

**OREGON AGRICULTURAL EXPERIMENT STATION
OREGON STATE UNIVERSITY
CORVALLIS, OR 97331**

Release of 'Verdant' winter hooded barley

Verdant is a six-row, standard height, winter growth habit, hooded barley selection. Spikes are semi-compact to lax. Verdant was selected from the cross of Kold/Hoody. Kold is an awned winter six-row feed barley with a strong vernalization requirement and good resistance to stripe rust and scald. Hoody is a hooded winter six-row barley with a strong vernalization requirement and it is susceptible to stripe rust and resistant to scald. The Kold/Hoody cross was made in 2000. From 2001 until 2004 the F2 – F4 generations were advanced at Hyslop Farm (Corvallis, Oregon) with selection for hooded spikes, stripe rust and scald resistance, lodging resistance, and high test weight. Selected F4 head rows were harvested in bulk. In 2005, preliminary grain yield and forage trials were conducted at at Madras, Oregon and Tulelake, California. Based on these trials, a subset of lines was selected for further testing in 2006. The F6 trials were conducted at Madras, Oregon; Tulelake, California; Davis, California; and at Corvallis, Oregon. Forage yield data only were obtained from Madras; grain yield data only were obtained from Davis. Forage and grain yield data were obtained from trials at Tulelake and Corvallis. Feed quality was determined on Hoody and the selection K/H 33-35-1 (which gave rise to Verdant) on samples from Corvallis, Madras, and Tulelake. Data from these trials are summarized in Tables 1, 2, and 3. Heads were selected from promising selections, including K/H 33-35-1. In 2007, purification head row blocks (F7) were planted at Corvallis. In the spring of 2008, three blocks of head rows were selected and designated as OR79, OR710, OR711, and OR712 (which derived from K/H33-35-1 and gave rise to Verdant). These three selections (F8) and Hoody were planted at Corvallis and Pendleton, Oregon in 2008. Agronomic traits and forage quality were measured on these trials in 2009. Data from these trials are shown in Table 4. Based on these data, OR712 (Verdant) was selected for advance, release, and licensing. F9 seed of Verdant from the three replications of the Corvallis yield trial was harvested in 2009 and tagged as "Breeder's Class". This Breeder Class seed was divided and planted in "head rows" the Washington State Crop Improvement Association facilities at Othello, Washington in the fall of 2009. In this increase the following off-types were observed: 2.5 hooded heads (spikes) up to 1 inch longer than average/10,000 heads. Plants with these long heads were earlier to flower and at flowering were 4 – 6 inches taller than average. However, by crop maturity, the height and earliness differences were not as apparent. Awned heads were observed at a frequency of 10/10,000. In Registered and Certified seed the long-head variant may occur at a level of up to 5/10,000 and the awned variant at a level of up to 20/10,000.

Performance data

Verdant, and its predecessors, were tested for yield, forage quality and disease resistance over a range of locations and years in Oregon and California. Because winter forage barley is a unique sub-class of winter barley, there is no Regional Nursery

system for generating balanced data sets. Instead, selections are tested and advanced as resources and interest allow. Tables 1 - 3 show data on the F6 selection from which OR712 was selected. Tables 4 – 6 show data on the F8 selection (OR712) from which Verdant was selected. Cumulatively, these data show that Verdant is superior to Hoody in terms of resistance to stripe rust (incited by *Puccinia striiformis* f.sp. *hordei*). The two varieties have comparable levels of resistance to scald (incited by *Rhynchosporium secalis*). Under conditions with severe stripe rust disease pressure - such as those encountered at Corvallis, Oregon and Davis, California - the grain yield, grain test weight, and forage yield of Verdant are superior to those of Hoody. In the absence of these diseases (e.g. environments such as Pendleton, Madras, (Oregon) and Tulelake, California – the two varieties have similar levels of performance. Forage quality analyses for the two varieties are very similar. In all tests where Verdant and Hoody were both grown, no differences in winter hardiness were observed.

OSU will not submit Verdant for Plant Variety Protection. Verdant will be exclusively licensed to TriState Seeds for a period of five-years. Tri-State Seeds may elect to submit Verdant for Plant Variety Protection with or without the Title 5 option. OSU will maintain head row seed stocks. Tri-State Seeds will produce foundation, registered and certified seed stock classes. Seed stocks that fail to meet certification standards cannot be sold as seed, nor used as seed.

Author: P. Hayes

Approved:

Dean, College of Agricultural Sciences
Oregon State University

Date

P. Hayes Dep. of Crop and Soil Science, Oregon State University, Corvallis, OR, 97331

Table 1. Forage yield, grain yield, and grain test weight of Verdant vs. Hoody at three locations in 2006.

| Variety | Forage Yield tons/acre | | | Grain Yield lbs/acre | | | Test weight lbs/bushel | |
|--------------------------|---------------------------|-----------------|--------------|-------------------------|-----------------|-------------|---------------------------|-----------------|
| | Tule Lake CA | Corvallis OR | Madras OR | Tulelake CA | Corvallis OR | Davis CA | Tulelake CA | Corvallis OR |
| Verdant (K/H 33-35-1) | 7.7a* | 5.0a | 6.8a | 5350a | 5948a | 3590a | 47ab | 50a |
| Hoody | 8.0a | 4.8a | 5.8b | 5397a | 2897b | 1070b | 44a | 46b |

*Means followed by the same letter are not different at $P < 0.05$.

Table 2. Forage quality analysis of Verdant vs. Hoody at three locations in 2006. T= Tulelake, CA; C = Corvallis, OR; M = Madras, Oregon in 2006.

| Variety | Dry matter (%) | | | NDF (%) | | | ADF (%) | | | Ash (%) | | | Crude protein (%) | | |
|---------|--------------------------|----|----|------------|----|----|------------|----|----|------------|---|---|----------------------|---|---|
| | T | C | M | T | C | M | T | C | M | T | C | M | T | C | M |
| | Verdant (K/H 33-35-1) | 93 | 93 | 93 | 59 | 57 | 61 | 34 | 33 | 36 | 9 | 5 | 7 | 7 | 5 |
| Hoody | 93 | 93 | 93 | 61 | 53 | 57 | 36 | 30 | 34 | 9 | 6 | 7 | 8 | 7 | 8 |

Table 3. Heading date, stripe rust disease severity and scald rating of Verdant vs. Hoody at Corvallis in 2006, 2007, and 2008.

| Variety | Heading date (Julian days) | | | Stripe rust (% severity) | | | Scald (1 – 9 scale) | | |
|-----------------------|-------------------------------|------|------|-----------------------------|------|------|--------------------------|------|------|
| | 2006 | 2007 | 2008 | 2006 | 2007 | 2008 | 2006 | 2007 | 2008 |
| Verdant (K/H 33-35-1) | 127 | 124 | 139 | 1 | 0 | 0 | 1 | 5 | 5 |
| Hoody | 131 | 133 | 141 | 70 | 50 | 30 | 3 | 6 | 4 |

Table 4. Forage yield, grain yield, and grain test weight of Verdant vs. Hoody at two locations in 2009.

| Variety | Forage Yield tons/acre | | Grain Yield lbs/acre | | Test weight lbs/bushel | |
|--------------------|-----------------------------------|-----------------|---------------------------------|-----------------|-----------------------------------|-----------------|
| | Corvallis OR | Pendleton OR | Corvallis OR | Pendleton OR | Corvallis OR | Pendleton OR |
| Verdant (OR712) | 10.0a* | 4.8a | 5330a | 5718a | 50.4a | 48.2 |
| Hoody | 8.8b | 4.8a | 1885b | 4267a | 41.4b | 50.0 |

*Means followed by the same letter are not different at $P < 0.05$.

Table 5. Forage quality analysis of Verdant vs. Hoody at Corvallis and Pendleton, OR in 2009.

| Variety | Dry matter (%) | | NDF (%) | | ADF (%) | | Ash (%) | |
|--------------------|---------------------------|-----------------|--------------------|-----------------|--------------------|-----------------|--------------------|-----------------|
| | Corvallis OR | Pendleton OR | Corvallis OR | Pendleton OR | Corvallis OR | Pendleton OR | Corvallis OR | Pendleton OR |
| Verdant (OR712) | 91 | 91 | 65 | 55 | 37 | 28 | 6 | 8 |
| Hoody | 91 | 91 | 65 | 50 | 38 | 27 | 7 | 6 |

Table 6. Heading date, stripe rust disease severity and scald rating of Verdant vs. Hoody at Corvallis in 2009

| Variety | Heading date (Julian days) | Stripe rust (% severity) | Scald (1 – 9 scale) |
|-----------------|---------------------------------------|-------------------------------------|--------------------------------|
| Verdant (OR712) | 131a | 8a | 1a |
| Hoody | 132a | 80b | 1a |