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Abstract: Drought is a major limitation in rice production worldwide and there is an urgent demand for drought tolerant lines that can provide considerable yield under drought stress. Developing drought tolerant lines and understanding the mechanisms affecting drought tolerance are important issues for rice breeding. However, the mechanisms underlying drought tolerance are quite complex. Also, reduction of time of breeding cycle is another important requirement. The aim of the present investigation was to identify superior F3 segregants having drought tolerant QTL from 100 randomly selected segregants of the cross between drought tolerant (DT) parent Birsa Gora 102 and drought susceptible (DS) parent BPT 5204. Hundred segregants were randomly selected and its phenotypic observations were recorded for the traits viz. plant height, panicle length, number of tillers, number of effective tillers, grains per panicle, panicle weight, seed yield per plant, 1000 seed test weight, rough rice length, breath and L/B ratio, brown rice length, breath and L/B ratio, rough rice and brown rice colour. Seventeen segregants of plant number 3, 4, 6, 14, 16, 17, 21, 29, 33, 35, 41, 42, 45, 47, 64, 66 and 100 were identified superior in having yield more than 7.03 g/ plant. The parents were analysed with 19 SSR marker and 14 markers were found to be polymorphic. Two check parents Vandana (DT) and IR 20 (DS) were also used for the analysis. The selected primers viz. RM 24, RM 3, RM 17, RM 171, RM 3825, RM 527, RM 537, RM 327, RM 302, RM 212, RM 232, RM 341, RM 5443 and RM 166 were employed for the analysis of the segregants. None of the plants were found to be homozygous at the entire 14 loci. The identified 17 segregants were found to have the drought tolerant QTLs. Maternal allele were present at different number of loci viz., 2, 3, 4 5, 6, 7, 8 and 10. The plant number 25, 26, 28, 38, 43, 50, 52, 55, 56, 57, 77, 91 and 92 had maternal allele at 8 loci, whereas the plant number 5, 94 and 10 had maternal allele at 10 loci. The segregants were found to be heterozygous in 1, 2, 3, 4, 5, 6, and 7 numbers of loci. In addition to identification of drought tolerant segregants anther culture, a tissue culture technique was used for the plant regeneration from the rice anthers. Rice anther culture technique immensely reduces the time and labour required for development of a homozygous line as compared to conventional methods. A three way cross of PA6444 X IR 36 anthers was used for the anther culture. Three plants were regenerated through callus induction in 1 anther only which was cold pre treated at 40 C for 6 days. It was collected at the stage when the auricle distance between the flag and the penultimate leaf was 7-9 cm. Anther induction frequency was 1%, total regeneration frequency was 13.04% and the anther culturability was of 3%. The regenerated plants were hardened in the greenhouse for 45 days prior to transfer in the pot.