SCIENTIFIC NOTE

MILLÁN-INIA, NEW VARIETY OF HIGH QUALITY EARLY SPRING BREAD WHEAT FOR IRRIGATED SOILS IN CENTRAL-SOUTHERN CHILE

Iván Matus1*, Ricardo Madariaga1, Claudio Jobet2, Javier Zúñiga2, and Christian Alfaro3

ABSTRACT

Millán-INIA is a variety of spring bread wheat (Triticum aestivum L.) originating from a cross carried out in the Wheat Plant Breeding Project of the Instituto de Investigaciones Agropecuarias (INIA), in the Centro Regional de Investigación Quilamapu in 1995. This is a spring wheat variety with an early to medium-early head emergence and upright growth habit in the seedling stage. The adult plant is low to medium height and varies between 75 and 90 cm, with a mean of 85 cm. The spike is white with long awns along its full length. The grain is large-sized, white, and vitreous. The weight of 1000 grains varies between 50 and 59 g. It was sown in mid-August at the Santa Rosa Experimental Station (36°31'S; 71°54'W), Chillán. Head emergence occurred 88 to 89 d after sowing, which is 2 to 3 d after Ciko-INIA. On average, Millán-INIA reached a yield similar to that of the var. Ciko-INIA. This line stands out for its good resistance to disease, high protein content (11.5% mean), high sedimentation value, and high W value.

Key words: Spring wheat, Triticum aestivum, new variety, Millán-INIA.

There are variations within spring varieties as regards precocity. One of the advantages of the earlier varieties is that they can be sown at later dates, including twice in the same season in some zones. Millán-INIA is an early spring variety exhibiting outstanding quality as compared to other spring varieties. It also shows good resistance to the most important diseases and stands out for its large white vitreous grain.

Origin

Millán-INIA is a spring wheat variety (Triticum aestivum L.) originating from a cross in the Wheat Plant Breeding Project of the Instituto de Investigaciones Agropecuarias (INIA), in the Centro Regional de Investigación Quilamapu in 1995. The F2 to F8 selection stages were carried out between 1997 and 2003 using the pedigree method. It was evaluated in a preliminary yield trial in 2004 and included in the main yield trial in 2005. Between 2006 and 2008, the standard trial was registered as variety trials in application for Registration of Varieties Suitable for Certification (RVSC), required by the Ministry of Agriculture through the Servicio Agrícola y Ganadero (Agriculture and Livestock Service). The experimental line for all these trials was identified as QUP 2563-2004.

Crossing and pedigree


Morphological description of the plant

This is a spring wheat variety with an early to medium-early head emergence and an upright growth habit in the seedling stage. The adult plant is low to medium height and varies between 75 and 90 cm with a mean of 85 cm (Figure 1). The leaf sheath of the flag leaf exhibits nil or very weak glaucocity. Stalk medulla is medium-sized and has low to moderate resistance to lodging. The auricle is large and white, the latter owing to the lack of antocianin.

Spike and grain characteristics

The spike is compact, pyramid-shaped, approximately 11 to 12 cm long, white, with nil or very weak glaucocity, upright at maturity, and exhibits long whitish awns along its full length. The peak of the lower lemma of the spikelet in the middle third of the stem is straight.

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average percentage weight of seeds retained in a 2.3 mm oblong mesh sieve was 93%, and 1000 seeds weigh 50 to 59 g (Figure 2). It exhibits medium coloration to phenol.

Agronomic and phytopathological characteristics
Sowing was in mid-August at the Santa Rosa Experimental Station (36°31’ S; 71°54’ W), Chillán. Heads emerged 88 to 89 d after sowing, 2 to 3 d after head-emergence of Ciko-INIA (Mellado et al., 1989).

Millán-INIA shows resistance to stripe rust (*Puccinia striiformis* West. f. sp. *tritici*), leaf rust (*Puccinia graminis* Erikss.), stem rust (*Puccinia graminis* Pers. f. sp. *tritici* Erikss. and Henn.), and resistance to moderate-resistance to powdery mildew caused by the *Blumeria graminis* DC. f. sp. *tritici* Marchal sl fungus. It did not exhibit leaf blotch (*Mycosphaerella graminicola* (Fuckel) J. Schröt.) in spring sowing (Table 1).

Grain and quality yield
Millán-INIA was evaluated in standard trials conducted in irrigated soils in the provinces of Ñuble Chillán (36°31’ S; 71°54’ W) and Yungay (37°08’ S; 72°0’ W) in Nuble Province and Humán (37°26’ S; 72°14’ W) in Bío Bío Province from 2006 to 2008. It reached a mean yield 0.7% higher than that of var. Ciko-INIA in the evaluated locations (Table 2).

Millán-INIA is a wheat variety with a good hectoliter weight and hard texture. Numbers for Zeleny sedimentation, wet gluten, and protein classify it as strong wheat (INN, 2000). It exhibits good bread volume, high W value, and a good P/L ratio. This value is the relationship between dough tenacity and extensibility, a stability index used as a guideline to determine if dough has reduced, balanced, or high extensibility. This line stands out for its high protein content, high sedimentation value, and high W value (Table 3).

Cultivation area and sowing dates
Data obtained in the standard trials allow recommending

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Table 1. Behavior of cv. Millán-INIA and control cv. Ciko-INIA to stripe rust (*Puccinia striiformis*) and leaf rust (*P. triticina*) in three irrigated locations from 2006 to 2008.

<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Millán-INIA</th>
<th>Ciko-INIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yellow rust¹</td>
<td>Leaf rust¹</td>
</tr>
<tr>
<td>Quilamapu</td>
<td>2006</td>
<td>0</td>
<td>5MS</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>5MS</td>
<td>TMS</td>
</tr>
<tr>
<td></td>
<td>2008</td>
<td>20MR</td>
<td>5MS</td>
</tr>
<tr>
<td>Yungay</td>
<td>2006</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2008</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Humán</td>
<td>2006</td>
<td>20MR</td>
<td>0</td>
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<tr>
<td></td>
<td>2007</td>
<td>0</td>
<td>TMS</td>
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<tr>
<td></td>
<td>2008</td>
<td>0</td>
<td>5MS</td>
</tr>
</tbody>
</table>

¹Values according to modified Cobb Scale (Peterson et al., 1984) where attack intensity can vary between 0 and 100% (T = traces), plant reaction can be: resistant (R), moderately resistant (MR), moderately susceptible (MS), or susceptible (S).
Millán-INIA is a new variety of early spring bread wheat with a good yield potential and good hectoliter weight. The grain is large, white, and vitreous. Numbers for Zeleny sedimentation, wet gluten, and protein classify it as strong wheat. This line stands out for its high protein content, sedimentation value, and W value. It exhibits resistance to moderate resistance to stripe rust, leaf rust, stem rust, powdery mildew, and leaf blotch.

Data obtained in the standard trials allow recommending sowing cv. Millán-INIA in irrigated soils of the central-southern zone of the country.

**RESUMEN**

Millán-INIA, nueva variedad de trigo harinero precoz de primavera de alta calidad para suelos de riego de la zona centro sur de Chile. Millán-INIA es un trigo harinero (Triticum aestivum L.) de primavera que proviene de un cruzamiento efectuado en 1995 en el Proyecto de Fitomejoramiento de Trigo del Instituto de Investigaciones Agropecuarias INIA, en el Centro Regional de Investigación Quilamapu. Es un trigo de hábito primaveral, de época de espigadura mediana a precoz, con hábito de crecimiento erecto al estado de plántula. La altura de la planta adulta se considera mediana a baja, y varía entre 75 y 90 cm, con un promedio de 85 cm. La espiga es de color blanco y de barbas largas y presentes en toda su extensión. El grano es de color blanco y aspecto vitreo y de tamaño grande, con un peso de los 1000 granos que varía entre 50 y 59 g. La semilla es de color blanco y de tamaño grande, con un peso de los 1000 granos que varía entre 50 y 59 g. Sembrada a mediados de agosto en el Campo Experimental Santa Rosa (36°31’ S; 71°54’ O), Chillán, la emisión de espigas ocurre 88 a 89 días después de la siembra, entre 2 y 3 días después que Ciko-INIA. Como promedio en las localidades evaluadas, Millán-INIA tuvo un rendimiento medio similar a la var. Ciko-INIA. Esta línea se destaca por su muy buena resistencia a enfermedades, alta

**Electrophoresis of high molecular weight glutenins and molecular analysis**

Millán-INIA exhibits allele 1 in locus Glu1A, alleles 17+18 in locus GluB, and alleles 2+12 in locus Glu1D. In accordance with this classification it attains a value of 8 on a scale of 4 to 10.

This variety does not carry the rye translocation 1BL.1RS and exhibits the Pin-a hardness allele. It does not have aluminum tolerant alleles.

**CONCLUSIONS**

Millán-INIA is a new variety of early spring bread wheat with a good yield potential and good hectoliter weight. The grain is large, white, and vitreous. Numbers for Zeleny sedimentation, wet gluten, and protein classify it as strong wheat. This line stands out for its high protein content, sedimentation value, and W value. It exhibits resistance to moderate resistance to stripe rust, leaf rust, stem rust, powdery mildew, and leaf blotch.

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contenido de proteína (promedio 11,5%), alto valor de sedimentación, y alto valor W.

**Palabras clave:** trigo de primavera, *Triticum aestivum*, nueva variedad, Millán-INIA.

**LITERATURE CITED**
