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A multi-approach improves the description of the entomopathogenic nematodes distribution in corn fields

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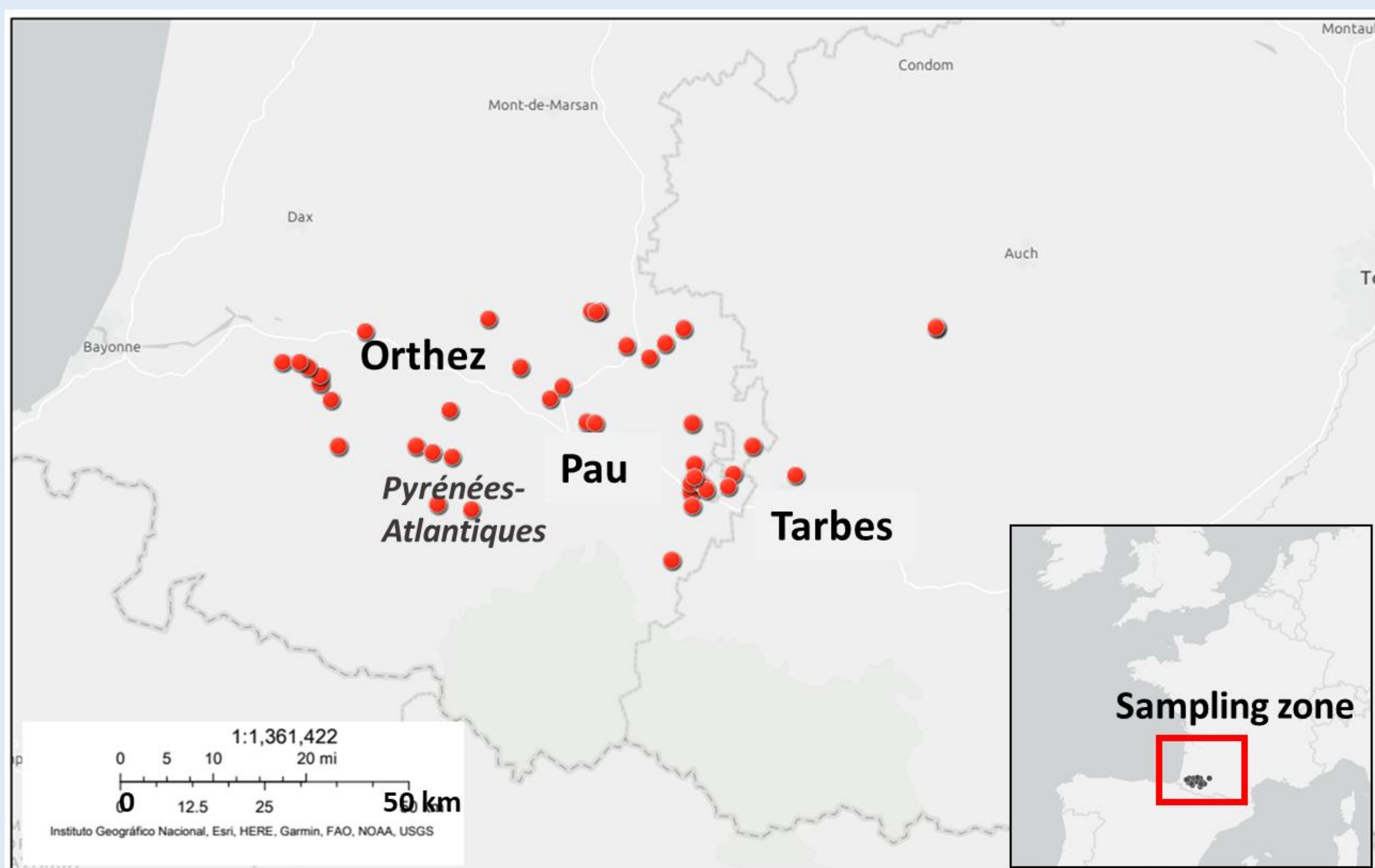
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Introduction

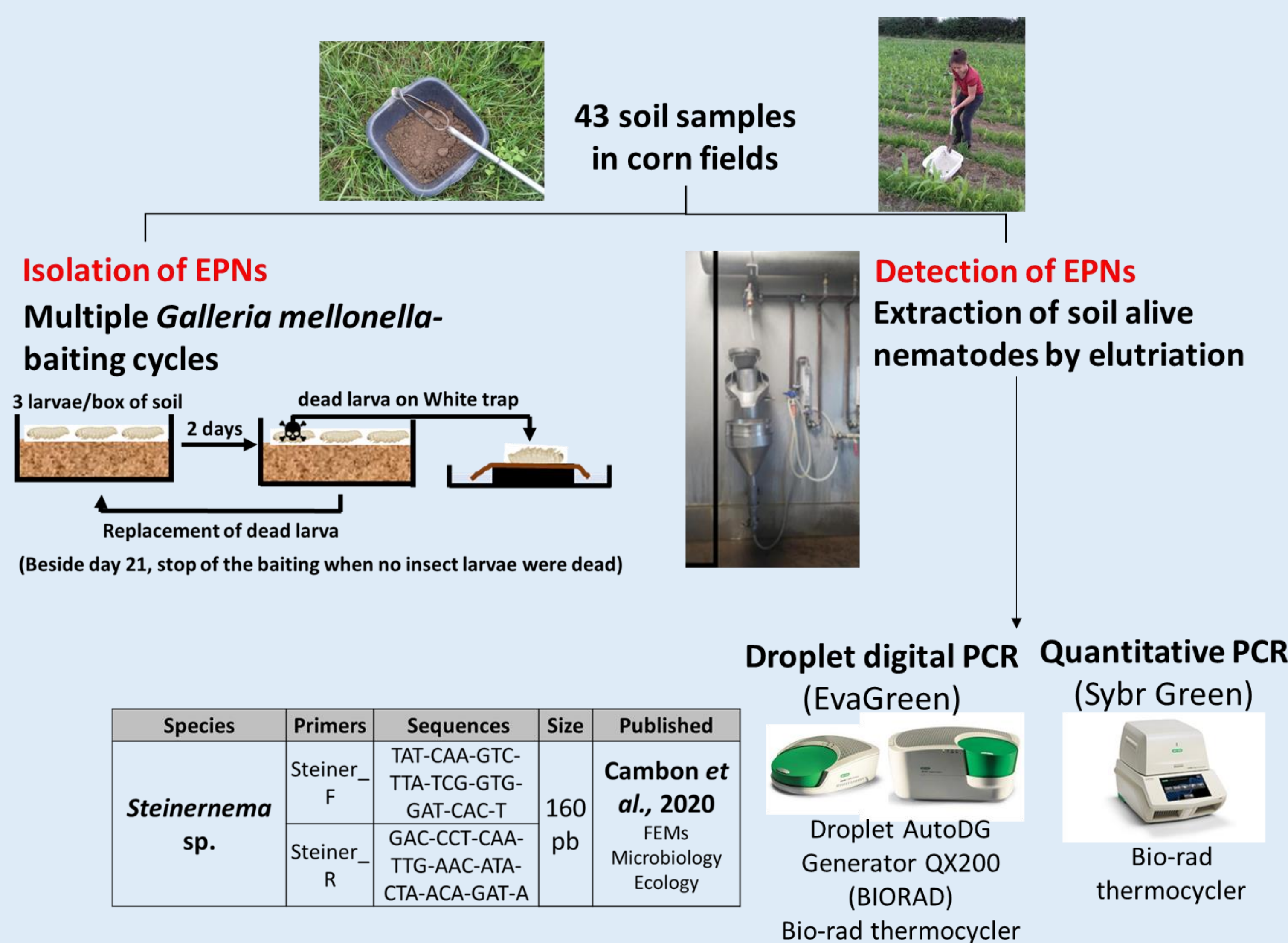
Entomopathogenic nematodes (EPNs), *Steinernema* sp. and *Heterorhabditis* sp., are soil-dwelling insect parasites distributed in all continents except in Antarctica. Moreover, the detection method may bias the diagnosis of the presence of EPNs in soils. The classical method for the detection of EPNs is the baiting method by *Galleria mellonella*. **The objective of this study is to combine several methods to improve the detection of EPNs in cultivated soils. We assumed that a multi-approach which combines baiting with successive trapping cycles (Abd-Elgawad, 2020, Nematology) and molecular detection (Campos-Herrera et al., 2011, Annals of Applied Biology) would provide the most accurate picture of the presence and diversity of EPNs in the sampled soils.**

Sampling map

Map of the 43 sampling plots cultivated in corn in South Western France

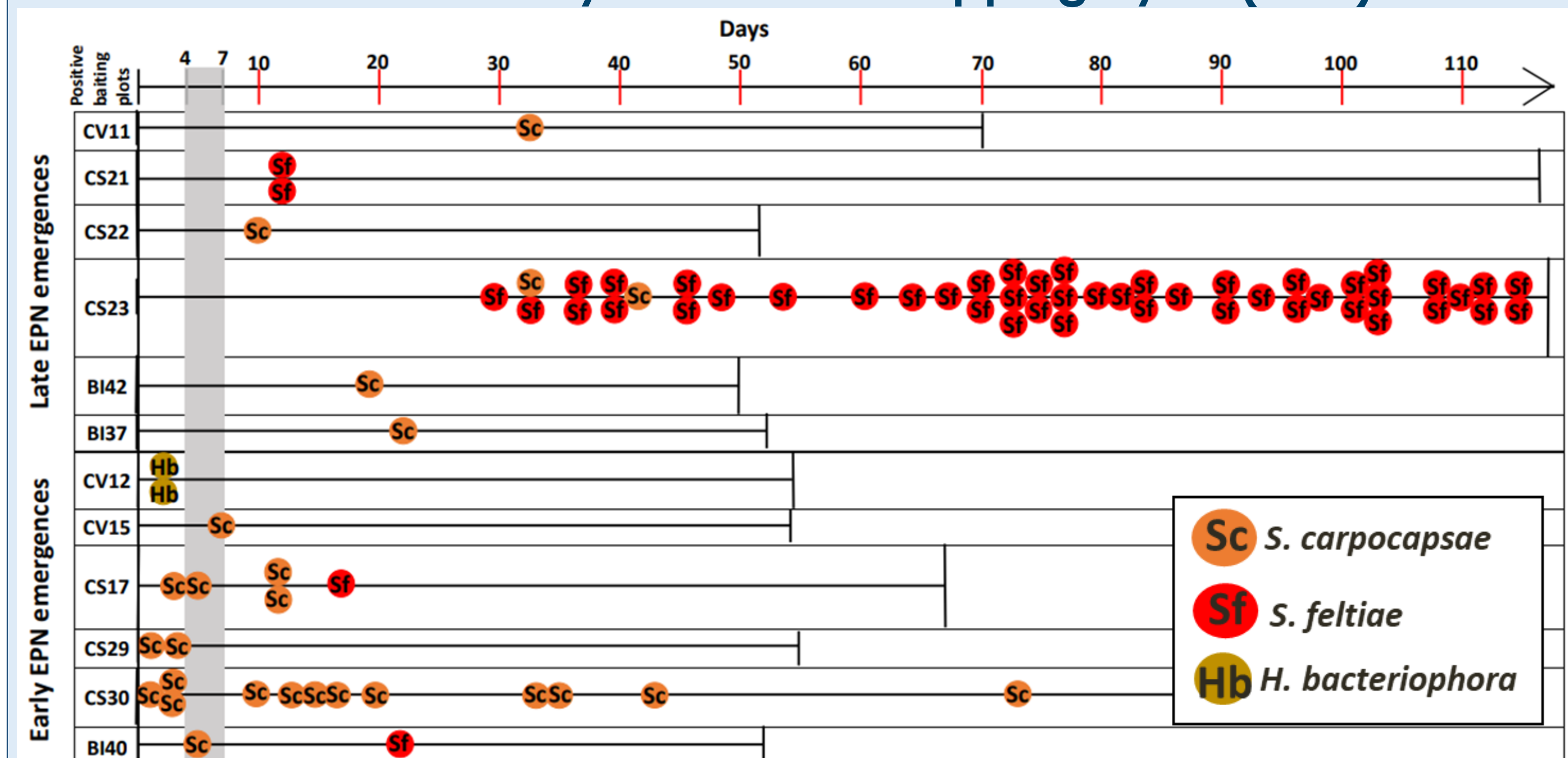


Experimental procedure



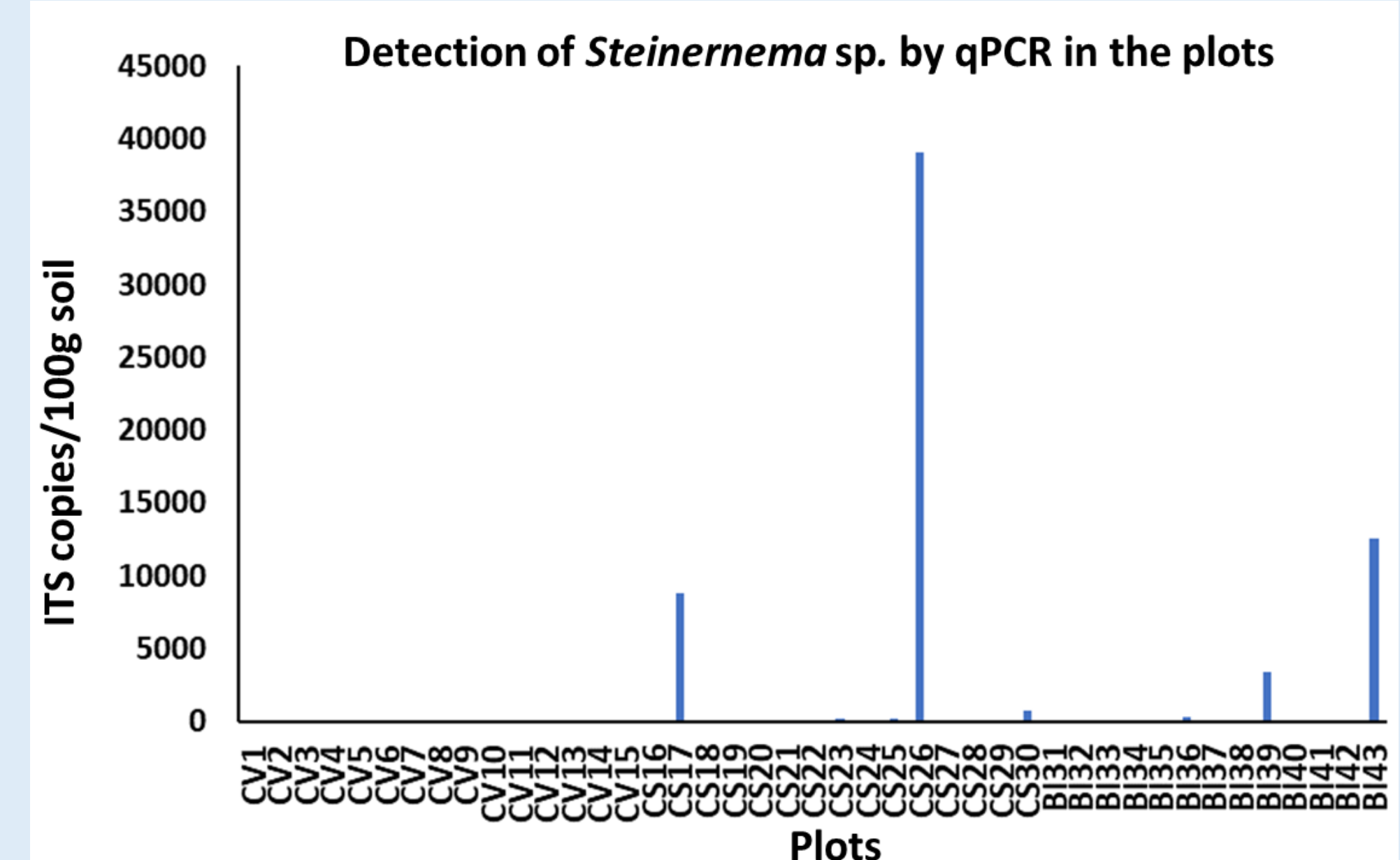
Results

EPNs detection by successive trapping cycles (28%)

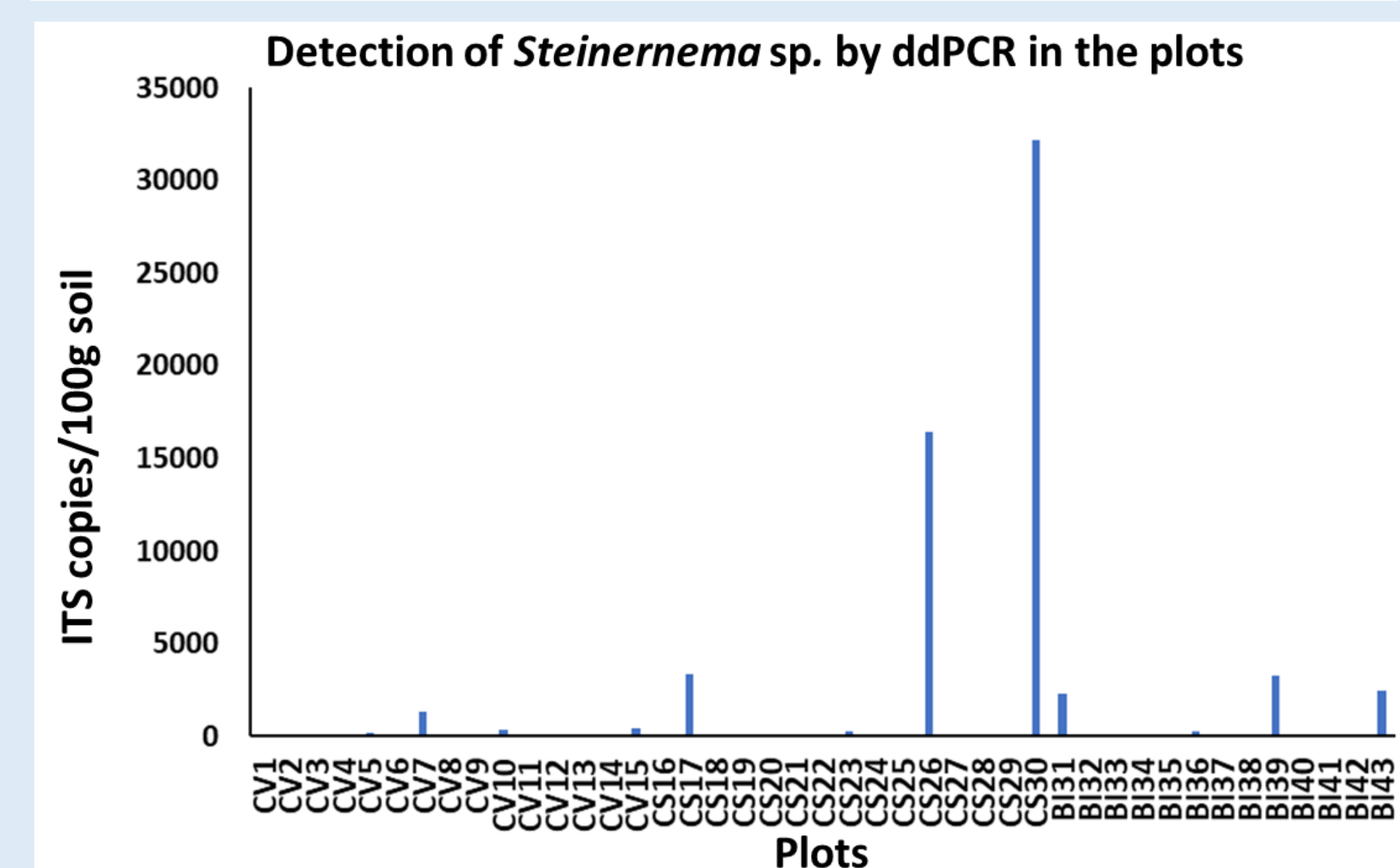


Three species were isolated: *S. carpocapsae*, *S. feltiae* and *H. bacteriophora*. The multiplication of the baiting cycles allowed to increase the number of positive plots and the species diversity of EPNs isolated

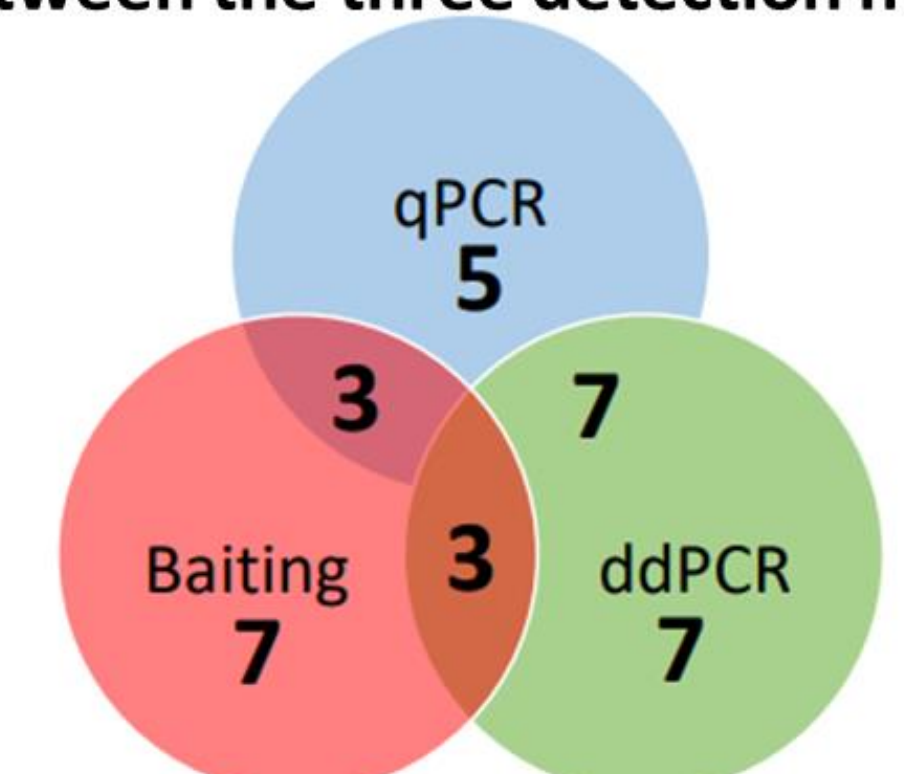
***Steinerna* sp. detection by qPCR (19%)**



***Steinernema* sp. detection by ddPCR (33%)**



Common/different positive plots between the three detection methods



By combining all methods we obtained 49% of positive plots for *Steinernema*

Conclusion

- ❖ Mismatches are observed between the detection methods (e.g. molecular detection of EPNs in negative plots by baiting).
- ❖ Using of multi-approach improves the detection of native EPNs in soils.
- ❖ A good picture of the distribution of EPNs in agricultural soils is useful for their use in biological control by conservation.