

Antimicrobial susceptibility pattern of *Flavobacterium columnare*, the causative agent of columnaris disease

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Introduction



Fig. 1. Rainbow trout : gill necrosis caused by *F. columnare* (arrow, operculum removed)

Flavobacterium columnare is the causative agent of columnaris disease, a predominant bacterial disease of both cultured and wild fresh-water fish. *F. columnare* infections may result in skin lesions, fin erosion and gill necrosis (Figures 1 and 2), with a high degree of mortality, resulting in severe economic losses. Hitherto, only limited data are available on the antimicrobial sensitivity pattern of *F. columnare*. This information



Fig. 2. Rainbow trout : typical skin lesions caused by *F. columnare* (arrows)

nevertheless is necessary to be able to select effective antimicrobial agents and to monitor antimicrobial resistance development. The purpose of this study was therefore to test the *in vitro* susceptibility of 100 isolates of *F. columnare*. The broth microdilution technique was used, following the Clinical and Laboratory Standards Institute (CLSI) guidelines, which allows testing these fastidious organisms reliably.

Materials and methods

One hundred *F. columnare* isolates, originating from 15 fish species, were collected worldwide between 1987 and 2011. The following 12 antimicrobial agents were tested : ampicillin, chloramphenicol, enrofloxacin, erythromycin, florfenicol, flumequin, gentamicin, nitrofurantoin, ormetoprim-sulfadimethoxin, oxolinic acid, oxytetracycline and trimethoprim-sulfadimethoxazole.

Results

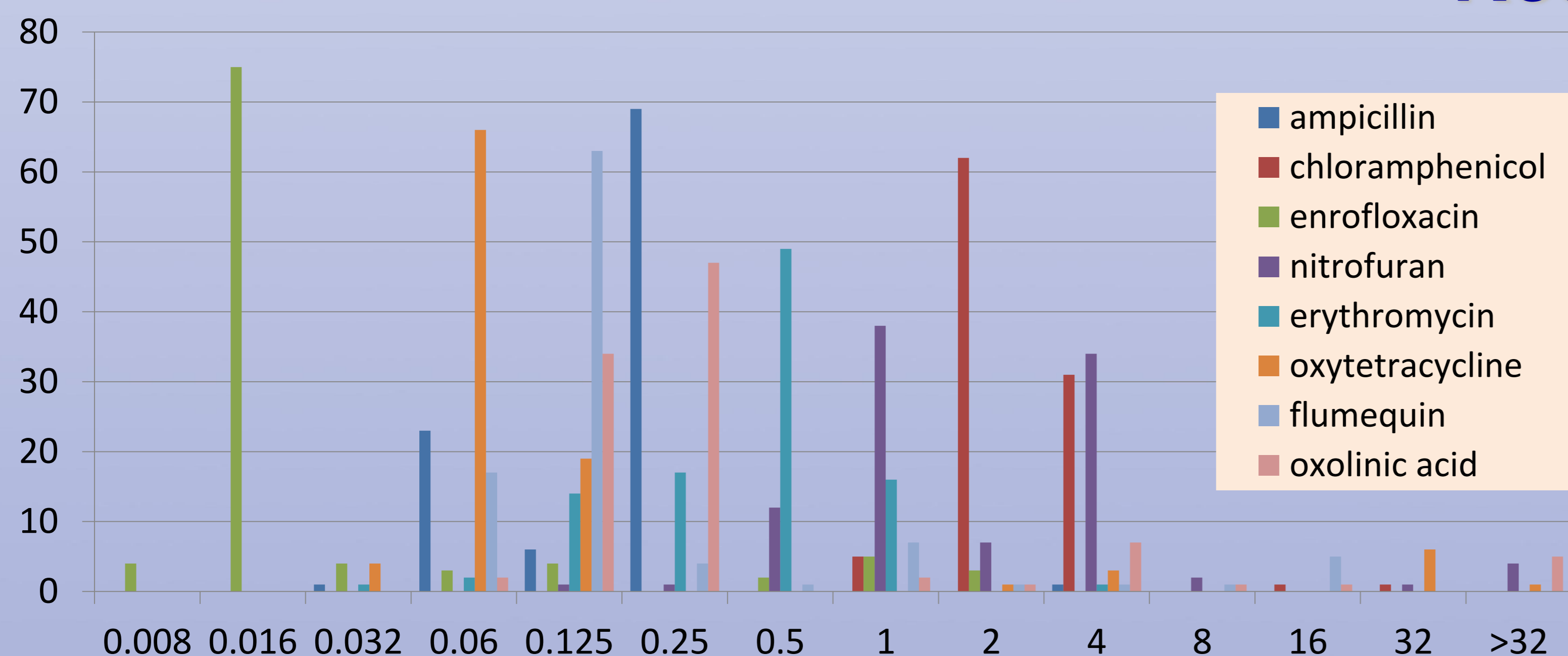


Fig. 3 : Minimum Inhibitory Concentration (MIC) of 12 antimicrobials against which acquired resistance was noted for 100 isolates; X-axis : MIC-values ($\mu\text{g/ml}$), Y-axis : number of isolates

- None of the isolates displayed acquired resistance to erythromycin, florfenicol, ormetoprim-sulfadimethoxin, trimethoprim-sulfadimethoxazole and gentamicin.
- The distributions of the MIC-values for the antimicrobial agents against which acquired resistance was noted are shown in Figure 3.
- All isolates, except for one, displaying acquired resistance against at least two antimicrobial classes originated from ornamental fish. Forty percent of the resistant isolates coming from this type of fish even showed resistance against three different antimicrobial classes.

Conclusion

This study is the first in its kind in view of the high number and mixed origin of isolates in terms of fish species and geographical area. The obtained results might indicate less prudent use of antimicrobials especially in the ornamental fish industry. Further genetic research into the mechanisms by which isolates can fend off the action of those antimicrobials is underway.

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