSMFW 2101 and means of the control cultivars (UPFA 21 Moreninha and IPR Cabocla) in trials of Value for Cultivation and Use, seasons 2018 to 2021

Cultivars	**Fresh matter** (kg ha^{-1})				
	2018	**2019**	**2020**	**2021**	**Mean**
UFSMFW 2101	50306.0 a	52760.0 a	32122.7 a	27084.3 a	40568.3 a
Control cultivar mean	44485.5 b	49893.3 b	32190.7 a	22949.8 b	37379.8 b
Cultivars	**Dry matter** (kg ha^{-1})				
	2018	**2019**	**2020**	**2021**	**Mean**
UFSMFW 2101	8440.8 a	9040.0 a	6700.3 a	5774.6 a	7488.9 a
Control cultivar mean	7563.3 b	9340.0 a	6176.3 b	5056.7 b	7034.1 b
Cultivars	**Grain yield** (kg ha^{-1})				
	2018	**2019**	**2020**	**2021**	**Mean**
UFSMFW 2101	3483.1 a	2748.3 a	1949.0 a	1810.0 a	2497.6 a
Control cultivar mean	2303.7 b	2185.9 b	1354.2 b	1570.1 b	1853.5 b

Means followed by the same lowercase letter in the column do not differ by Scott-Knott ($p \leq 0.05$)

Table 2. Days from emergence to flowering, days from emergence to maturity, plant height, number of tillers per plant, and dry matter per plant for cv. UFSMFW 2101 and means of the control cultivars (UPFA 21 Moreninha and IPR Cabocla) in trials of Value for Cultivation and Use, seasons 2018 to 2021

Cultivars	Days from emergence to flowering (days)				
	2018	2019	2020	2021	Mean
UFSMFW 2101	83.0 b	82.2 b	84.0 b	84.3 b	83.4 b
Control cultivar mean	92.3 a	91.5 a	89.9 a	92.5 a	91.6 a
Cultivars	**Days from emergence to maturity (days)**				
	2018	**2019**	**2020**	**2021**	**Mean**
UFSMFW 2101	121.4 b	120.5 b	120.1 b	122.1 b	121.0 b
Control cultivar mean	137.4 a	136.2 a	133.8 a	137.7 a	136.3 a
Cultivars	**Plant height (cm)**				
	2018	**2019**	**2020**	**2021**	**Mean**
UFSMFW 2101	141.8 a	147.1 a	140.2 a	107.9 a	134.3 a
Control cultivar mean	139.1 a	144.0 a	138.9 a	109.9 a	133.0 a
Cultivars	**Number of tillers per plant**				
	2018	**2019**	**2020**	**2021**	**Mean**
UFSMFW 2101	3.4 a	2.5 a	1.8 a	2.5 a	2.6 a
Control cultivar mean	2.9 a	2.1 a	1.9 a	2.4 a	2.3 a
Cultivars	**Dry matter per plant (g)**				
	2018	**2019**	**2020**	**2021**	**Mean**
UFSMFW 2101	4.5 a	3.8 a	3.7 a	3.6 a	3.9 a
Control cultivar mean	3.0 b	3.5 a	3.1 b	3.0 a	3.1 b

Means followed by the same lowercase letter in the column do not differ by Scott-Knott ($p \leq 0.05$)

SEED PRODUCTION

UFSMFW 2101 was protected by National Service for the Protection of Cultivars (SNPC) under no. 20210020 on 08/19/2020. The registration and definition of a partner for seed multiplication is in progress (seed availability 550 kg).

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