Protocols for in vitro regeneration and polyploidy induction were developed to restore fertility in *Rhododendron* ‘Fragrantissimum Improved.’ Combinations of TDZ (0, 2, 10, 15 µM) and NAA (0, 5, 10 µM) were used to induce shoot regeneration from leaves. Shoot regeneration was optimized using 5 µM TDZ and 10 µM NAA. To induce polyploidy, regenerative callus was treated with 7.5, 15, 30, 60 or 90 µM concentrations of the mitotic inhibitor oryzalin for 1, 3, 5, 7 or 14 days. Oryzalin significantly affected survival and shoot regenerative capacity with shoots only being obtained from 7.5, 15 and 30 µM treatments. Maximum polyploidy induction was obtained from regenerative callus treated with 30 µM oryzalin for 3 days. Polyploid plants will be grown to flower, assessed for fertility and used in future breeding programs.