

Host-Specific Viruses for the Detection of Faecal Pollution in Coastal Waters

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Aims

- Investigate the host-specificity and -sensitivity of human-specific adenoviruses (HS-AVs), bovine-specific adenoviruses (BS-AVs), and human-specific polyomaviruses (HS-PVs) for microbial source tracking in coastal waters
- Application of viral markers to identify the sources of faecal pollution in a coastal river affected by faecal pollution in Southeast Queensland (SEQ), Australia.

Materials and Methods

- Culture based methods were used for the enumeration of faecal indicator bacteria (FIB).
- Host-specificity and -sensitivity of the markers were assessed by screening 182 wastewater and animal faecal samples.
- PCR and qPCR assays were used for the detection of MST markers and quantification of zoonotic pathogens in environmental water samples ($n = 20$).

Results

Viral markers	Host-specificity	Host-sensitivity
HS-AVs	1.0	0.78
BS-AVs	1.0	0.73
HS-PVs	1.0	0.99

Table 1: Host-specificity and -sensitivity of viral markers



Figure 3: Percentage of samples exceeded ANZECC recreational water quality guideline value for primary contact

- The numbers of FIB in water samples collected ranged from 48 11 to 2906 300 (for *E. coli*) and from 60 20 to 1586 180 (for enterococci).

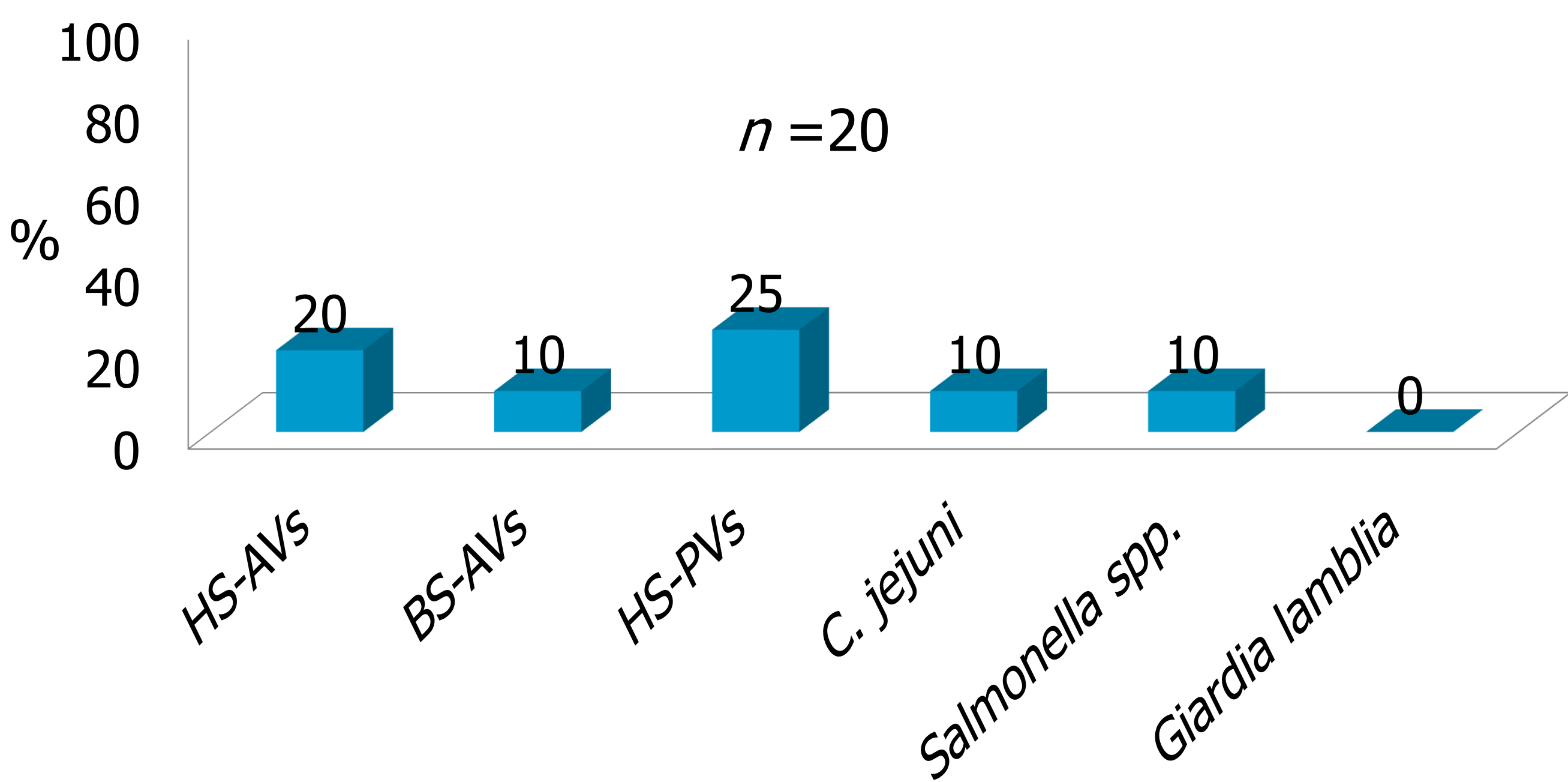


Figure 4: Percentage of samples positive for the viral markers and zoonotic pathogens

- The numbers of *Salmonella* spp. ranged from 350 40 to 430 70 genomic copies per 500 mL of water.
- Weak correlation was found between *E. coli* with HS-AVs ($p = 0.02$). However, significant correlations were observed between *E. coli* with BS-AVs ($p = 0.007$) and *Salmonella* spp. ($p = 0.007$)
- The numbers of enterococci correlated with BS-AVs ($p = 0.006$), *C. jejuni* ($p = 0.01$) and *Salmonella* spp. ($p = 0.006$). No significant correlations were found between *E. coli* and enterococci with HS-PVs.
- The results suggest that human and bovine specific viral markers detection using PCR could be a useful tool for the identification of human and bovine faecal pollution in coastal waters.



Figure 1: Host-groups screened for the host-specificity and -sensitivity assays

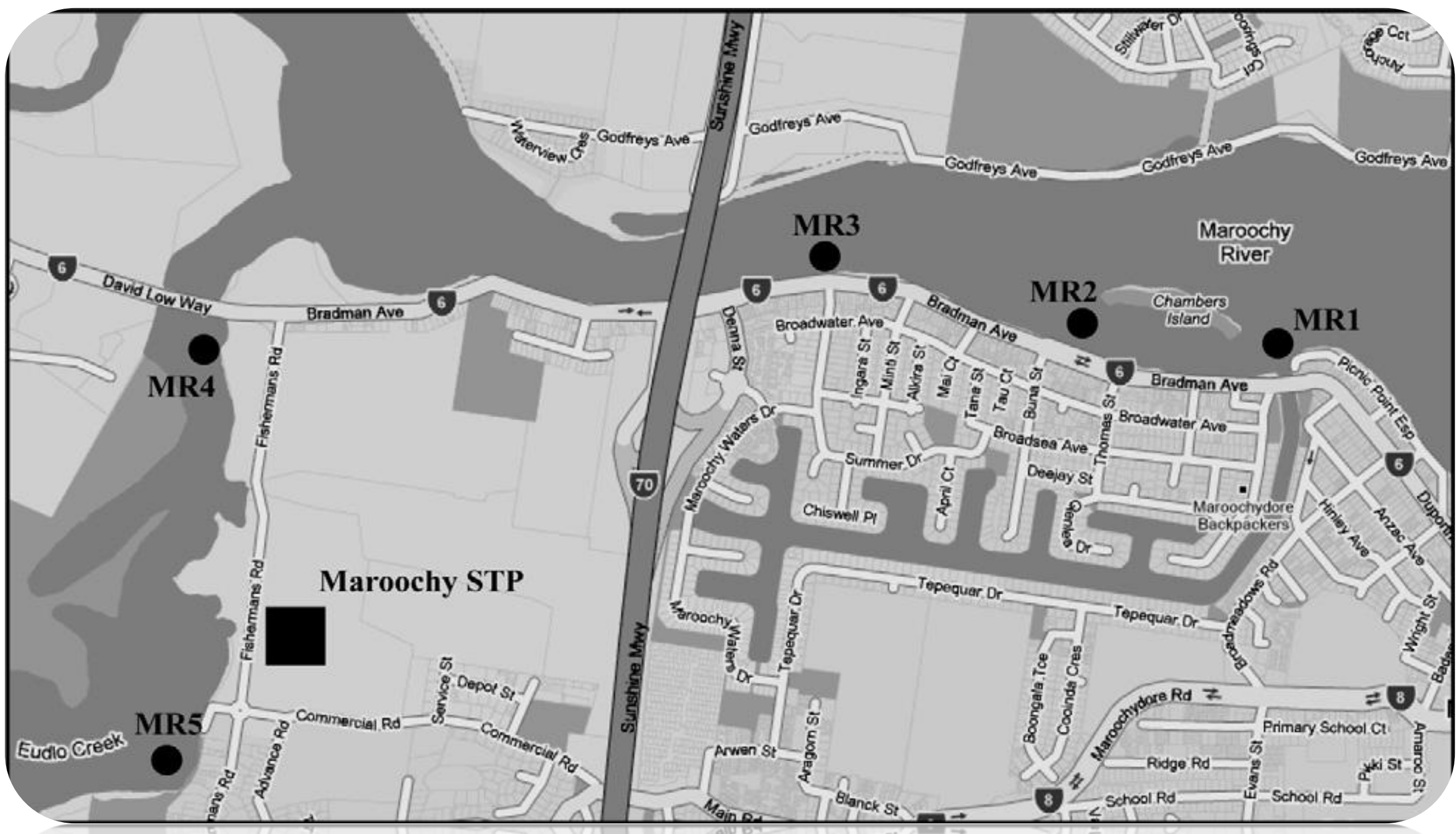


Figure 2: Maroochy River sampling sites MR1-MR5

Further information

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