A Leaf Bud Development Scale for Rabbiteye Blueberry (*Vaccinium ashei* Reade)

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A crop's vegetative and reproductive development are frequently divided into stages to describe its progress. Such a description is very useful for denoting developmental differences between cultivars, for making crop management recommendations based on growth stages, and for clear communication among individuals concerned with research, management, and production of the crop. A standard description of crop development makes one's attempt to designate the stage of development easier and less ambiguous. Hence, such descriptions are necessary for every crop.

Rabbiteye blueberry (*Vaccinium ashei* Reade) flower development has been described by Spiers (1978). This floral bud scale is widely used for various management decisions, such as growth regulator applications (NeSmith and Krewer, 1992). To our knowledge, no such developmental scale exists for vegetative development of rabbiteye blueberry. Reports describing highbush blueberry (*V. corymbosum* L.) vegetative characteristics (Gough et al., 1976, 1978) do not describe stages of leaf bud development. Hildebrand and Braun (1991) depicted floral and leaf bud stages for lowbush blueberry (*V. angustifolium* Aiton) that they used in disease ratings. Their vegetative scale ceased as leaves began to unfold. The purpose of this report is to present a leaf bud development scale for rabbiteye blueberry that extends through fully exposed leaf buds.

The scale reported here was developed after careful observation of various rabbiteye blueberry cultivars over several years under diverse environments. Vegetative buds were collected at stages that spanned the develop-

ment period from dormant buds through fully expanded leaves. As these were studied, six distinct stages of development became obvious (Fig. 1).

Stage 1 is a dormant bud with no visible signs of growth or swelling. Following certain stimuli, such as chilling or pruning, the inactive bud will begin to develop. Stage 2 describes a bud that has started to swell, is just beginning to elongate, and has a green tip just becoming visible. Stage 3 is an elongated bud prior to leaf unfolding. There is considerable visible green; however, leaves of the bud are still tightly rolled. Stage 4 describes the stage when the leaf bud is fully elongated and leaves have just started to unfold. The bud is not "open," but has started to open. In stage 5 the bud has opened. The basal leaves are readily visible, but have not fully expanded. In stage 6 the bud has fully opened and the first three to four leaves are completely unfolded and visible. The growing tip is still active.

Fig. 1. Stages of leaf bud development in rabbiteye blueberry: 1) dormant bud; 2) early green tip; 3) late green tip; 4) unfolding stage; 5) mouse-ear stage; 6) fully opened bud.

While we hope that the numerical designations of stages will become widely used, we have suggested the following common names that growers might readily identify: stage 1—a dormant bud; stage 2—"early green tip"; stage 3—"late green tip"; stage 4—"unfolding"; stage 5—"mouse-ear"; stage 6—fully opened.

We observed these stages of development in several rabbiteye blueberry cultivars. As with all crops, the rate of progression through the stages depends on environmental factors, particularly temperature (Ritchie and NeSmith, 1991). These stages have proven useful in comparing the rates of leaf development among cultivars and in response to winter chilling. The stages appear to be relevant to highbush blueberries as well, according to limited observations made for that species.

Literature Cited

- Gough, R.E., V.G. Shutak, and R.L. Hauke. 1978. Growth and development in highbush blueberry. I. Vegetative growth. J. Amer. Soc. Hort. Sci. 103:94-97.
- Gough, R.E., V.G. Shutak, and N.D. Windus. 1976. Observations on vegetative and reproductive growth in blueberry. HortScience 11:260-261.
- Hildebrand, P.D. and P.G. Braun. 1991. Factors affecting infection of lowbush blueberry by ascospores of *Monilinia vaccinii-corymbosi*. Can. J. Plant Pathol. 13:232-240.
- NeSmith, D.S. and G. Krewer. 1992. Flower bud stage and chill hours influence the activity of GA₃ applied to rabbiteye blueberry. HortScience 27:316-318.
- Ritchie, J.T. and D.S. NeSmith. 1991. Temperature and crop development, p. 5-29. In: R.J. Hanks and J.T. Ritchie (eds.). Modeling plant and soil systems. Amer. Soc. Agron. Monogr. 31. Madison, Wis.
- Spiers, J.M. 1978. Effect of stage of bud development on cold injury in rabbiteye blueberry. J. Amer. Soc. Hort. Sci. 103:452-455.

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