Registration of ‘Vanguard’ Wheat

‘Vanguard’ hard red winter wheat (Triticum aestivum L. (Reg. no. CV-850, PI 593891), a cultivar with tolerance to feeding and cutting damage caused by wheat stem sawfly (Cephus cinctus Norton), was developed and released by the Montana Agricultural Experiment Station in 1995.

Vanguard resulted from an F3 headrow selected and bulked in 1990 from the cross ‘Lew’/‘Tiber’/‘Redwin’. Lew, a solid-stemmed spring wheat, is the source of sawfly resistance. Vanguard was evaluated as MTSF2238 in Montana Preliminary, Intra-state, and Off-Station yield nurseries from 1991 through 1995 and in the Northern Regional Winter Wheat Performance Nursery in 1995. Vanguard was released to Montana producers as an emergency measure to reduce losses to wheat stem sawfly, which have been severe in areas of central and north-central Montana since the mid-1980s. Vanguard is the first sawfly-tolerant winter wheat cultivar released since ‘Rego’ and ‘Sawmont’ in 1957 and 1965, respectively (2,3).

Vanguard has white straw and chaff with awned spikes that are inclined to nodding at maturity. Kernels are hard, red, long, and elliptical, with a midsized germ and a short brush. Kernel cheeks are rounded, with a wide, straight, deep crease. Coleoptile length of Vanguard is long, averaging about 10 mm longer than ‘Rocky’ and ‘Neeley’ in a replicated growth chamber evaluation (dark) at 20°C for 12 d. Vanguard has shown tolerance to wheat streak mosaic virus under field conditions but was susceptible to both the virus (mechanical inoculation) and its vector, the wheat curl mite (Eriophyes tulipae Keifer) in a growth chamber evaluations. Vanguard is also susceptible to prevalent races of stem rust (caused by Puccinia graminis Pers. Pers.), leaf rust (caused by Puccinia graminis Ug. P. recondita Pers.:Pers.), dwarf bunt (caused by Tilletia controversa Kühn), and Russian wheat aphid (Diuraphis noxia (Mordvilko)].

Vanguard is medium in maturity, heading about 1 d later than Rocky, but 3 to 4 d earlier than Neeley. Vanguard is similar in height to ‘Judith’ and Neeley (88 cm, 54 environments), with a tendency to lodge, particularly in high-yield environments. Vanguard has marginal winterhardness for dependable production in Montana, having similar or slightly lower winterhardness than Neeley and Rocky. Although Vanguard expresses a high degree of stem solidness over variable environmental conditions, levels of larval infestation by wheat stem sawfly in Vanguard are often as high as in hollow-stemmed cultivars. Vanguard is tolerant to feeding and cutting damage of wheat stem sawfly, based on limited yield testing under moderate to heavy sawfly infestations and field-scale observation of resistance to sawfly cutting under heavy sawfly infestations. Grain yield of Vanguard is medium to low in the absence of wheat stem sawfly, but equivalent or superior to most hollow-stemmed cultivars under moderate to heavy sawfly infestations. From 1992 to 1995 (54 location-years), grain yield of Vanguard (3689 kg ha⁻¹) was 19, 16, 13, and 5% lower than predominant cultivars, Neeley, Judith, Rocky, and Redwin, respectively (2,3).

Grain volume weight of Vanguard (763 kg m⁻³) is similar to that of Rocky and Redwin and higher than volume weights of Judith and Neeley. Vanguard is heterogeneous for height and several morphological traits, containing up to 5% tall variants (5 to 15 cm taller than modal height), 7.5% hollow-stemmed plants, 0.1% awnless plants, and 0.1% red-chaffed plants.

Initial nursery tests near Corvallis, OR, indicated good yield potential, alpha acid content between 4 and 5%, beta acid content between 4 and 5%, and a chroomone content of about 25%. Tests in the Yakima Valley near Malton and Prosser, WA, confirmed high yield potential, but dried cones averaged about 2% less alpha and 1% less beta acid than those from Oregon tests.

The Hop Research Council, in cooperation with the USDA, established 1.2-ha test plots of Ultra in Oregon, Washington, and Idaho in 1989, as suggested by brewers, who judged the aroma potential of this hop to be "outstanding." Between 1990 and 1992, commercial testing confirmed Ultra’s superior yield potential in Oregon and Washington, but not in southwest Idaho. Yields of established 2-yr-old plants averaged more than 2200 kg ha⁻¹ in Oregon and Washington, but less than 1500 kg ha⁻¹ in Idaho. The brewing quality obtained in commercial plots was somewhat lower than that found in nursery plots, with alpha acids ranging from 2 to 3% in Oregon, 2 to 3% in Washington, and about 2% in Idaho. Beta acid content averaged 1% higher than alpha acid. Cummulone content ranged from 25 to 30% over the 3-yr commercial testing period.