G_1G_2:

Offspring: $f(G_1G_2) = \frac{1}{2}p + \frac{1}{2}q$

$= \frac{1}{2}(\underbrace{p+q}_{=1}) = \frac{1}{2}$

Parents	Males G_1 $f(G_1)=p$	G_2 with $f(G_2)=q$	
G_1 with $f(G_1)=0.5$	$f(G_1G_1)=\frac{1}{2}p$	$f(G_1G_2)=\frac{1}{2}q$	$f(G_1G_2)=0.5p$
G_2 with $f(G_2)=0.5$	$f(G_1G_2)=\frac{1}{2}p$	$f(G_2G_2)=\frac{1}{2}q$	$f(G_2G_2)=\frac{1}{2}(p+q)=\frac{1}{2}$

$f(G_2G_2)=\frac{1}{2}q$

$M_{12} = 0.5p \cdot a + 0.5d + 0.5q \cdot a$

$- \frac{1}{2}(pa + d - qa)$

$= \frac{1}{2}([p-q]a + d)$

$BV_{12} = 2\left(0.5([p-q]a+d) - [(p-q)a + 2pqd]\right)$

$= (q-p)[a + (q-p)d] = (q-p)\alpha$