Earthworms – Architects of fertile soils

Their significance and recommendations for their promotion in agriculture

In Brief

Today, much is known about the general taxonomy and biology of earthworms, whereas relatively little is known about their impact on soils, their interactions with other soil organisms and the influence of farming practices on their populations.

This guide gives a brief overview of the biology, ecology and the multiple services of earthworms to farmers and provides recommendations for the promotion of these extraordinary creatures in agricultural soils.

Underestimated workers

In the 19th century earthworms were considered a soil pest. Even though this view has changed, earthworms receive little attention in agricultural practice. Very few farmers only actively promote them. Increasingly heavy machines, intensive tillage and intensive use of pesticides have in many places eliminated earthworms in fields. In contrast to this scenario, in the healthy soil of one hectare of grassland one to three million earthworms can be found.

Number and diversity of earthworms in a soil are considered an important criterion of soil fertility, because earthworms contribute in many ways to healthy and biologically active soils and better adaptation of farming systems to climate change, thus providing key soil functions that favour many positive ecosystem services. Due to their numerous services that increase sustainability of agro-ecosystems, earthworms should receive more attention in sustainable farming systems.

Distribution and biology

With the exception of the Polar Regions and deserts, earthworms can be found in most soils. While more than 3,000 species are known worldwide, only 400 species are found in Europe and 40 species in Central Europe. In cropland only 4 to 11 species are commonly found.

Earthworms prefer medium-heavy loam to loamy sand soils. Heavy clay and dry sandy soils are not favourable to their development. In acidic peat soils only specialised species are found that have adapted to such "hostile-to-life" conditions.

Earthworms are hermaphrodites and develop slowly, with the exception of the leaf litter dwellers. Only one generation with a maximum of 8 to 12 cocoons (eggs) is produced per year. Earthworms live 2 to 8 years, depending on the species. Sexually mature worms can be identified by the "genital belt" ( clitellum) encircling the body.

Peak burrowing activity and reproduction take place in March and April and also in September and October (temperate zone). When it is very dry and hot, many earthworms estivate and retreat to deeper