

Ecosystem services within agricultural landscapes – trade-offs and synergies

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Introduction and methods

- Agriculture is the greatest direct driver of change in terrestrial ecosystems, mainly through a change of land use (conversion to cropland) and an application of new technologies enhancing yield.
- There is a general problem how to ensure a sufficient food supply without depleting ecosystems.
- Ecosystem services interact and have mutual relationships (trade-offs, synergies). Focus on a provision of some particular services can have negative consequences for the supply of other services.
- Current trends in ES valuation focus on monetary values and are not very detailed.
- Our focus was on the provision of four ES, **carbon sequestration, pollination, biological control** and **food provision**, in agricultural landscape, particularly croplands, orchards and vineyards, and grasslands.

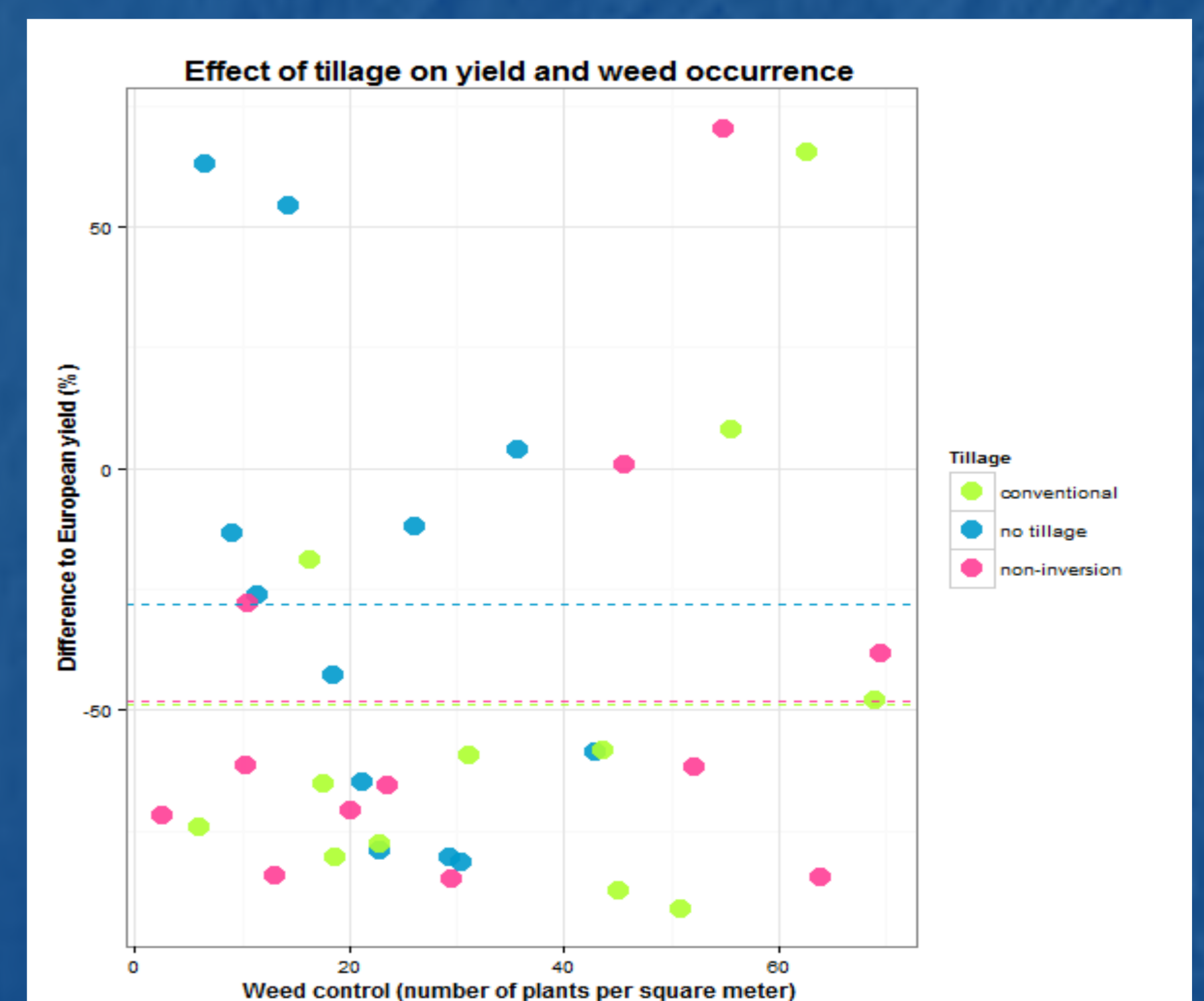
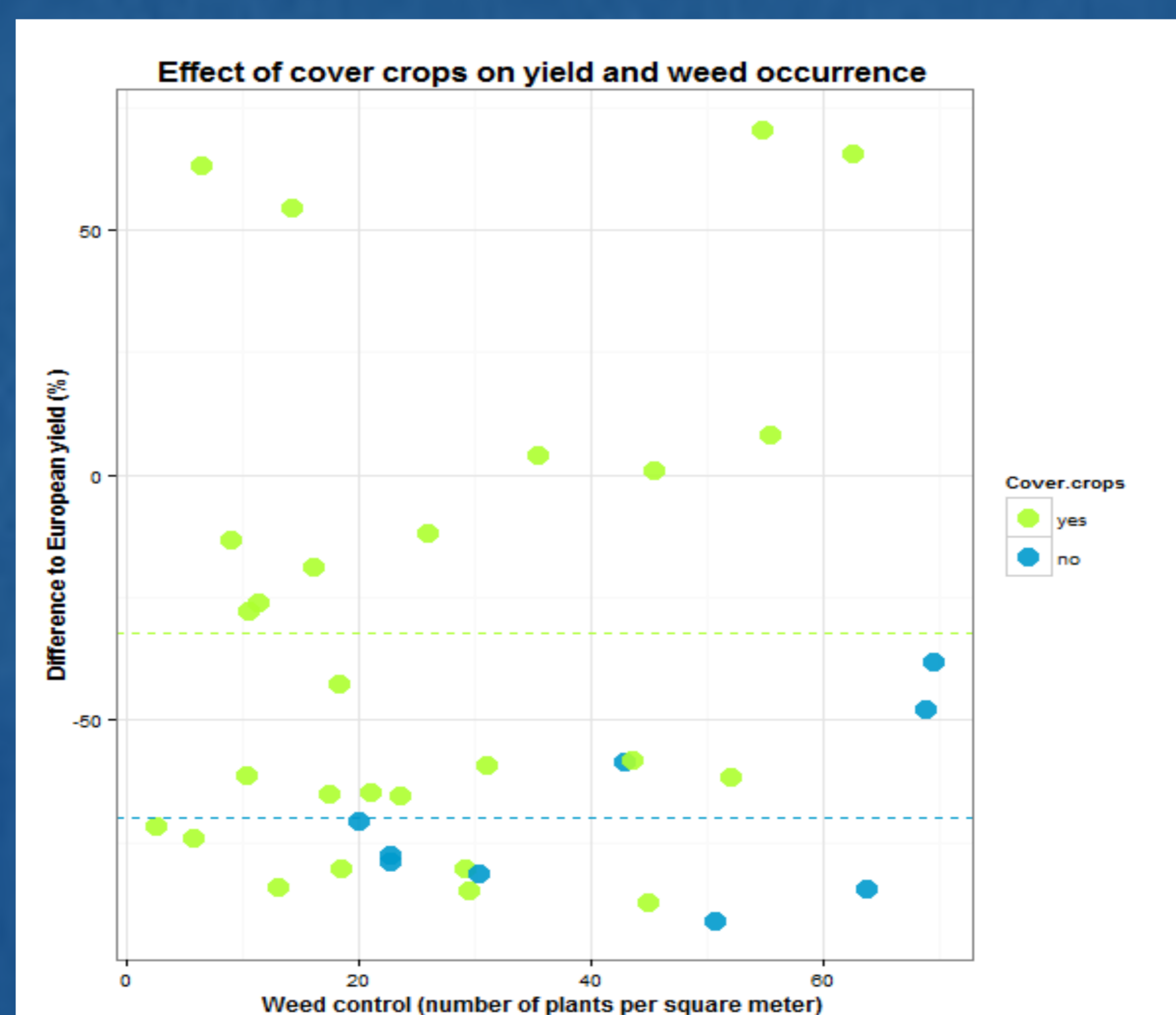
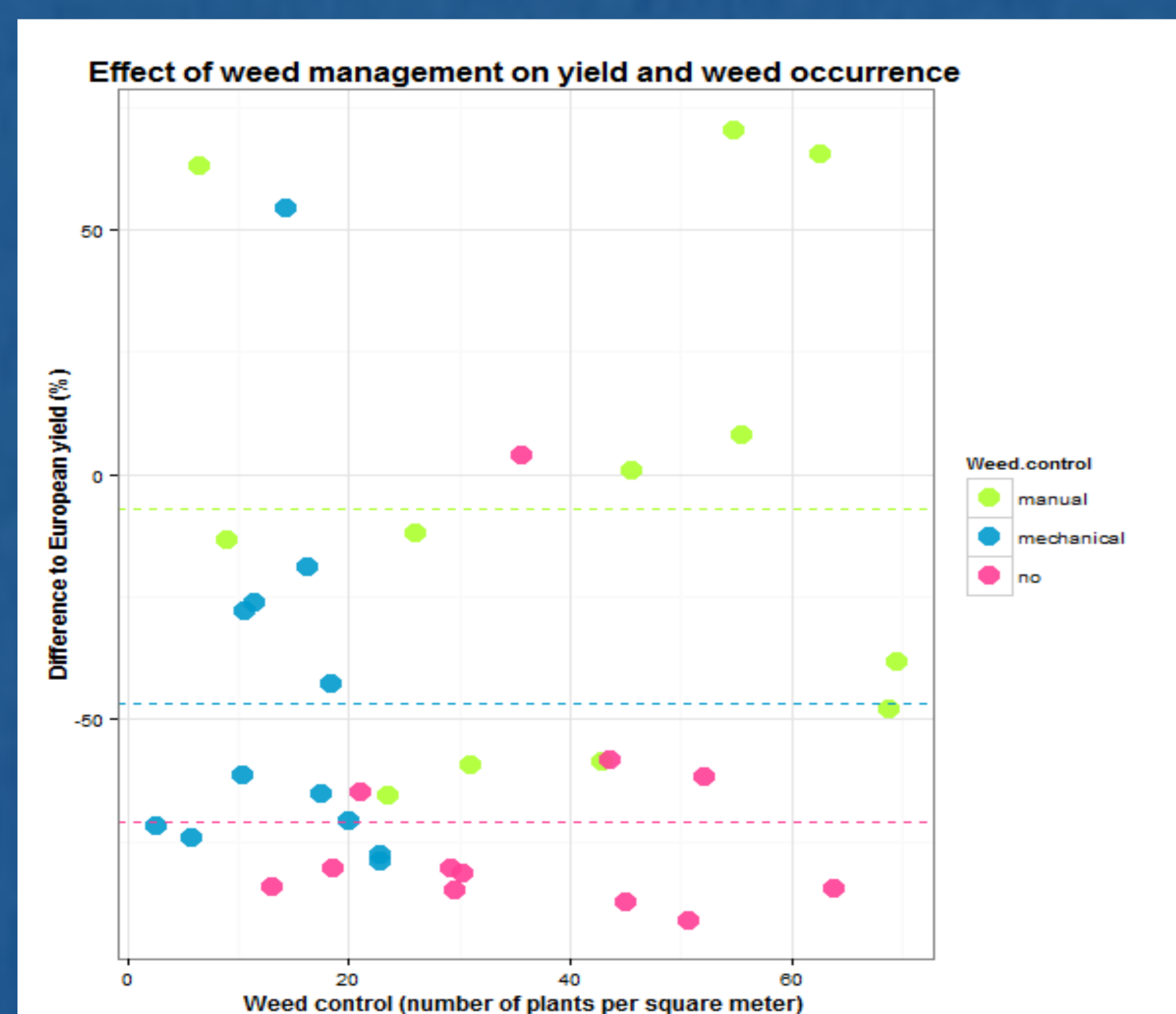
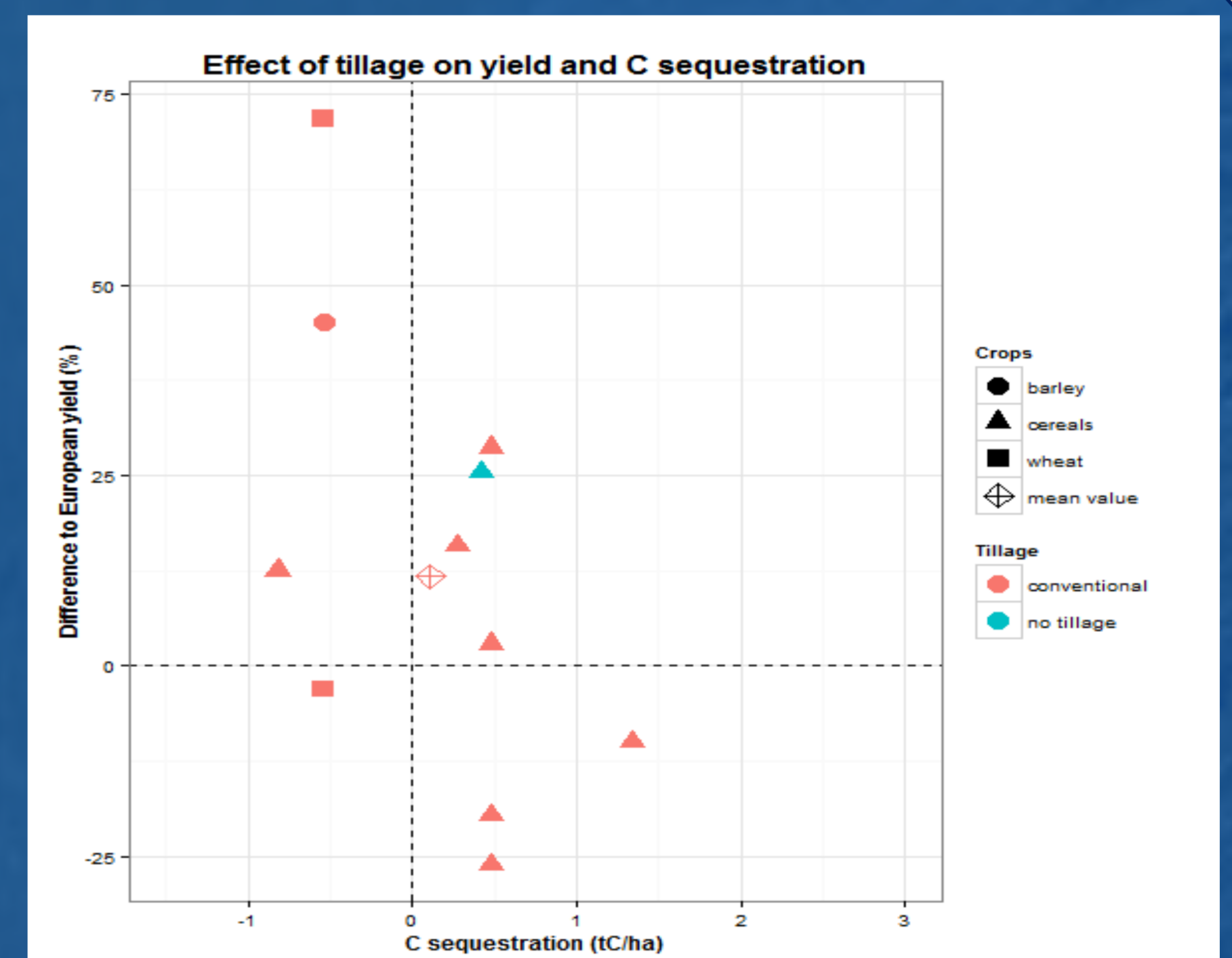
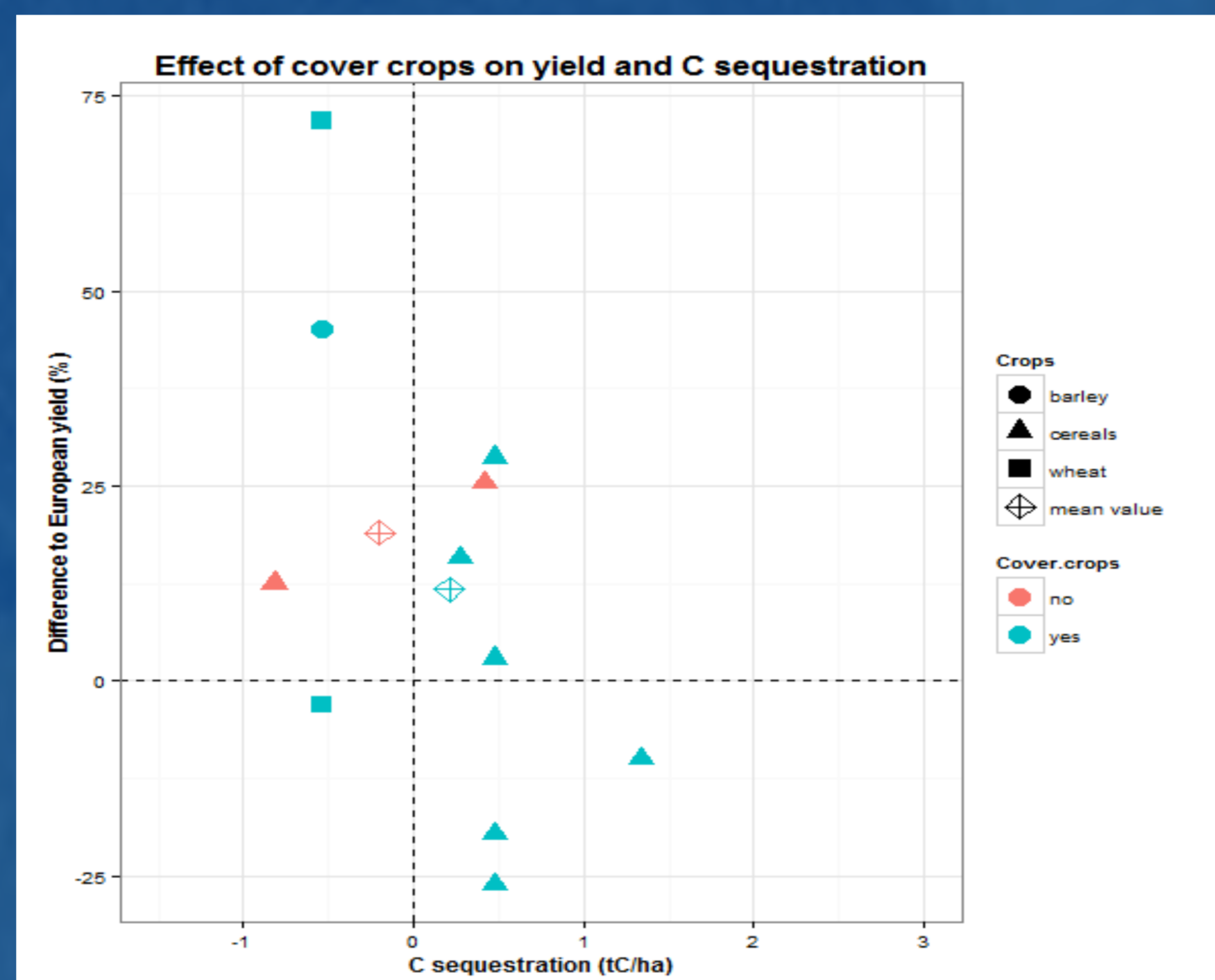
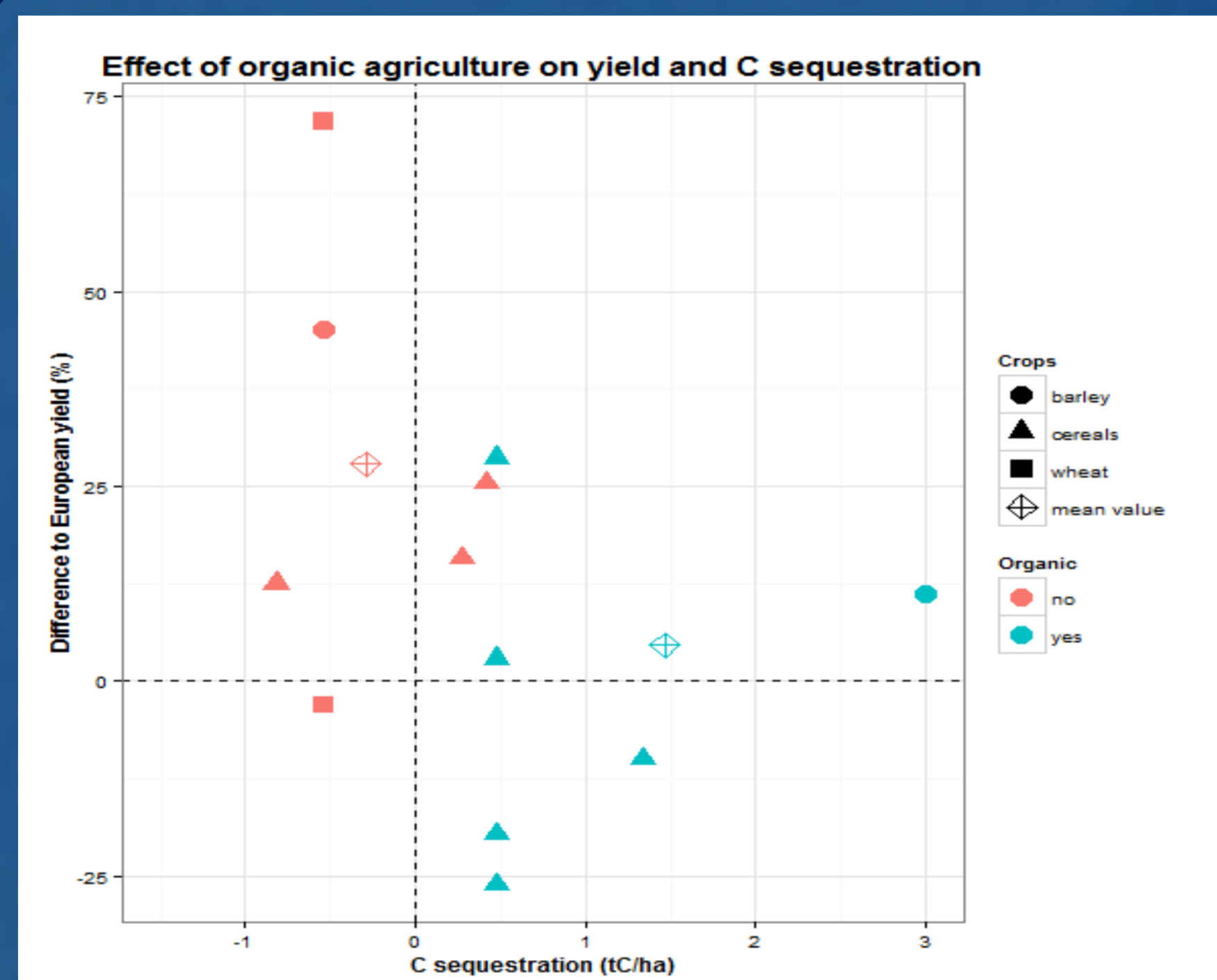
Specification of particular ecosystems and ES

Extensive literature review with a focus on biophysical values

Creation of a database of biophysical values and practices

Analysis of the values using R software, interpretation of results

Effect of particular practices on selected ecosystem services



Discussion and conclusion

- There is a strong trade-off between food provision and carbon sequestration within all the practices analysed.
- The values for biological control and pollination were not comparable and so we made a qualitative analysis for these two ES. We found out that they are enhanced by organic agriculture, landscape features, cover crops, and absence of herbicides and synthetic fertilisers.
- The practices that improve carbon sequestration are mainly organic agriculture, absence of herbicides, use of cover crops, exclusion of synthetic fertilisers, application of organic fertilisers and zero tillage. The practices favouring food provision are conventional agriculture, application of herbicides and synthetic fertilisers, absence of organic fertilisers, and in some cases also use of cover crops and no tillage.
- For organic fertilisers the situation is not very clear as they may be used as a partial replacement of synthetic fertilisers. In general, the focus should be more on combinations of practices, on the agricultural process as a complex.
- Valuation of ES in biophysical terms can be a useful way not only to evaluate services and good provided by nature but also to detect the effects of agriculture and particular practices on ecosystems as wholes.