

## **Transmission and hybridisation dynamics of *Schistosoma haematobium* in the Senegal River Basin: No barrier breakdown between human and cattle schistosomiasis?**

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### Introduction

Hybridisation and introgression between schistosome species may strongly impact on the epidemiology and the evolution of a disease. In the Senegal River Basin (Northern Senegal) introgressive hybridisation between the human *Schistosoma haematobium* and the animal *S. bovis* has been detected.

### Aim

Here we want to study the transmission and hybridisation dynamics of these two species in order to understand the impact on the epidemiology of human schistosomiasis.

### Methods

We collected *S. haematobium* parasite genetic data in ten villages in the Senegal River Basin. We also included parasite samples from Southern Senegal, Mali and Corsica as outgroup. In Northern Senegal, adult *S. bovis* worms were collected from cattle. *Schistosoma* parasites (>800) were genotyped with 17 highly polymorphic microsatellite markers, a subset was also genotyped with a mitochondrial marker (partial cytochrome oxidase 1 (cox1) fragment) and the nuclear ITS rDNA marker to define their species status (*S. bovis*, *S. haematobium* or hybrids).

### Results

As expected, pure *S. bovis* parasites clustered strongly apart from the ‘pure’ *S. haematobium* parasites. Hybrid parasites, i.e. with a *S. haematobium* nuclear ITS rDNA profile and a *S. bovis* cox1 mtDNA profile) did however not cluster intermediate between the ‘pure’ *S. haematobium* and the pure *S. bovis* parasites. Within *S. haematobium* the clustering of parasite genetic variation was related to their geographical location but not to their hybrid status. These results clearly show that no first generation (F1, F2) hybrids are present. Hybridization is therefore either rare or ‘old’, unidirectional and followed by repeated backcrossing with *S. haematobium* (‘mitochondrial capture’).

### Conclusion

This study suggests that, although experimental studies have shown that *S. haematobium* and *S. bovis* readily hybridize under laboratory conditions, a strong species barrier between *S. haematobium* and *S. bovis* persists in the field.