

## **Plant Variety Protection Office Guidelines Exhibit B - Statement of Distinctness**

To produce a Statement of Distinctness the applicant can follow the below steps:

(1a) State the most similar previously existing variety, varieties, or identifiable group of varieties; or,

(1b) State all the previously existing varieties known for a crop. Generally, this can only be one for a newly identified crop.

(2) State the character or characters that clearly distinguish the applicant's variety from the varieties stated in step 1 (i.e., the most similar variety or varieties).

(3) State the qualities or quantities of the character(s) referenced in step 2. Note the character state must be provided for the application variety and the most similar variety or varieties. Please see Examples of Statements of Distinctness.

### **General Requirements for a Distinguishing Character**

Differences in quantitative characters such as plant size, seed size, and maturity, that are not obvious and detectable without a direct comparison, must be supported by evidence provided by the applicant. The evidence must be given as numerical data obtained from at least 2 trials. Please see the Guidelines for Presenting Evidence in Support of Variety Distinctness.

Distinction based on differences in color needs to be referenced with a standard such as the Royal Horticultural Society Colour Chart or the Munsell Book of Color, unless dramatic (i.e., red vs. green). Color chart measurements must be conducted in two or more localities or growing seasons.

Distinction based on differences in disease reaction needs to be supported with data or results from at least 2 trials that were conducted in two or more localities or growing seasons, unless dramatic (i.e., immune vs. highly susceptible); or the presence or absence of a gene known to elicit the reaction must be stated. When the causal agent has been demonstrated or identified, the source of the disease must be provided. Also, the disease reaction needs to be referenced to the causal agent or organism including the race, strain, or pathotype where appropriate. If the causal agent has not been demonstrated or identified, the source of the disease or inoculant must be provided.

Differences in yield cannot be used as a basis for distinction because yield is a highly complex character. Sub-characters that contribute to differences in yield can be used as a basis for distinction.

Improvements in uniformity (by reducing the standard variation) are not sufficient to assess distinction.

The PVPO will accept differences using molecular techniques (DNA fingerprinting) only if:

- The molecular marker locus is publicly disclosed and cited (cites to URLs such as Soybase or MaizeGDB are acceptable);
- the molecular marker locus is clearly identified;
- the specific differentiating data is cited;
- if photographic copies are provided, they contain sufficient resolution of scientific publishable quality gels or other molecular data with sufficient resolution and labeling to resolve the individual data in question are provided;
- the molecular marker locus can be detected by a third party.

For example, in the case of:

SNPs - the locus is defined by the SNP sequence showing the substitution or indel

SSRs - the locus may be defined by primer pairs or sequence

AFLPs - the locus is defined by primer pairs

RAPDs - the locus is defined by primer pairs

#### Guidelines for Presenting Evidence in Support of Variety Distinctness

Differences in quantitative characters such as plant size, seed size, maturity and any difference not obvious must be given as numerical data obtained from similar comparisons with a statistical analysis showing the degree of significance. The comparison must be conducted in at least two locations or two growing periods.

The following information is required as part of the statistical analysis:

- (1) Provide data or results from at least 2 trials for comparison of a differentiating characteristic, conducted in two or more localities or growing seasons with the results analyzed separately clearly demonstrating repeatability (do not pool your data);
- (2) The location of each trial; planting, harvesting, and comparison dates for each trial; number of plants in each trial; sample size or number of plants (or plant parts) for each comparison;
- (3) Mean or average value of the differentiating characteristic for each variety in the comparison.
- (4) Some measure of the range of observed values for each variety in the comparison, such as the standard deviation, 95% confidence intervals, the actual range observed values from minimum to the maximum, or a histogram or box plot, which are helpful in determining the validity of any comparisons;
- (5) Name of the specific statistical analysis used (e.g., T-test, specific "LSD" procedure, ANOVA, or the like);

(6) Citation of the actual statistic and the probability value (if a T-test was used, provide the actual T-value, as well as the probability value corresponding to it);

(7) Evidence that the analysis is appropriate in this case (e.g. if the distribution was not a normal distribution, that the analysis was non-parametric, e.g. Mann-Whitney U-test, or that the data were appropriately transformed), include any factors that prevented the normal distribution and/or confidence of the data.

#### Examples of Statements of Distinctness

'Variety A' is most similar to 'Variety B'; however, 'Variety A' has a darker leaf color than 'Variety B' (140B vs. 140A and 143B vs. 143A RHS, respectively).

'Variety A' is most similar to 'Variety B'; however, 'Variety A' has a lighter pod color than 'Variety B', (137B vs. 193A RHS, respectively).

'Variety A' is most similar to 'Variety B'; however, 'Variety A' has the er gene conferring resistance to Erisyphe pisi (powdery mildew), whereas 'Variety B' lacks the er gene and is susceptible.

'Variety A' is most similar to 'Variety B'; however, 'Variety A' carries the mo allele for resistance to bean yellow mosaic virus and is resistant, whereas 'Variety B' carries the Mo dominant allele for susceptibility and is susceptible.

'Variety A' is most similar to 'Variety B'; however, 'Variety A' is more resistant to Erisyphe pisi, which causes powdery mildew, than 'Variety B', 3.0 vs. 5.5 on a 1-9 scale with 1 being highly resistant and 9 being highly susceptible.

'Variety A' produces 2 to 3 flowers per node, whereas 'Variety B' only produces 1 to 2 flowers per node.

'Variety A' is most similar to 'Variety B'; however, 'Variety A' flowers 6 days earlier than 'Variety B' (50 vs. 56 days, respectively).

'Variety A' is most similar to 'Variety B'; however, 'Variety A' has a larger seed weight than 'Variety B' (2500 vs. 3000 seeds/lb., respectively).

'Variety A' is most similar to 'Variety B'; however, 'Variety A' has a brown hilum, whereas 'Variety B' has a black hilum.

'Variety A' is most similar to 'Variety B'; however, 'Variety A' differs from 'Variety B' in plant height (219 vs. 178 cm) and ear height (90 vs. 69 cm).

'Variety A' is most similar to 'Variety B'; however, 'Variety A' differs from 'Variety B' in leaf angle (14 vs. 28 degrees, respectively) and silk color, salmon vs. green (Munsell 2.5R 4/8 vs. 2.5 GY 8/6, respectively).

'Variety A' is most similar to 'Variety B' and 'Variety C'; however, 'Variety A' is 7 days earlier to bloom than 'Variety B' and 4 days later to bloom than 'Variety C'.

'Variety A' is most similar to 'Variety B' and 'Variety C'. 'Variety A' has a lower lint percent (35.0 vs. 37.6%), lower lint index (6.6 vs. 7.9 g lint/100 seeds), higher stelometer (33.2 vs. 30.2 g/tex) and higher 2.5% span length (1.37 vs. 1.32) than 'Variety B'. 'Variety A' has a lower lint index (6.6 vs. 7.3 g lint/100 seeds) and a lighter boll (3.2 vs. 3.4 g) than 'Variety C'.

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