

# Variability in Chemical Composition of Preen Waxes in Gulls (Laridae)

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Preen gland is the only skin gland in most birds. It produces oily secretion, which smeared onto the plumage improves its maintenance, but can also influence the colour or smell of the individual. The main components of preen gland secretion are waxes (esters of fatty acids and long chain alcohols) and its composition often changes during the year probably due to better clutch protection against predators and microorganisms. The aim of this study was to determine differences in chemical composition of preen waxes in five gull species: herring gull *Larus argentatus*, common gull *L. canus* and black-headed gull *Chroicocephalus ridibundus* captured in Poland, and hartlaub's gull *C. hartlaubii* and kelp gull *L. dominicanus* from South Africa. Effect of sex, age of birds and season (winter and breeding season) on preen waxes composition in herring gull was also tested.

Preen gland secretions of all studied species consist of monoester waxes. About 28 saturated C<sub>7</sub>-C<sub>16</sub> fatty acids and about 56 saturated C<sub>11</sub>-C<sub>20</sub> alcohols were detected as preen waxes components and most of them were common among all species. Unbranched-octanoic acid and *n*-hexadecanol had the highest content of all fatty acids and alcohols, respectively, but 2-methyl compounds predominate in all individuals.

Chemical composition of fatty acids and alcohols differ between winter and breeding season. Hartlaub's and kelp gulls captured in the beginning of the breeding season in South Africa as well as half of breeding herring gulls from Poland did not produce 2-methyl fatty acids contrary to common, black-headed and herring gulls from winter, where 2-methyl fatty acids were second most abundant. Breeding gulls had also higher content of *n*-octanoic acid, *n*-hexadecanol and trimethyl fatty acids and lower content of dimethyl fatty acids than wintering species. In herring gulls these differences between seasons were larger in breeding males than breeding females. There were no differences in fatty acids and alcohols composition in wintering herring gulls of different age classes and sexes.

Function of changes in breeding season is not clear. Higher content of unbranched compounds in breeding species would lower the volatility of the preen gland secretion. On the other hand, higher content of *n*-octanoic acid with relatively

small mass and slight, unpleasant odour and higher content of trimethyl fatty acids that are more volatile than di- and monomethyl compounds, would increase volatility of the secretion. Changes between winter and breeding season probably occurred due to clutch protection against predators that may use olfaction to detect its prey. That would explain bigger changes in preen waxes of male herring gulls incubating more often at night, when the risk of being detected by mammalian predators is greater than at the day.