MICROSCOPIC EXAMINATION OF THE TISSUES FROM WILD BROWN TROUT WITH ULCERATIVE DERMAL NECROSIS SYNDROM (UDN), CAUGHT IN THE SŁUPIA RIVER IN POLAND

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Introduction: Ulcerative dermal necrosis (UDN), a disease of unclear pathogenesis, has been repeatedly reported in recent years in brown trout migrating from the Baltic Sea into Polish fresh water. Here we present the microscopic features in the tissues of UDN-affected wild sea trout spawners caught in the Słupia River in Poland in 2021 and 2022.

Materials and Methods: Formalin-fixed paraffin-embedded (FFPE) tissue sections from skin, spleen, and liver of wild spawners, negative for known salmonid viruses, caught in 2021 (group I, n=5) and 2022 (n=8) (group II) (Fig. 1 and 2) and archival FFPE tissues from immunosuppressed farmed sea trout (n=5) which developed UDN lesions (Fig.3) while cohabited with UDN-affected wild spawners were subjected to histopathological examination using HE staining followed by Grocott staining of the sections to confirm the fungal infection. Glutaraldehyde-fixed sections from the ulcers and normal-looking skin were subjected to scanning electron microscopy (SEM).

Fig. 1. Wild sea trout in early stage of UDN.

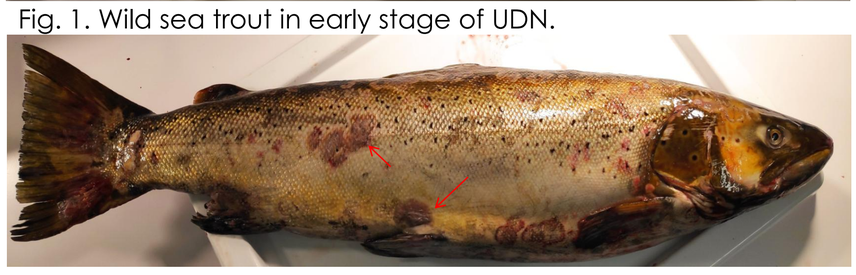

Fig. 2. Wild sea trout in middle stage of UDN. Ulcers indicated with red arrows).

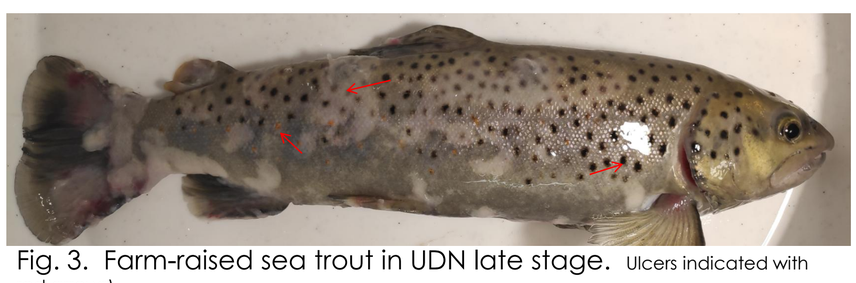

Fig. 3. Farm-raised sea trout in UDN late stage. Ulcers indicated with red arrows).

Results: In the fish with no UDN lesions the only histopatological changes were mild accumulations of lymphocytes within the intact epidermis (Fig.4A).

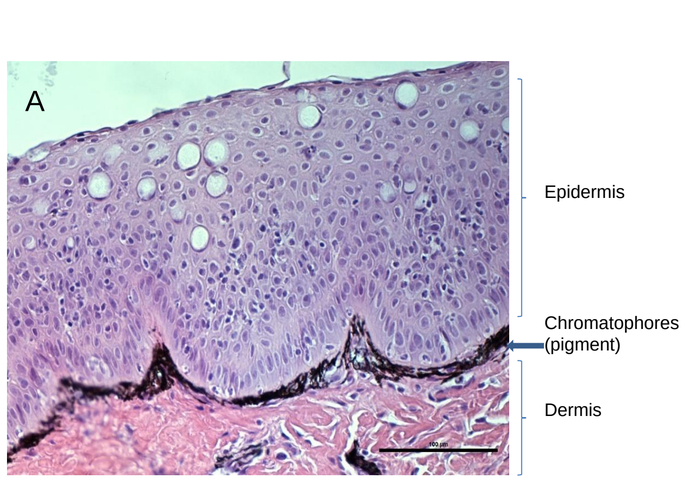

Fig.4. Tissues from UDN-unaffected trout, HE. A. Skin, B. Liver, C. Spleen.

Histopathological lesions in the UDN–affected fish included disruption of the epidermal layer with the occasional presence of fungal hyphae penetrating the epidermis and necrotic dermis in all cases (Fig.5.and 6.) In the 2022 cases, there was also prominent lymphocytic infiltration of the dermis with minor fungal involvement (Fig. 5. C and D) plus periportal lymphocytic infiltrations in one liver. Other than that no changes were found in the liver and spleen. Degeneration of the skin penetrated by fungi was evident in SEM examination (Fig.7).

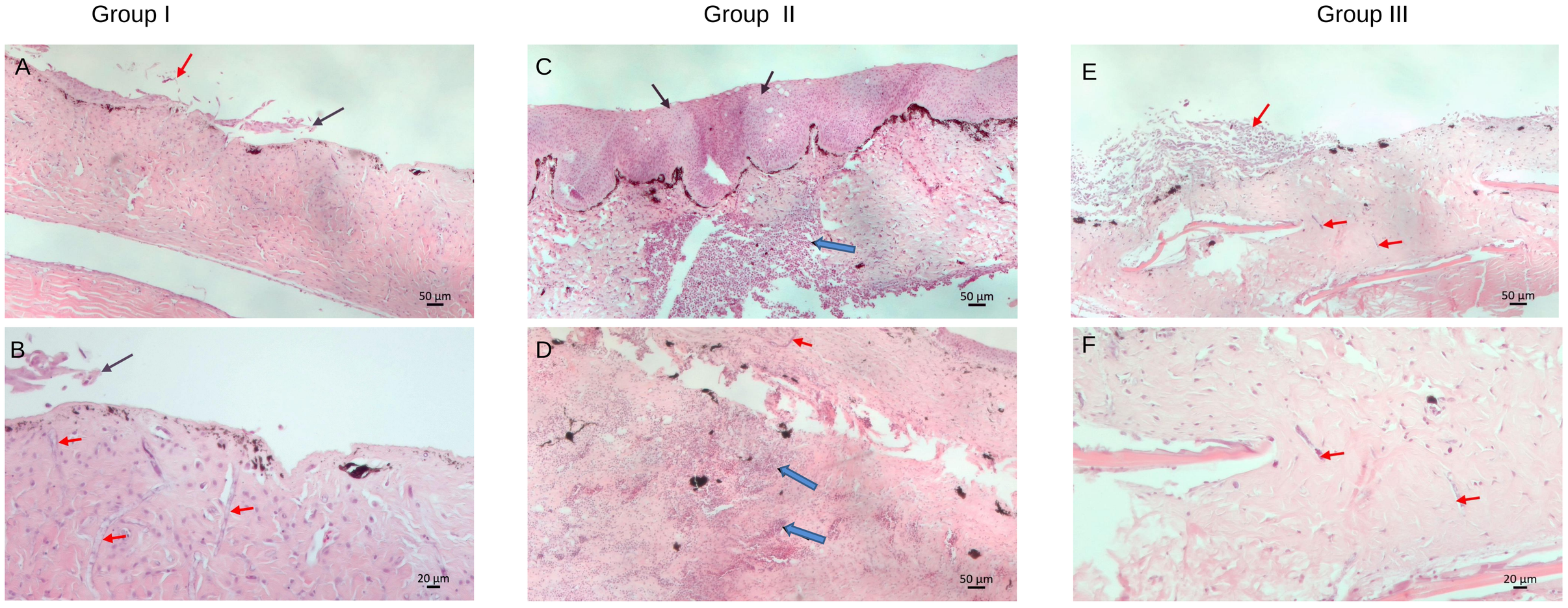

Fig. 5. UDN-affected trout, skin, histopatology, HE. Group I, A and B: Multiple fungal hyphae (red arrows) penetrating into the desquamated epidermis (black arrows) and dermis. Group II, C: Thick epidermal layer (black arrows), focally extensive lymhoid-cell infiltration (blue arrow) within the dermis. D: Single fungal hyphae (red arrow) and multifocal ymphoid-cell infiltrations in the dermal layer. Group III, E: Multiple fungal hyphae penetrating the necrotic and desquamated epidermis (red arrow) and dermis. B. Higher magnification of the above visible section)

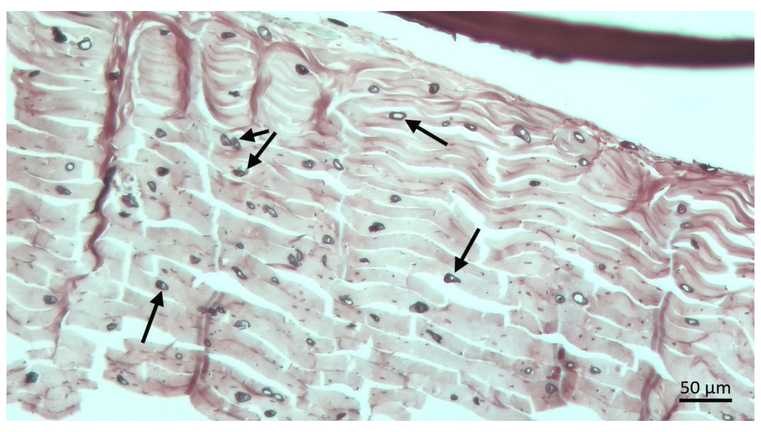

Fig. 6. Grocott-staining of he skin section from trout, group A. Multiple fungal hyphae (arrows) in the dermis.

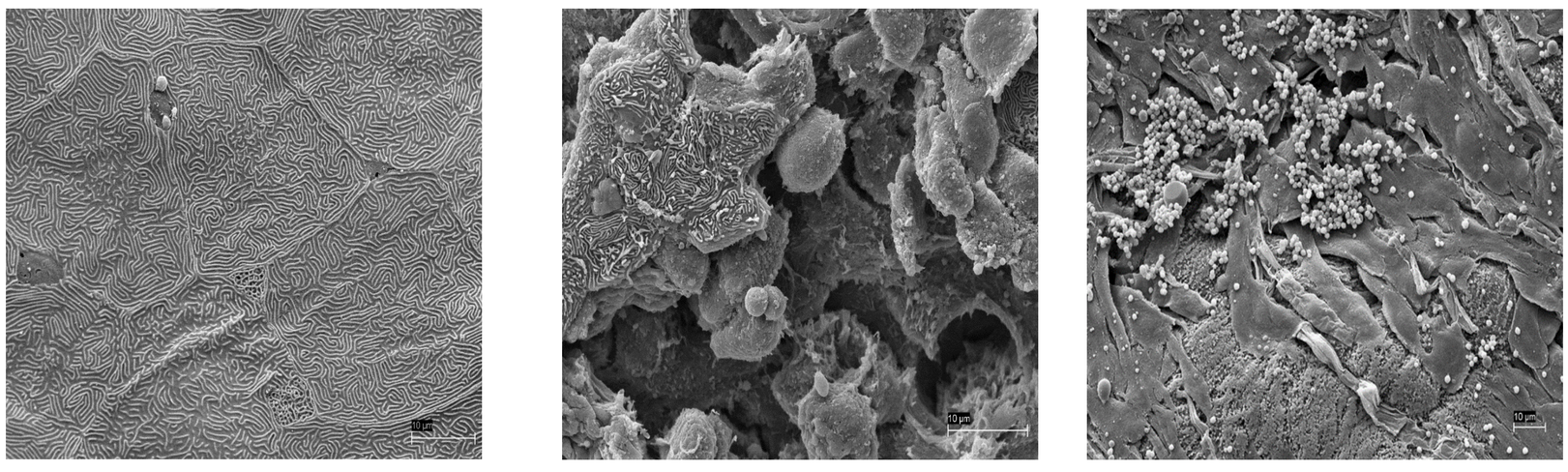

Fig. 7. SEM examination: Normal skin surface with mucous cells (A), sloughing epidermis along lesion margin (B), exposed dermis of with fungal infection UDN-affected trout (C)

Conclusions: The pathological changes in the majority of the cases seemed to be associated with fungal infections, limited to the skin, which has been reported in previous years in salmonids. Our report from 2020* indicated that the fungal infection in the UDN infected trout from the same river was *Fusarium spp*. The increased intensity of the changes in the trouts from 2022 might indicate a more complex pathogenesis of the disease.

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