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[For more information on wireworms:](#)

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Fig. 1. Click-beetle (*Agriotes lineatus*).



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Fig. 2. Wireworms.

Context

- Wireworms, the larvae of click beetles (**Coleoptera: Elateridae**), damage a wide range of crops and are among the most notorious soil-dwelling pests since long in Europe (Balachowsky, 1935).
- In France, **200 species** occur belonging to 15 sub-families (Leseigneur, 1972).
- Only **4 species** belonging to the genus *Agriotes* are mainly responsible for economic losses (Blot, Brunel et al. 1999).
- Because of **wireworms upsurge since 15 years**, understanding their ecology and the factors influencing their pest potential has become a key issue (Poggi, Le Cointe et al. 2018).

Life cycle

A multi-year life cycle

- Wireworms mature very slowly and they can spend **several years** as soil-dwelling pests in the larval stage before pupating (Parker et al., 2001).

Seasonal feeding phases

- Feeding phases could be **only about 20%** of the larval lifespan and mainly rely on vertical migration in soil which notably depends on soil moisture (Furlan, 1998).

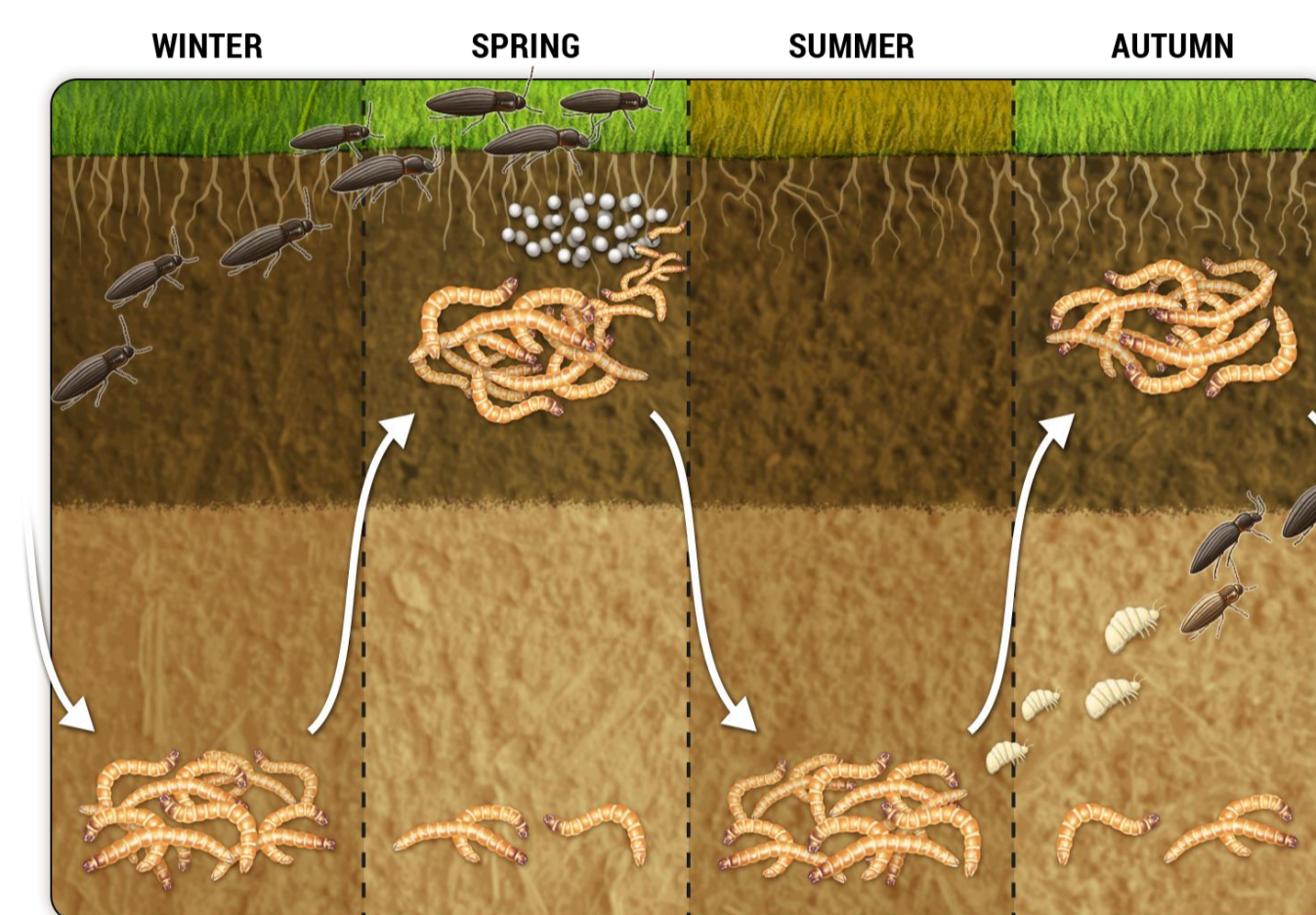


Fig. 3. Seasonal vertical migration of wireworms.

Flexible Trophic position of wireworms

New insights from stable isotope analysis

- Stable isotope analyses reveal that **species previously considered as predominantly herbivorous** (i.e. *Athous spp.*) seem to be **predatory** (Traugott et al., 2008).

Intra-species variation

- Even in the typically herbivorous *A. obscurus* about **8%** of individuals demonstrated $\delta^{15}\text{N}$ values characteristic of carnivores (Traugott et al., 2008).

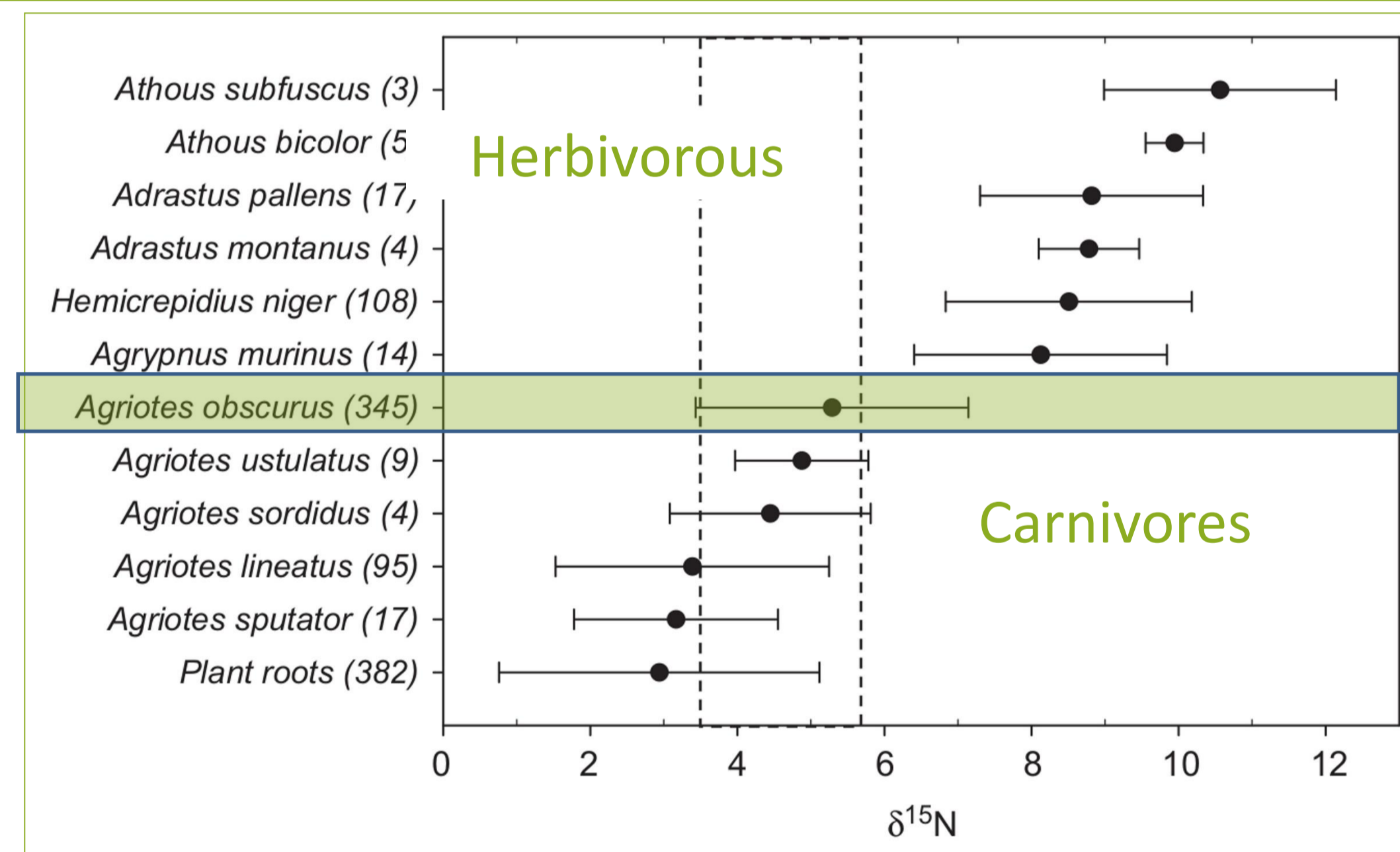
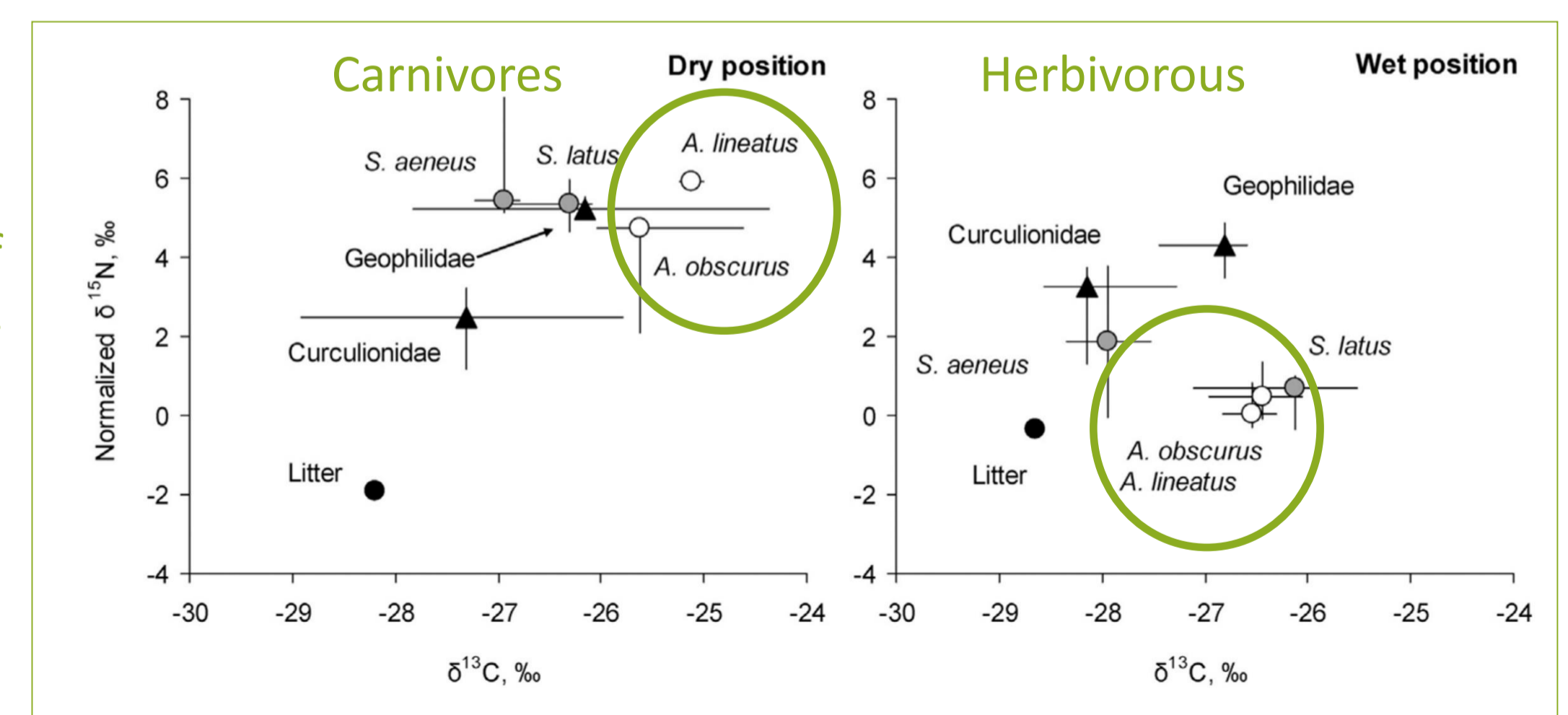


Fig. 4. Mean $\delta^{15}\text{N}$ signatures of plant roots and elaterid larvae collected from Central European arable land. (Traugott, SBB, 2008)

Feeding behavior depending on soil moisture and age of larvae

- Wireworms tend to be phytophagous and saprophagous in wet conditions, but **carnivorous in driest habitats** and an increase in $\delta^{15}\text{N}$ values with age suggests that larger larvae prey upon phytophagous animals (Samoylova et al., 2017).

Fig. 5. The flexible trophic position of *Agriotes* wireworms according to soil moisture. (Samoylova, ASE, 2017)



Conclusion

Recent insights from stable isotopes analyses highlight the **complexity of the feeding behavior of wireworms**. More investigations about factors influencing their trophic position could help to design integrated management strategies of these notorious pests.

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