Breeding Value for animal $G_1 G_1$:

$$BV_{11} = 2 \cdot (\mu_{11} - \mu) \qquad \text{where } \mu = (p-q)a + 2pqd$$

μ_{11} : average genotypic value of offspring from $G_1 G_1$ parent:

Rate of S

Parent	$f(G_1) = p$	$f(G_2) = q$	
$f(G_1) = 1$	$f(G_1 G_1) = 1 \cdot p$ $= p$	$f(G_1 G_2) = 1 \cdot q = q$	$\}\, f(G_2 G_2) = \emptyset$

Offspring

$$\mu_{11} = V_{11} \cdot f(G_1 G_1) + V_{12} \cdot f(G_1 G_2)$$
$$= a \cdot p + d \cdot q$$
$$BV = 2(\mu_{11} - \mu) = 2\left(a \cdot p + d \cdot q - \left[(p-q)a + 2pqd \right] \right)$$