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Seasonal distribution of Salmonella in stream water in Taiwan

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Salmonella is one of the most important causal agents of waterborne diseases. The taxonomy of Salmonella is very complicated and the genus of Salmonella comprises more than 2,500 serotypes. The traditional detection methods for Salmonella are usually based on cultures using selective media and characterization of suspicious colonies by biochemical tests and finally confirmed by serological assay. However, those methods are generally time and labor consuming. To overcome this disadvantage, immunological and genetic methods for identification of Salmonella have been developed. The aim of this study was to investigate the seasonal distribution of Salmonella using novel procedures of detection method and to identify the serovars of Salmonella isolates from 156 stream water samples in Taiwan. The procedures include membrane filtration, non-selective pre-enrichment, selective enrichment of Salmonella, and then isolation of Salmonella strains by selective culture plates. The selective enrichment and culture plates were both detected by PCR. Finally, we used serological assay to confirm the serovars of Salmonella and also used pulsed-field gel electrophoresis (PFGE) to identify their serovar categories by the genetic pattern. We also investigated the relationships between the Salmonella and water quality parameters. In total positive samples, water temperature and total coliforms were positively associated with the presence of Salmonella ($p<0.05$). In this study, 41 water samples (26.3%) were indentified as Salmonella. The presence of Salmonella was higher in the summer months compared to other seasons. Besides, the result indicates the existence and diversity of Salmonella vary temporally and is strongly influenced by seasonal precipitation, turbidity, heterotrophic bacteria and pH ($p<0.05$).

Keywords: Salmonella; Serological assay; PCR; PFGE