LIST OF FIGURES

Figure 1.: Evolutionary pathways of two cultivated species of rice.

Figure 2.: Growth curve of cell suspension cultures of cvs. RCPL1-2C, RCPL1-3C, Nami, IR36, IR65, V20A and V20B.

Figure 3.: Plant regeneration from embryogenic suspension cells of RCPL1-2C initiated from embryogenic calli of mature seed derived scutellum.

Figure 4.: Plant regeneration from protoplasts of Japonica rice line RCPL1-2C.

Figure 5.: Plant regeneration from protoplasts of Indica rice lines IR36 and IR65.

Figure. 6.: Plant regeneration from protoplasts of CMS line V20A.

Figure 7.: Schematic diagram illustrating the donor - recipient protoplast fusion for cytoplasmic gene transfer.

Figure 8.: Cybridisation and plant regeneration from cybrid calli.

Figure 9. a.: Southern blot of Hind III-digested mitochondrial DNA from the maintainers, CMS line V20A and putative cybrids probed with orf155 showing the location of orf155 in 12 kb fragments in the maintainer lines and 1.3 kb fragment in CMS as well as putative cybrid lines.

Figure 9. b.: Southern blot of Hind III-digested mitochondrial DNA from BC1 progenies probed with orf155 showing the location of orf155 in the 1.3 kb fragment.

Figure 10.: Production of new CMS lines through protoplast fusion.

Figure 11. a: Southern blot of Hind III-digested mitochondrial DNA from the CMS line V20A (lane 1-5), IR62819A (lane 6-10) and IR54752A (lane 11-15) probed with orf155 showing the location of orf155 in 1.3 kb fragment in CMS lines.

Figure 11. b.: Southern blot of Hind III-digested mitochondrial DNA from the fertile maintainer lines V20B, IR62819B, IR54752B, RCPL1-2C, RCPL1-3C, Nami, IR58025B and Taipai 309 probed with orf155 showing the location of orf155 in 12 kb fragment in maintainer lines.

Figure 12. a.: Southern blot of Hind III-digested mitochondrial DNA from the putative cybrids between V20A X V20B, V20A X RCPL1-2C, V20A X RCPL1-3C and V20A X
Nami probed with \textit{orf155} showing the location of \textit{orf155} in 12 kb fragments in 1.3 kb fragment in cybrid lines.

Figure 12. b.: Southern blot of \textit{Hind} III-digested mitochondrial DNA from the putative cybrids between IR62829A X IR62829B, IR62829A X RCPL1-2C, IR62829A X RCPL1-3C and IR62829A X Nami probed with \textit{orf155} showing the location of \textit{orf155} in 1.3 kb fragment in cybrid lines.

Figure 12. c.: Southern blot of \textit{Hind} III-digested mitochondrial DNA from the putative cybrids between IR54752A X IR54752B, IR54752A X RCPL1-2C, IR54752A X RCPL1-3C and IR54752A X Nami probed with \textit{orf155} showing the location of \textit{orf155} in 1.3 kb fragment in cybrid lines.