Aphids (Aphidomorpha) constitute a large group of insects comprising about 5000 species, predominately connected to the temperate climatic zone. They feed on phloem sap sucked mainly from leaves and stems, living in colonies scoring up to several thousand individuals. They occupy various types of habitats and may be encountered underground as well as above ground on various parts of plants. Generally, they are believed to be monophagous and oligophagous species, feeding on particular plant species, genera, or families. Still, many of them are also polyphagous, exploiting host plants in many unrelated plant families, depending on their availability in the environment. The exploited sap becomes a condensed mix of hydrocarbons, excreted as honeydew. It is produced almost constantly, being a valuable source of viable nutrients for many insects, including ants. In exchange for honeydew, ants provide aphids shelter and protection against predators. This sort of mutualistic interaction between aphids and ants is called trophobiosis.

However, not all aphids are involved in this sort of relationship. Due to the degree of involvement in mutualism, they can be divided into three categories: non-myrmecophilous aphids, which do not rely on trophobiosis and dispose of honeydew by themselves; facultative myrmecophilous, which may be involved in trophobiosis but can also survive without ants and obligatory myrmecophilous, which strongly rely on trophobiosis and cannot thrive without constant presence of ants.

To examine whether there is a correlation between the degree of myrmecophily and morphology of perianal structures of aphids, the total number of 36 aphid genera has been studied with the application of light microscopy and scanning electron microscopy. The perianal structures of aphids consist of tergite VIII – the penultimate segment of the abdomen, cauda – highly variable morphologically across many species; anal plate – rectangular and chitinous plate above which the anal pore is located and sternite VIII – the so-called genital plate, present only in adult individuals. Between the anal and genital plates, the genital pore is located.

As a result of the research, the perianal structures of 62 aphid species were described, including 26 non-myrmecophilous, 12 facultative myrmecophilous, and 24 obligatory myrmecophilous species. Due to the significant variability of the morphology of perianal structures and the cuticle surface of studied species, the presence of 93

a trophobiotic organ was confirmed, but its concept was defined anew. The new definition indicates that the anal plate needs to be longer than its width and longer than the length of the

cauda in myrmecophilous aphids. This means the ratio of the length of the anal plate to its width > 1 and the ratio of the length of anal plate to the length of cauda >1.