

ID91-20503A
Soft White Winter Wheat
Proposed name: 'Dune'

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'Dune' soft white winter wheat (*Triticum aestivum* L.) is proposed for release by the Idaho Agricultural Experiment Station in 2004. Dune is a white chaffed, awned, semi-dwarf soft white common winter wheat with excellent yield potential in the Pacific Northwest, especially under irrigation. It is blue to blue-green in color with a semi-erect flag leaf. The kernels of Dune are an intermediate size, white, and soft.

Pedigree and History

Dune has the pedigree 'Norman'/VHO88262//'Lambert'. Norman is a soft red biscuit wheat from Nickerson Seed Inc. (formerly PBI), UK. VHO88262 is an advanced breeding line from the Washington State University soft white winter wheat breeding program. Lambert is a soft white common winter wheat released jointly by the Idaho Agricultural Experiment Station, the Oregon Agricultural Experiment Station and Washington Agricultural Experiment Station (Zemetra et al. 1995). The original cross for Dune was made in 1991. The F₁ population was designated as ID91-205 and grown in bulk for three generations with minimal selection. Heads were collected from the F₃ bulk population and planted as F₄ headrows. One row was selected from the F₄ headrows based on agronomic performance, disease resistance, seed appearance and quality (percent protein and SDS sedimentation). This headrow was designated ID91-20503A. ID91-20503A was then evaluated for 6 years in replicated yield trials. In 2000, ID91-20503A was entered in the Western Regional White Winter Wheat Nursery and evaluated for three years. ID91-20503A was entered for evaluation in the Tri-State Extension cereal testing nursery in 2002 and evaluated for two years. In 2003, ID91-20503A was evaluated by the Pacific Northwest Wheat Quality Council for its end-use quality. Heads were collected in 2003 and were grown during the 2003-2004 growing season at Moscow, Idaho to produce the breeder seed generation. The initial foundation seed generation is currently being grown in 2004-2005 at Kimberly, Idaho.

Area of Adaptation

Dune is an early, short, soft white common winter wheat with good to excellent straw strength that is adapted to irrigated and intermediate to high rainfed areas of the Pacific Northwest. Dune has tremendous potential as a replacement for 'Stephens' (Kronstad et al. 1978) under irrigated conditions in southern Idaho.

Agronomic Characteristics

Dune is a semi-dwarf wheat that is similar in height to 'Brundage 96' (Zemetra et al. 2003) and Stephens. Dune is blue to blue-green in color with semi-erect flag leaves. Heading date for Dune is 1-2 days earlier than that observed for Brundage 96 and Stephens (Table 1), and 2-3 days later than 'Brundage' (Zemetra et al. 1998). Dune has good to excellent straw strength showing a similar lodging response as Brundage 96 and Stephens under rainfed and irrigated conditions. Glumes of Dune are awned and seed is intermediate in size, white and soft.

Agronomic Performance

Dune is high yielding under both rainfed and irrigated conditions (Table 1). It equaled or exceeded the yield of Stephens, Brundage 96 and Brundage under rainfed conditions over four years of advanced yield testing and out yielded these three cultivars under irrigated conditions over the same four years of testing. Mean yield for Dune under rainfed conditions in northern Idaho (24 site/years) was 97 bu/acre and 153 bu/acre (11 site/year) under irrigated conditions in southern Idaho. In the Western Regional Uniform White Winter Wheat Nursery, Dune was the highest yielding cultivar in 2001, 2002 and 2003. Dune averaged 103 bu/acre over the three years of testing compared to 95 bu/acre for both Stephens and 'Madsen' (Allan et al.1989) over the same three years of testing (Table 3). In extension testing in northern Idaho in 2003 and 2004, Dune had an average yield equal to or greater than Brundage 96, Stephens or Madsen (8 site/years) (Table 5). In extension testing in southwestern Idaho under irrigation in 2003 and 2004 (8 site/year) Dune averaged 141 bu/acre compared to 133 bu/acre for Stephens and 122 bu/acre for Brundage. In extension testing in southeastern Idaho in 2003 and 2004 Dune again exceeded the check cultivars Stephens and Brundage for yield (6 site/year irrigated).

Dune had an equal to slightly higher test weight under both rainfed and irrigated conditions compared to Stephens and Brundage 96 (Table 1). Under irrigated conditions Dune had a slightly lower test weight than Brundage. In four years of advanced testing, Dune had an average test weight of 57.4 lbs/bu rainfed and 58.7 lbs/bu irrigated compared to Stephens (56.3 lbs/bu rainfed – 57.6 lbs/bu irrigated) and Brundage 96 (55.8 lbs/bu rainfed – 57.6 lbs/bu irrigated) In the Western Regional Uniform White Winter Wheat Nursery (Table 3), Dune's test weight (59.1 lbs/bu) was equal to that of Madsen (58.8 lbs/bu) and slightly higher than Stephens (58.4 lbs/bu) over three years of testing. In two years of extension testing in Idaho (2003 and 2004) (Tables 5), Dune's test weight was equal to or greater than the check cultivars under rainfed conditions in northern Idaho and equal to Brundage but greater than Stephens under irrigated conditions in southern Idaho.

End-use Quality

Dune has good end-use quality for a soft white winter wheat. Percent flour protein is similar to that found for other soft white winter wheat cultivars under both rainfed and irrigated conditions (Table 2). Depending on the method used to estimate kernel hardness, Dune is similar to or slightly harder than Stephens with kernel hardness more similar to Madsen in the advanced yield trials (Table 2). Break flour yield for Dune is similar to that observed in Stephens and slightly less than either Brundage or Brundage 96 (Table 2 and 4). Percent flour ash was similar to Brundage and less than Stephens in advanced yield testing (Table 2). For end-use quality, Dune had a mean cookie diameter similar to Stephens in both advanced yield testing and regional testing (Table 2 and 4). For sponge cake volume, Simon was similar to both Stephens and Madsen over three years of regional testing (Table 4). In Pacific Northwest Wheat Quality Council testing, Dune was found to have acceptable end-use quality for a soft white winter wheat.

Disease Reactions

Dune has moderate resistance to stripe rust (caused by *Puccinia striiformis* Westend.) based on regional testing (Table 6). Dune has temperature sensitive adult resistance based on the Mt. Vernon, WA results (Table 6). Dune appears to have an intermediate level of tolerance to Cephalosporium stripe (caused by *Hymenula cerealis* Ellis & Everh.) based on inoculated field results (Table 6) showing a much lower number of white heads and percent stunting compared to Stephens. It is susceptible to dwarf bunt

(caused by *Tilletia controversa* Kühn in Rabenh.) and would require the use of a seed fungicide treatment if grown in a region where dwarf bunt can occur.

Breeder and Foundation seed of Dune will be maintained by the Idaho Foundation Seed Program under the direction of the Idaho Agricultural Experiment Station, University of Idaho, Moscow, ID 83844.

References

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