

### Additional file 3 – Verification of double-crossover events in transformants.

The linear map shows the *pacC* genomic region, with the relevant genes and markers indicated. Primer names are shown, with their locations and directions indicated by small arrows. PCR products are shown in the gel images; the source of the template DNA is shown in bold text below each lane, and the primer pairs used for the amplification are noted below the image, referring to the corresponding set of lanes. The primer names are also listed in the table (Expected sizes of PCR products from mutant validation), along with the predicted amplicon sizes.

