Aquatic carnivorous plants use different types of glands within their trap leaves in order to secrete digestive enzymes and absorb prey-derived nutrients. Since the glands are the physiologically most active part of the trap, enhanced contents of physiologically important elements can be expected here. Furthermore, nutrient uptake from prey via the trap lumen should further increase the content of nutrients within these glands. It remains unclear if these elements are accumulated or immediately transported to other parts of the plant.

We used X-ray microanalysis (EDX) to study element contents and distributions in two genera of aquatic carnivorous plants, *Utricularia* (Lentibulariaceae) and *Aldrovanda* (Droseraceae). Plants were cultivated in the greenhouse, frozen in liquid nitrogen, dehydrated via freeze-drying in order to avoid element translocations, carbon coated and analysed in a Philips XL20 scanning electron microscope with attached EDX. Contents of N, P, S, K, Mg, Zn and other biologically relevant elements were compared between epidermal cells and various gland types in young but fully mature traps.

In *Aldrovanda vesiculosa*, significantly higher contents of N and Mg, but lower contents of P and S, were found in the quadrifid (A) glands compared to the epidermis. The elemental composition of the quadrifid glands was similar to that in the digestive glands (B), but clearly different from the external sessile glands outside the trap (C). In *Utricularia purpurea*, the quadrifid glands (D) contained higher contents of N, P, Ca and Zn. Generally, *A. vesiculosa* contained more N but less Mg, S, P and K than *U. purpurea* in the epidermis and especially in the quadrifid glands.

These results indicate different physiological functions of the quadrifid glands of *Aldrovanda* and *Utricularia* in spite of their similar morphology. Furthermore, the different functions of the various gland types in *Aldrovanda* are reflected by their different elemental content. The relevance of these findings for the physiology of nutrient uptake in aquatic carnivorous plants is discussed.

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Fig. 1: Glands of Aldrovanda vesiculosa (A-C) and Utricularia purpurea (D)