Streptococcus pneumoniae infections are one of the major causes of morbidity and mortality worldwide. Currently, the treatment of these diseases represents a new challenge because of the emergence of multidrug-resistance amongst pneumococci. In this context, bacteriocins produced by Lactic Acid Bacteria (LAB) constitute an alternative treatment to traditional antibiotics. Streptococcus infantarius LP90, a strain isolated from water-buffalo milk, displays antimicrobial activity against clinical isolates of S. pneumoniae. N-terminal amino acid sequencing by Edman degradation of a purified peptide showing antipneumococcal activity (infantaricin A₁) revealed a 19-amino acid sequence, which further allowed to determine the nucleotide sequence of a 18,900 bp region by inverse genetics. BLAST analysis identified the presence of 29 putative ORFs including 12 genes encoding 9 hypothetical new bacteriocins (InfA-I), as well as genes encoding proteins involved in bacteriocin secretion, immunity, and transcriptional regulation. Reverse transcription-PCR analysis of this multibacteriocinogenic genetic cluster showed that all genes, except those encoding two putative immunity proteins, a response regulator and a histidine protein kinase, were transcribed. MALDI-TOF MS analyses of the peptides purified from the supernatant of S. infantarius LP90 showed that, in addition to the antipneumococcal infantaricin A₁, at least two more putative bacteriocins, infantaricins B₂ and H, were also produced. Peptidogenomics experiments by heat-mapping are currently in progress to fully characterize bacteriocin production by S. infantarius LP90, which would allow the best exploitation of this multibacteriocinogenic antipneumococcal LAB strain.