

1. BACKGROUND

- Earthworms are soil quality indicators that are often regarded as 'soil engineers', 'chemical engineers' and 'ecological engineers' (Jones et al., 1994; Lavelle et al., 1997; Turbé et al., 2010; Bottinelli et al., 2015 and Jouni, 2019).
- Earthworms favour mostly organic management systems (Bengtsson et al., 2005; Gomiero et al., 2011; Tuomisto et al., 2012; Bai et al., 2016).
- Under ploughing, earthworm abundance is low as soil organic matter is removed, the burrow is removed, and moisture is removed (Chan, 2001; Capowiez et al., 2009)

In this research, three systems were compared:

- Ecologically managed field, intensely ploughed for weed control → **EP**
- Conventionally managed field, ploughed → **CP**
- Conventionally managed field, non-ploughed → **CNP**

2. RESEARCH QUESTIONS AND HYPOTHESES

- Is earthworm abundance in an ecological field and a conventional field (both with ploughing) the same?
- The abundance and diversity of earthworms will be higher in the ecological field than in the conventional field.
- How does ploughing impact earthworm abundance in differently managed fields?
- The intensity of ploughing would lower the earthworm abundance.



Fig 1: *Octolasion cyaneum*
Picture credit- Sachin, 2021, Reinshof

3. RESULTS

- Higher mechanization intensity in EP than CP & CNP (Fig 2)
- Higher organic matter content in CNP than CP & EP (Fig 4)
- Higher species diversity in CNP than CP and EP (Fig 6)
- Higher earthworm abundance in CNP than CP & EP (Fig 3)
- Higher soil resistance in CNP than CP & EP (Fig 5)

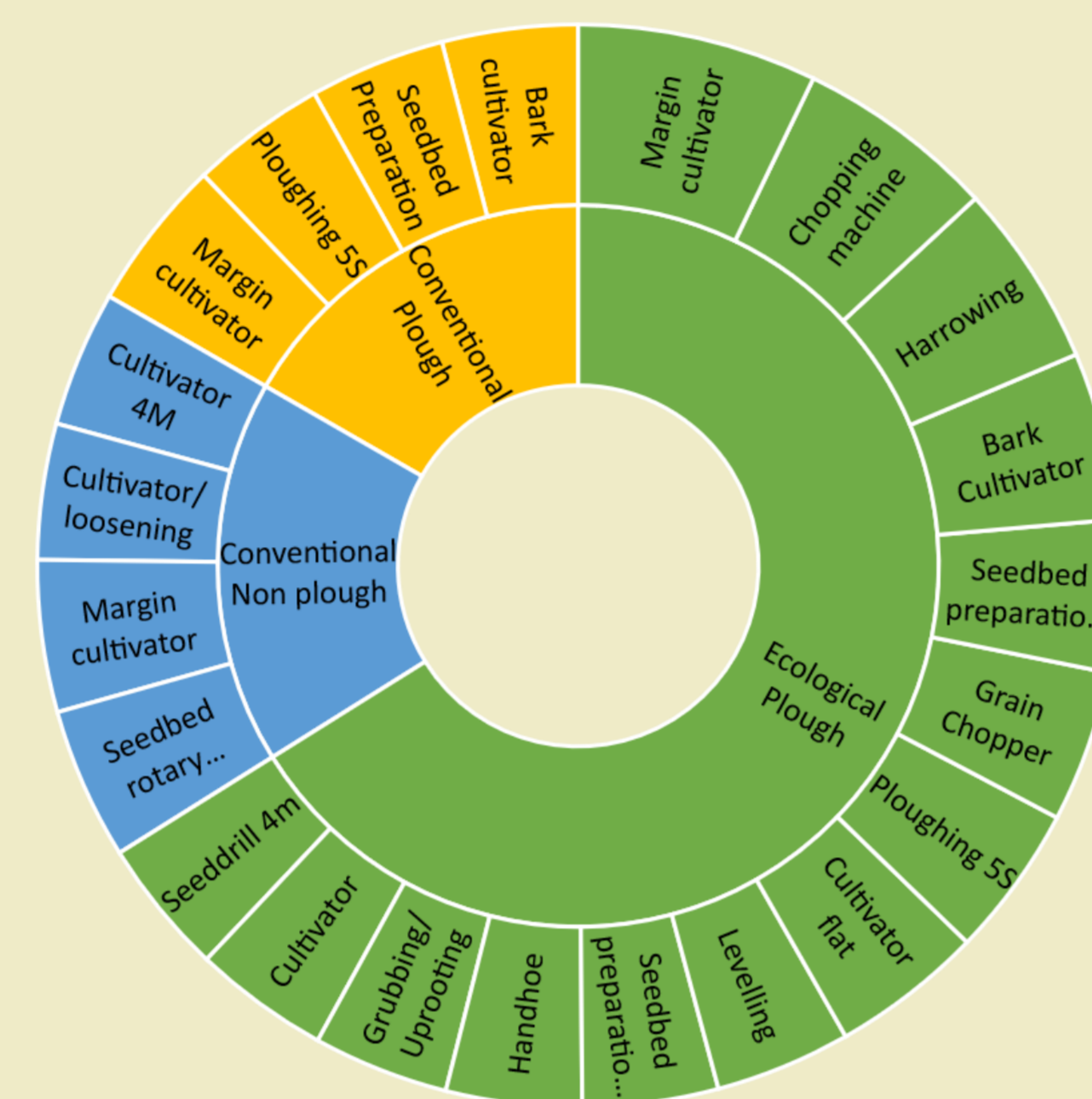


Fig 2: The three-year mechanization intensity (2018-2021) carried out in CNP, CP and EP fields based on the information from Reinshof experimental farm

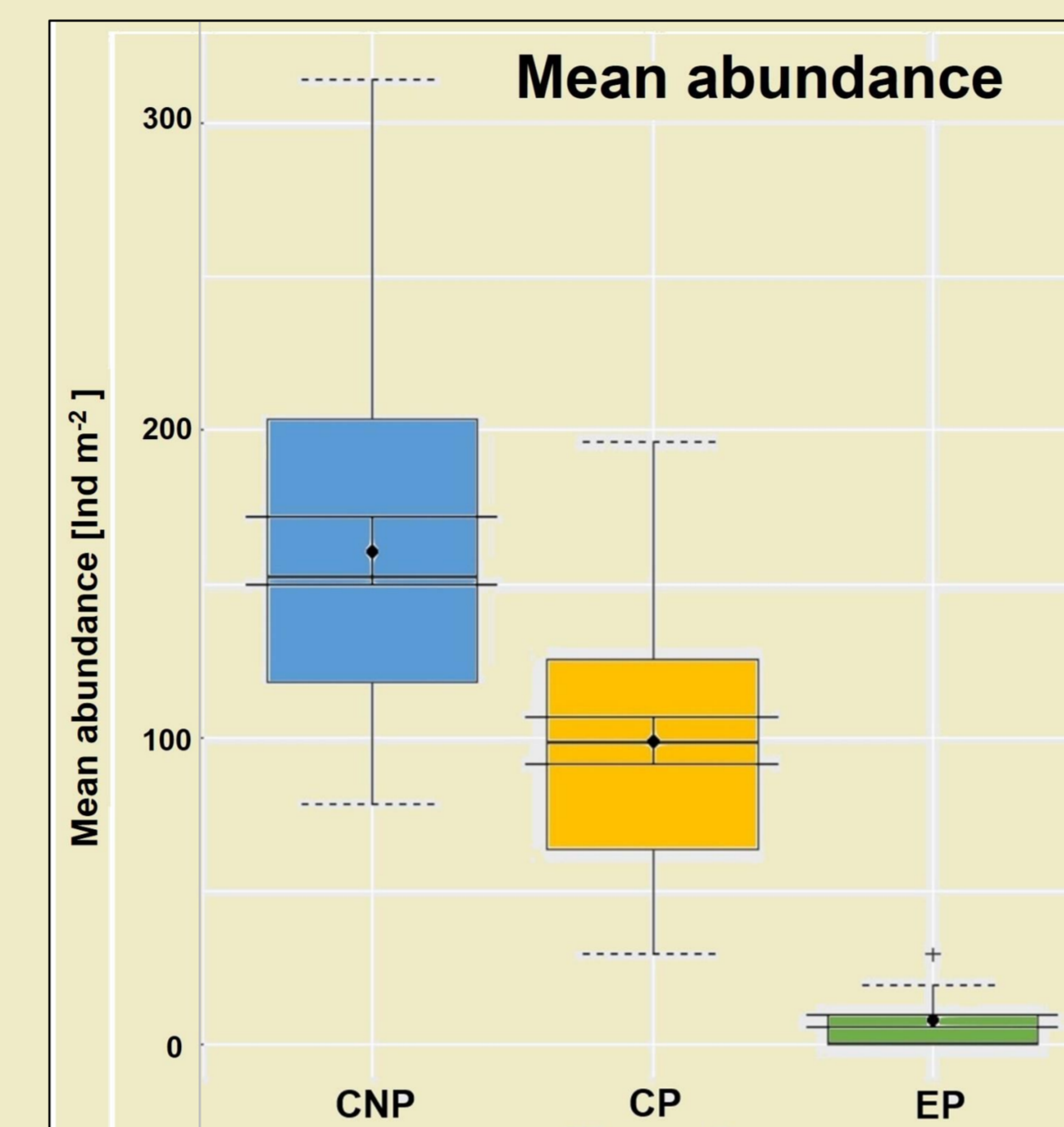


Fig 3: Total mean abundance of earthworm individuals in the three sampled fields: CNP (160.8 ind m⁻², n= 30), CP (98.9 ind m⁻², n= 30) and EP (7.9 ind m⁻², n= 30)

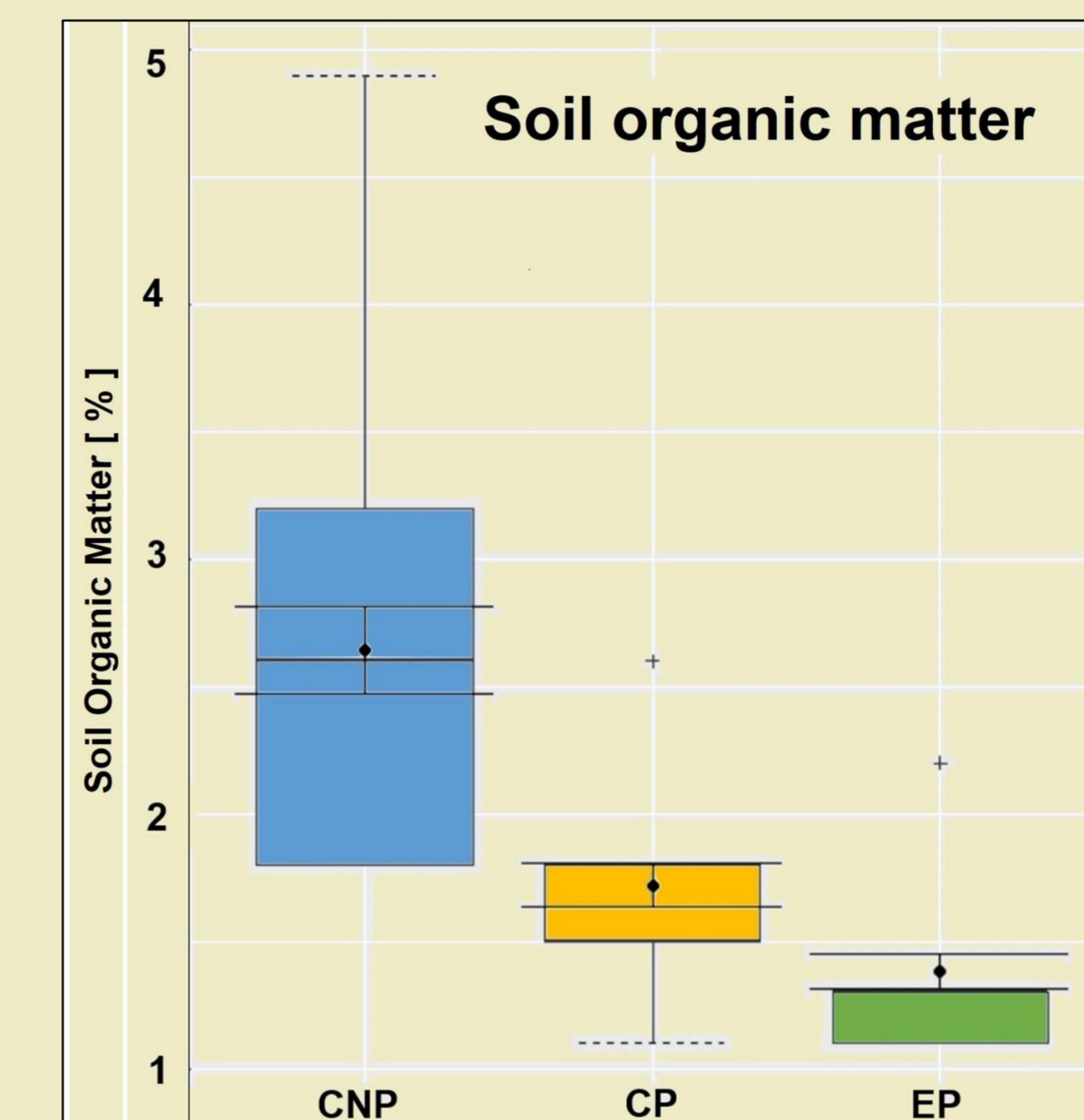


Fig 4: The mean soil organic matter content (%) measured for the soil depth of 0-5 cm in CNP (2.6%, n= 30), CP (1.7%, n= 30), and EP (1.3%, n= 30)

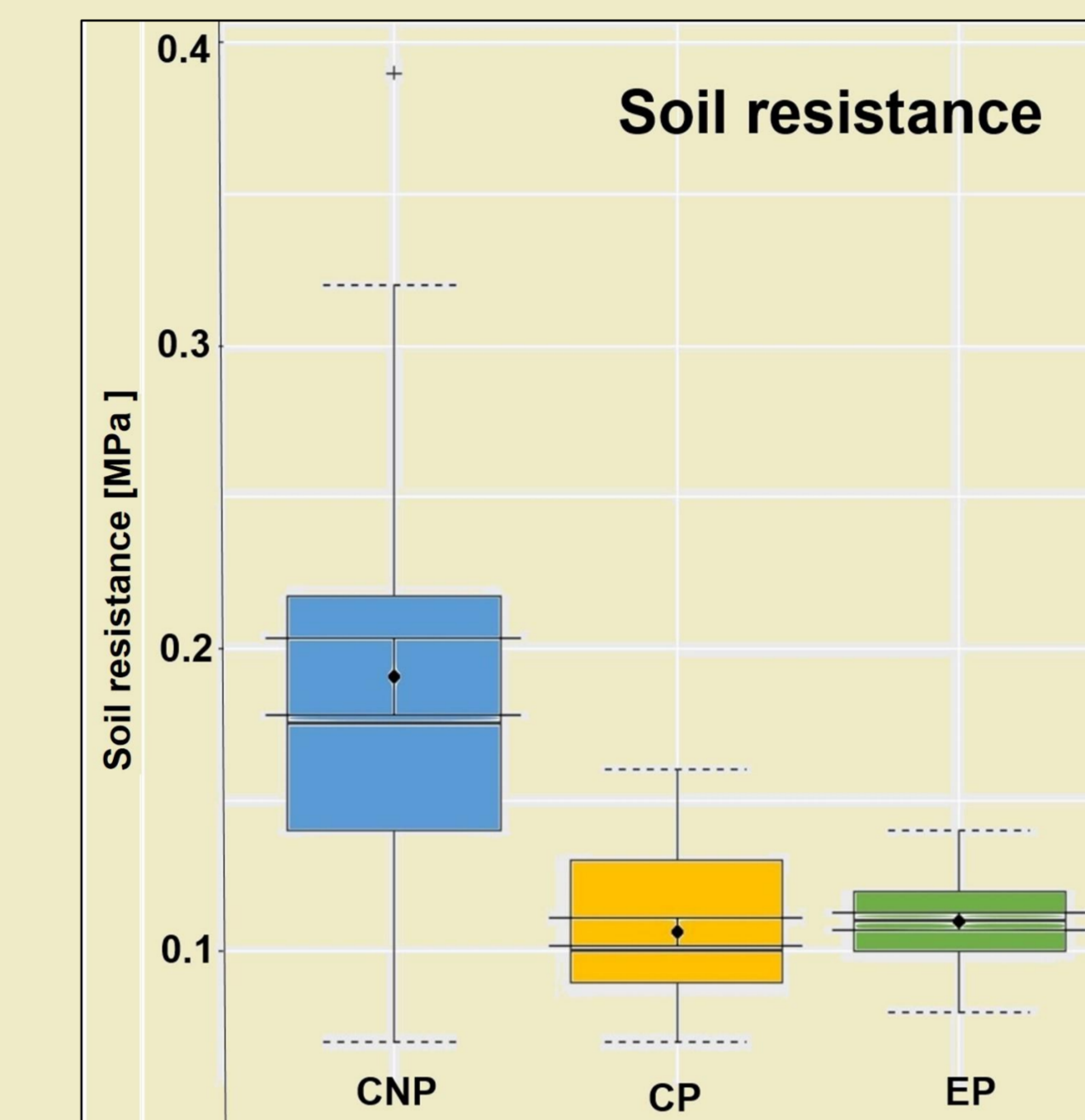


Fig 5: Mean penetrometer resistance measured for the soil depth 0-20 cm in the CNP (0.2 MPa, n= 30), CP (0.1 MPa, n= 30) and EP (0.1 MPa, n= 30)

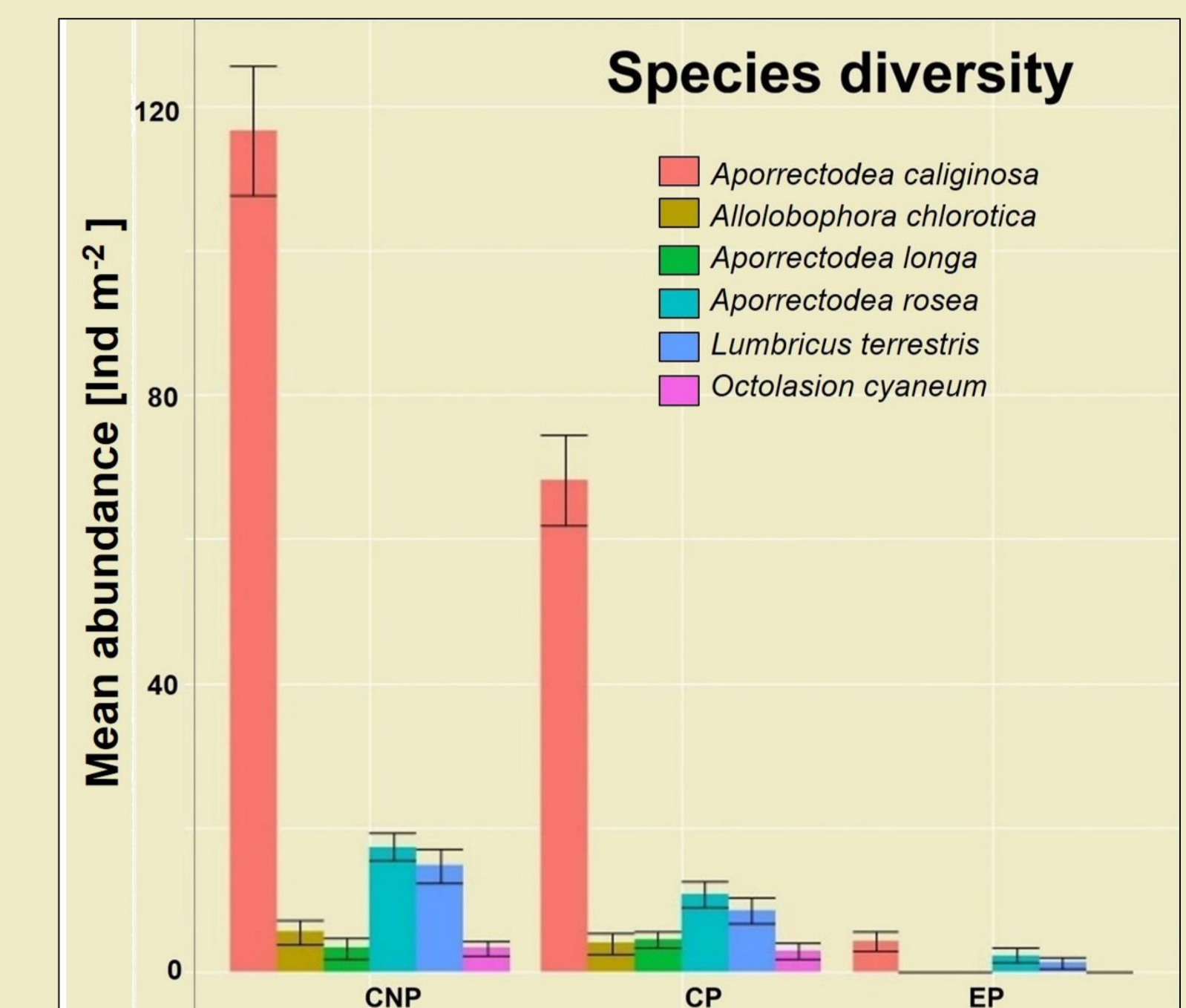


Fig 6: Mean abundance of the total species in the three fields with *Aporrectodea caliginosa* being dominant in all three fields: CNP (116.6 ind m⁻², n= 30) CP (68 ind m⁻², n= 30) and EP (4.3 ind m⁻², n= 30)

4. METHODOLOGY

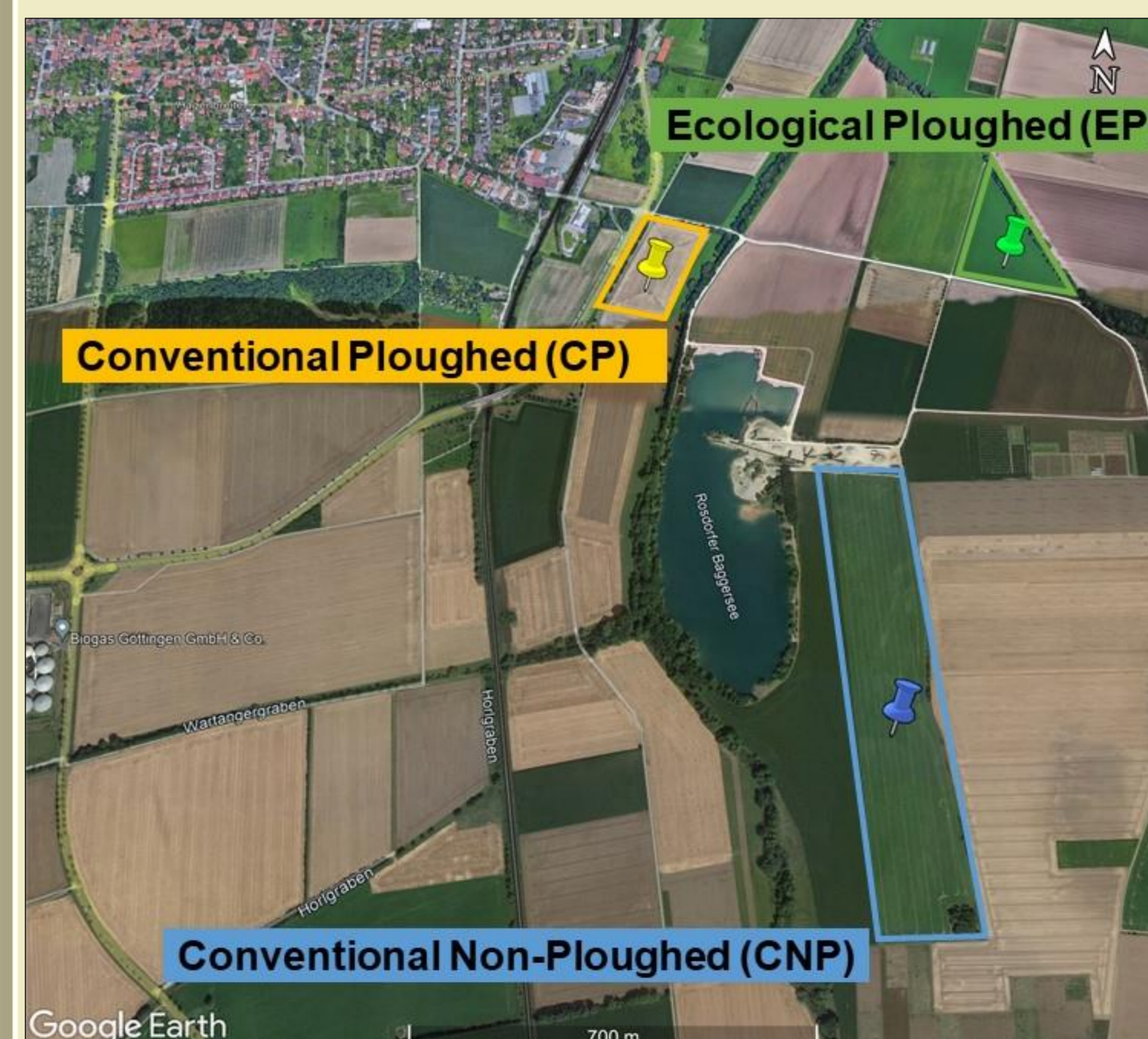
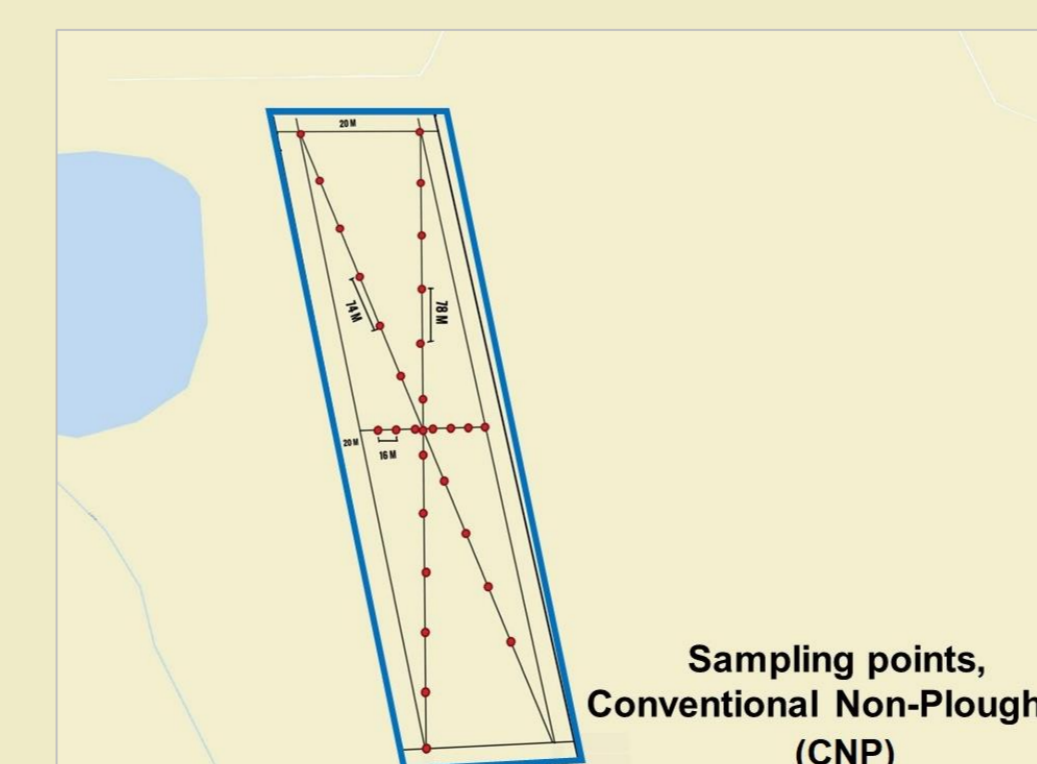
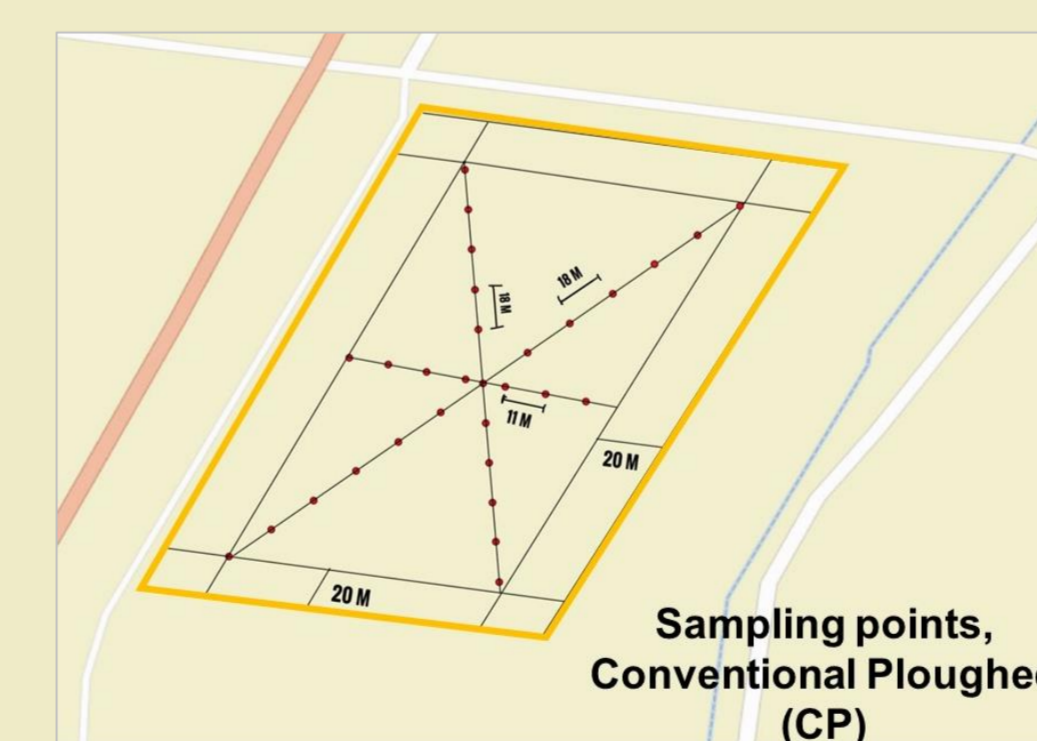
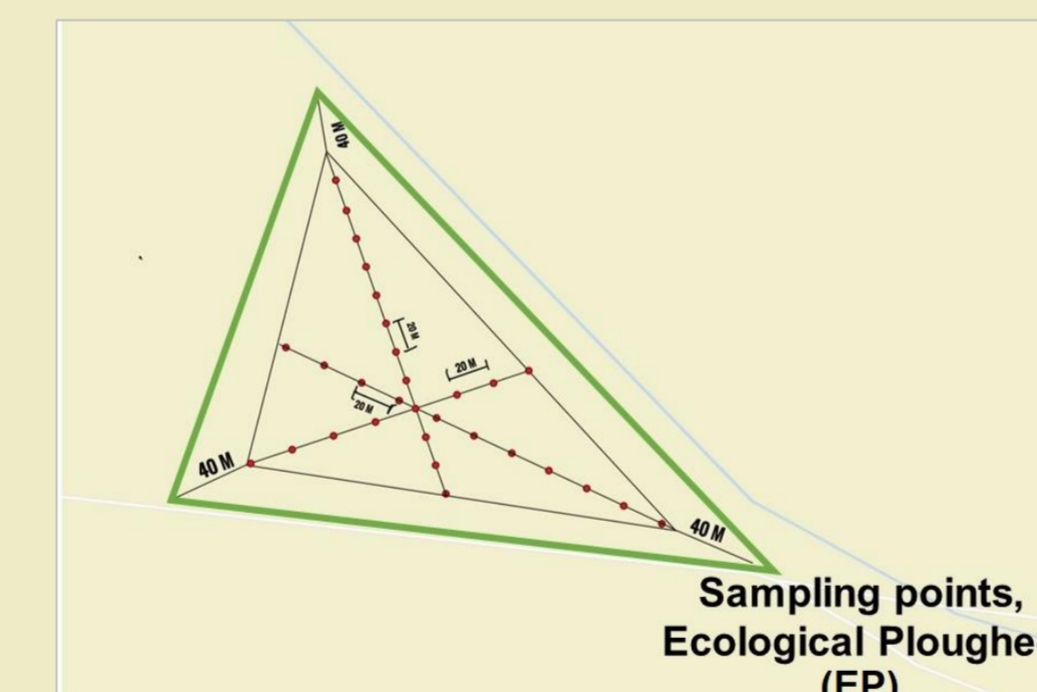


Fig 7: Map showing the sampling location- University of Göttingen experimental farm, Reinshof including sampling points



WRB soil group of fields:

- Ecological Ploughed: Luvisol, pH- 6.9
- Conventional Ploughed: Fluvisol, pH- 7.4
- Conventional Non-Ploughed: Gleyic Fluvisol, pH- 7.2

Methods:

- Mustard method for sampling earthworms (100 gm in 5 litre water)
- 90 sampling points: 30 per field.
- Earthworm identification according to: Krück (2018)
- Organic matter determination according to: Renger et al. (1987)
- Cone penetrometer: to measure soil resistance, depth 20 cm

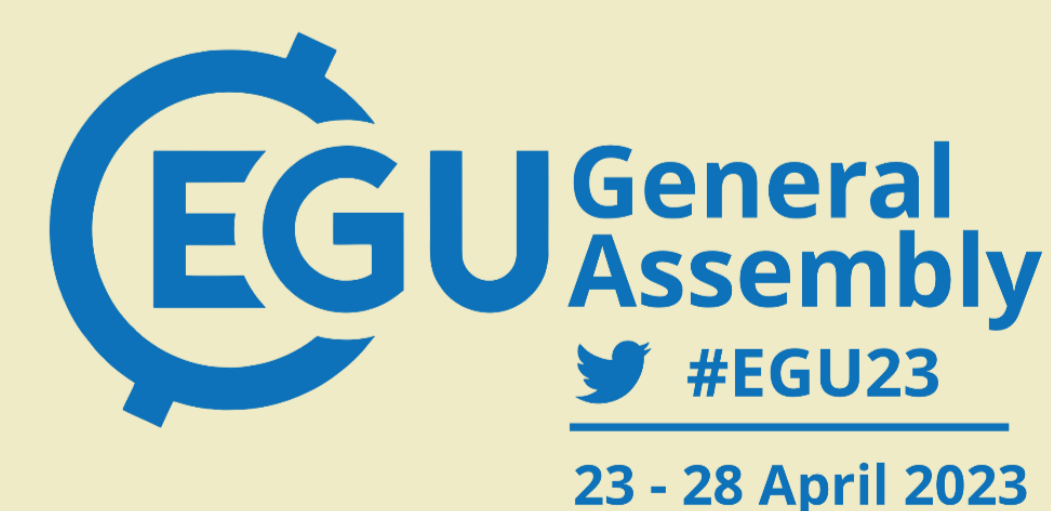
5. CONCLUSIONS

- Destructive effects of ploughing on earthworms were confirmed for conventional systems.
- Ecological management supported a few earthworm communities in the sampling area.
- Soil properties like organic matter content, bulk density including soil type seemed to overrule management impacts.

REFERENCES



ABOUT ME



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