Heritability of Rosette Resistance in Blackberry

Creighton L. Gupton¹ and Barbara J. Smith²

U.S. Department of Agriculture, Agricultural Research Service, Small Fruit Research Station, P.O. Box 287, Poplarville, MS 39470

Additional index words. *Cercospora rubi*, blackberry breeding, double blossom, witches'-broom

Rosette (witches'-broom) or double blossom (Fig. 1) caused by *Cercospora rubi* (Wint.) Plakidas, is generally considered the most limiting factor of blackberry production in the southern United States. Lipe (1979) reported that 'Humble' was immune to rosette; however, Buckley et al. (1995) considered that it was resistant but not immune. 'Brazos' and 'Rosborough' were reported as tolerant by Lipe (1979) and moderately tolerant by Bowen (1979). Bowen (1979), Buckley et al. (1995), and personal observation (C.L.G.) indicate that 'Brazos' and 'Rosborough' does not perform satisfactorily in areas where rosette is severe. This study was conducted to determine if 'Humble', 'Brazos', and 'Rosborough' transmit rosette resistance to progeny and to estimate heritability of this trait.

'Cheyenne', 'Choctaw', 'Shawnee', and 'Navaho' were crossed with 'Brazos', 'Humble', and 'Rosborough', producing 12 progeny populations (Table 1). On 5 May 1992 three eight-plant replications from each population were established in Stone County, Miss., using a randomized complete-block design in a field where rosette is endemic. Four-plant plots of the parental cultivars were planted randomly among the crosses in each replication. All plants were spaced 2.75 m apart in each direction. Adventitious plants were removed with a hoe. The plants were fertilized with a complete fertilizer (114 g per plant of 13-13-13) during June of the first growing season and again (228 g per plant) the following March. After the first year NH_4NO_3 (228 g per plant) was applied annually during June. Drip irrigation was applied as needed. Weed control was accomplished by hoeing and gramoxone (1,1'-dimethyl-4,4'-bipyridinium salts) applied at the labeled rate.

Each plant was rated for rosette severity 5 June 1995, based on the approximate numbers of nodes affected, as follows: 0 = none, 1 = a few, 2 = less than a quarter, 3 = many but less than half, 4 = half, 5 = more than half, 6 = almost all, and 7 = all nodes infected or plant dead.

Received for publication 18 Nov. 1996. Accepted for publication 5 Feb. 1997. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked advertisement solely to indicate this fact.

¹Research Geneticist.

²Research Plant Pathologist.

Fig. 1. (A) Normal blackberry buds and flowers on a shoot and (B) "beaked" red flower buds forming a rosette typical of *Cercospora rubi*-infected shoots. The beak is caused by elongated, larger, and coarser than normal sepals. As the petals unfold, they are usually pinkish, wrinkled, and twisted, which gives the appearance of double flowers; thus the name double blossom.

The few plants that died had numerous rosettes on the previous year's floricanes and therefore were rated 7. Only 3% of the plants were rated 0, indicating uniform infection by the fungus. 'Navaho' could not be rated because of deer feeding damage. An estimate of the heritability (h^2) of rosette resistance in the cultivars was computed by regression of cross means on parental means (SAS Institute, Cary, N.C.).

Table 1. Rosette severity mean rating (see text for rating scale) of 12 blackberry cultivar crosses.

Cross	Rating
Navaho x Brazos	6.8 A ^a
Choctaw x Brazos	6.2 AB
Choctaw x Rosborough	6.0 ABC
Cheyenne x Rosborough	5.6 ABC
Shawnee x Brazos	5.5 ABCD
Shawnee x Rosborough	5.2 ABCDE
Cheyenne x Humble	4.3 BCDE
Navaho x Rosborough	4.3 BCDE
Navaho x Humble	3.9 BCDE
Cheyenne x Brazos	3.8 CDE
Choctaw x Humble	3.2 DE
Shawnee x Humble	3.0 E

^aMean separation by Duncan's multiple range test, $P \leq 0.05$.

Literature Cited

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Table 2. Rosette severity mean rating (see text for rating scale) of blackberry cultivars, crosses, and other parents of crosses.

Cultivar	Cultivar rating	Cross rating	Other parents' rating ^a
Humble	0.5 b ^b	3.3	6.1
Brazos	5.2 a	5.6	6.1
Rosborough	4.8 a	5.4	6.1
Cheyenne	6.4 a	5.0	3.5
Choctaw	5.2 a	4.3	3.5
Shawnee	6.6 a	5.2	3.5
Navaho	---	5.1	3.5
$h^2 = 0.48$			

^aMean rating of cultivars used as other parents in crosses.

^bMean separation by Duncan's multiple range test, $P \leq 0.05$.