

Summary

Present work reports the application of modern molecular epidemiology methods for typing of bacteria. The aim was to study two important fowl-pathogenic bacteria *Pasteurella multocida* and *Riemerella anatipestifer* using methods adapted from the literature as well as developed during the present work.

Isolates were identified using specific PCR assays and rDNA sequencing, a PCR assay specific for *R. anatipestifer* was developed. To assess genetic relatedness of isolates different PCR-based (repetitive element based PCR, randomly amplified polymorphic DNA) typing methods and pulsed-field gel electrophoresis were applied, the pulsed-field gel electrophoresis protocol used for typing of *R. anatipestifer* was developed during this work on the basis of a protocol described to type *P. multocida*.

We examined three series of fowl cholera outbreaks and investigated the genetic diversity in a collection of Eastern-Hungarian *R. anatipestifer* isolates by means of the abovementioned method.

We proved that all three outbreak series originated in the persistence of a *P. multocida* strain, in case of the third series we also examined the possible causes of the failure of the vaccine applied. By employing these methods in real time (in a non-retrospective manner) key information may have become available which could have been a powerful aid in the prevention of recurrences. The work represents a potential application of molecular epidemiology in veterinary diagnostics.

Investigation of *R. anatipestifer* isolates revealed a spatially and temporally inhomogeneous pattern of strains, thus indicating the endemic presence of the pathogen in the area.

Present work demonstrates the applicability of molecular typing methods in veterinary diagnostic investigations, and may serve as a model to other application fields connected to veterinary sciences. These methods, for example, may provide useful data for the development of prevention programs against zoonotic bacteria or bacteria used as potential agents in bioterrorism. Food safety investigations bear emphasized importance in the EU, where these methods aid in microbial source tracking. (Such an investigation following *Salmonellae* and thermotolerant *Campylobacter spp.* From farm to fork is currently under way.