

# The spider biodiversity in long-term organic paddy field in subtropical China

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## Introduction

Spiders are one of the most important natural enemies in paddy fields and their diversity has declined due to pesticides application and agricultural intensification.

Organic farming is considered as a promising solution for augmenting natural enemies in the agroecosystem.

It was hypothesized that the effects observed of agricultural practice on beneficial organisms may depend on the duration of the agricultural practices in organic farm over years.

Therefore we assessed spiders diversity of organic rice paddy field in subtropical China that had been cultivated organically for 5 (OR5), 10 (OR10) and 15 (OR15) years since conversion and compared it to conventional rice (CR).

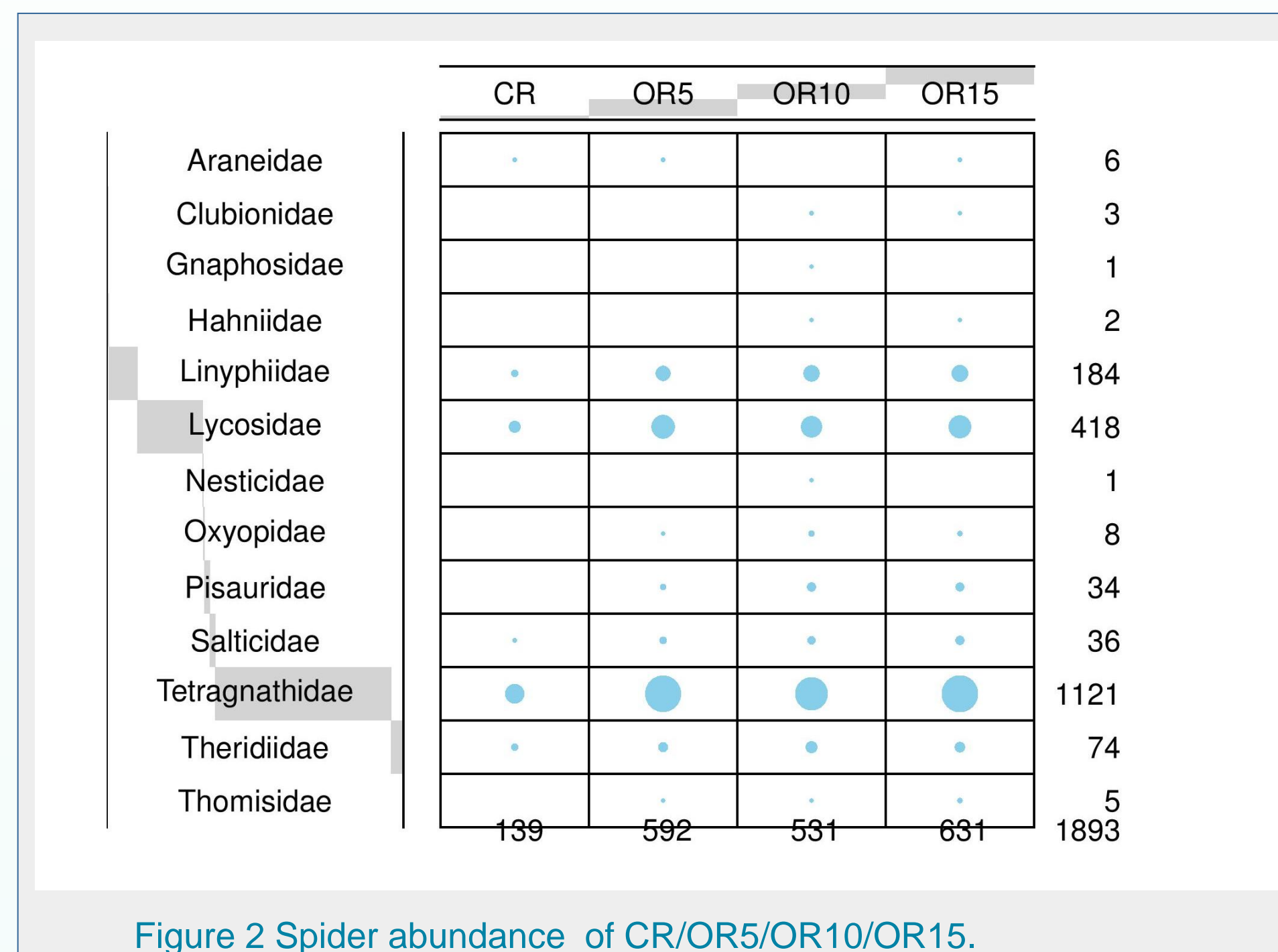


Figure 2 Spider abundance of CR/OR5/OR10/OR15.

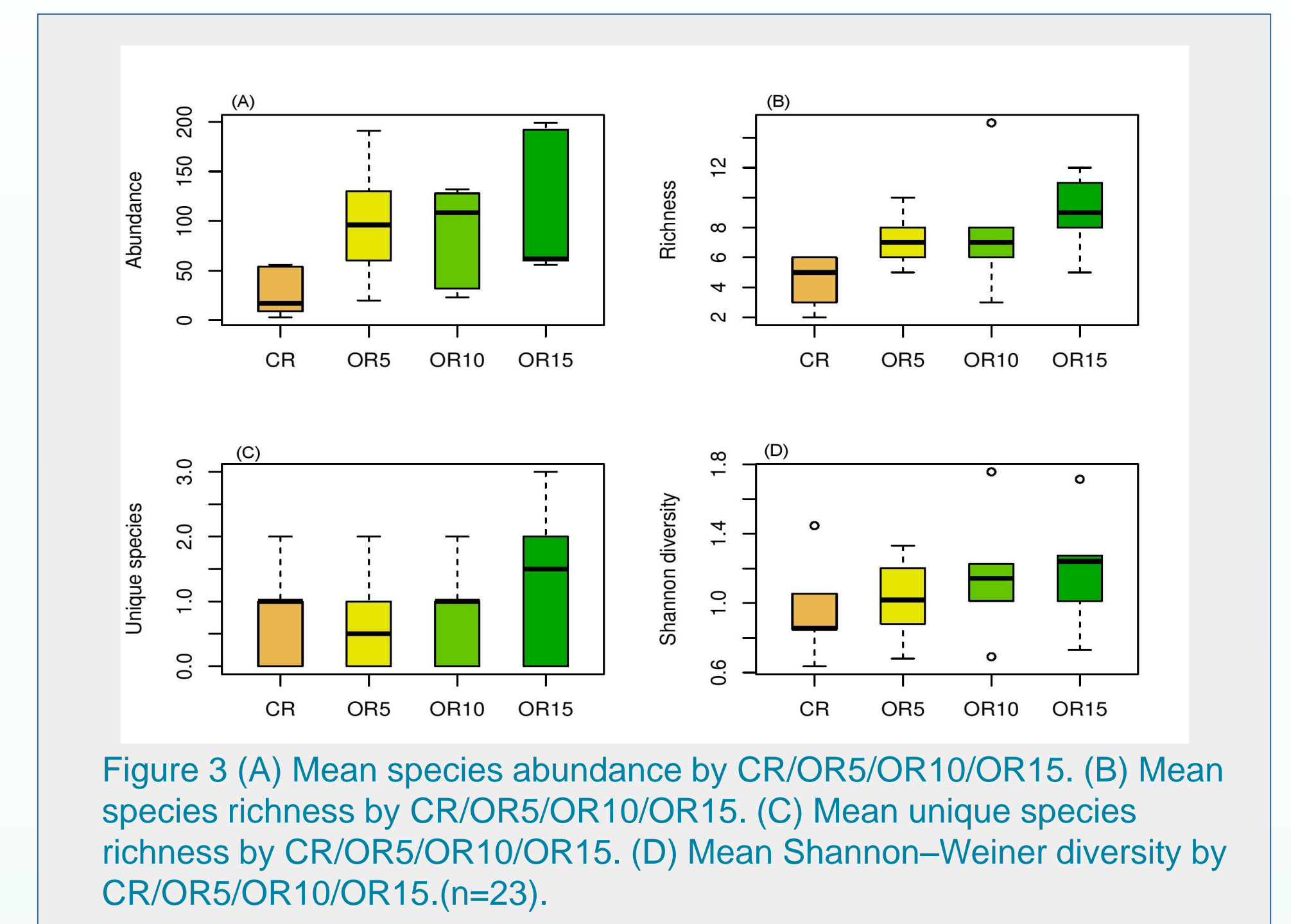


Figure 3 (A) Mean species abundance by CR/OR5/OR10/OR15. (B) Mean species richness by CR/OR5/OR10/OR15. (C) Mean unique species richness by CR/OR5/OR10/OR15. (D) Mean Shannon-Weiner diversity by CR/OR5/OR10/OR15. (n=23).

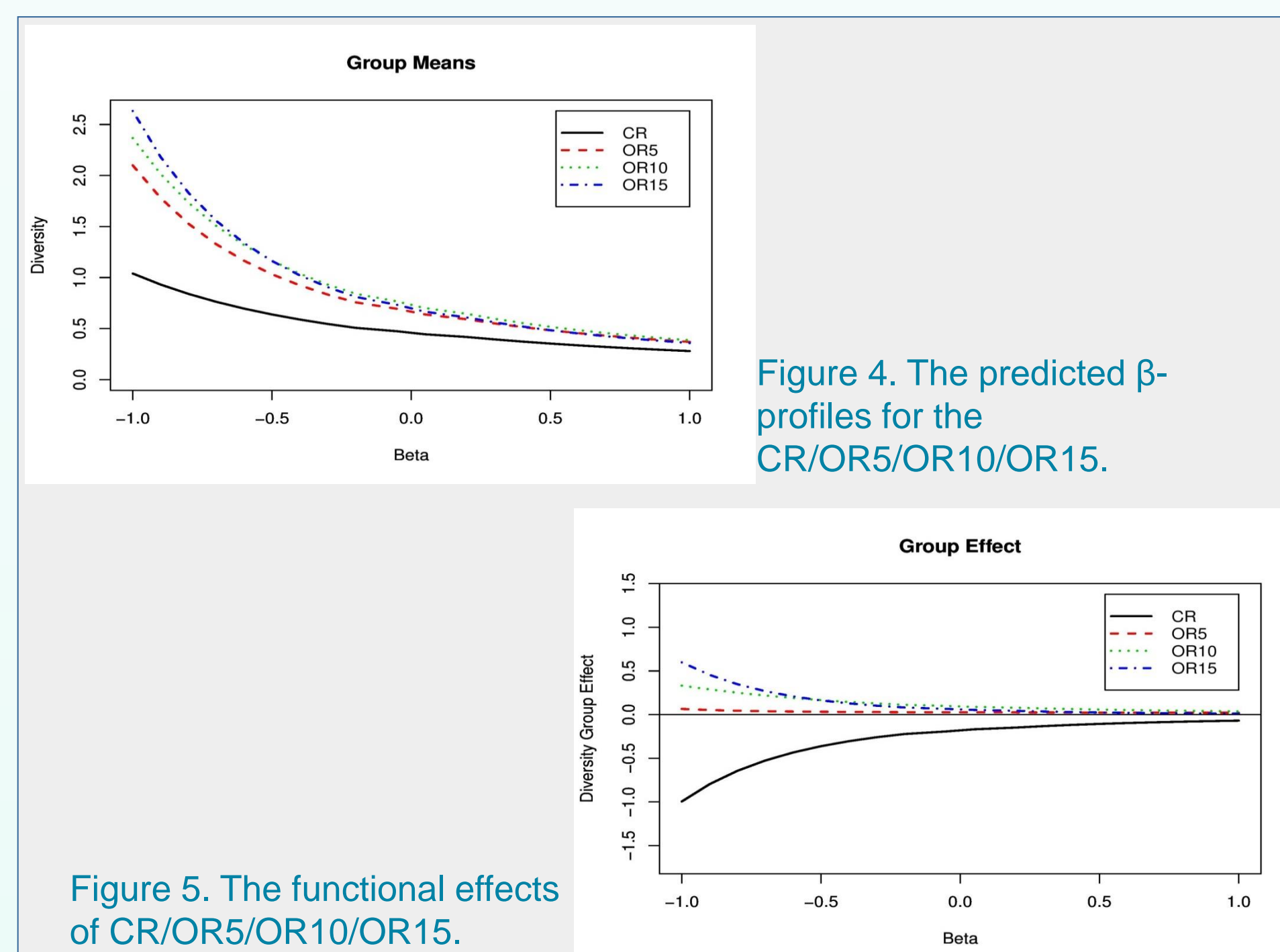


Figure 4. The predicted  $\beta$ -profiles for the CR/OR5/OR10/OR15.

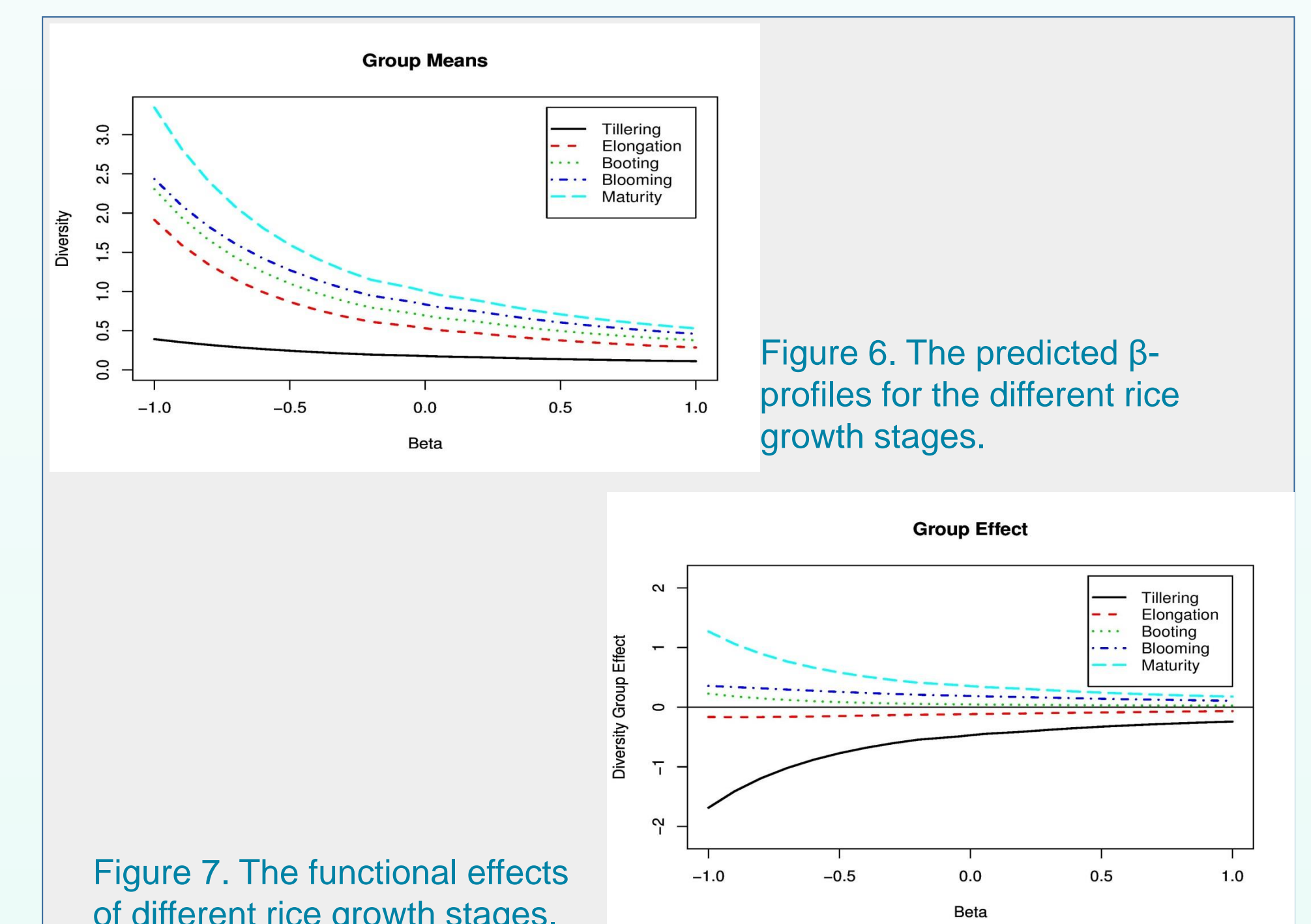


Figure 6. The predicted  $\beta$ -profiles for the different rice growth stages.

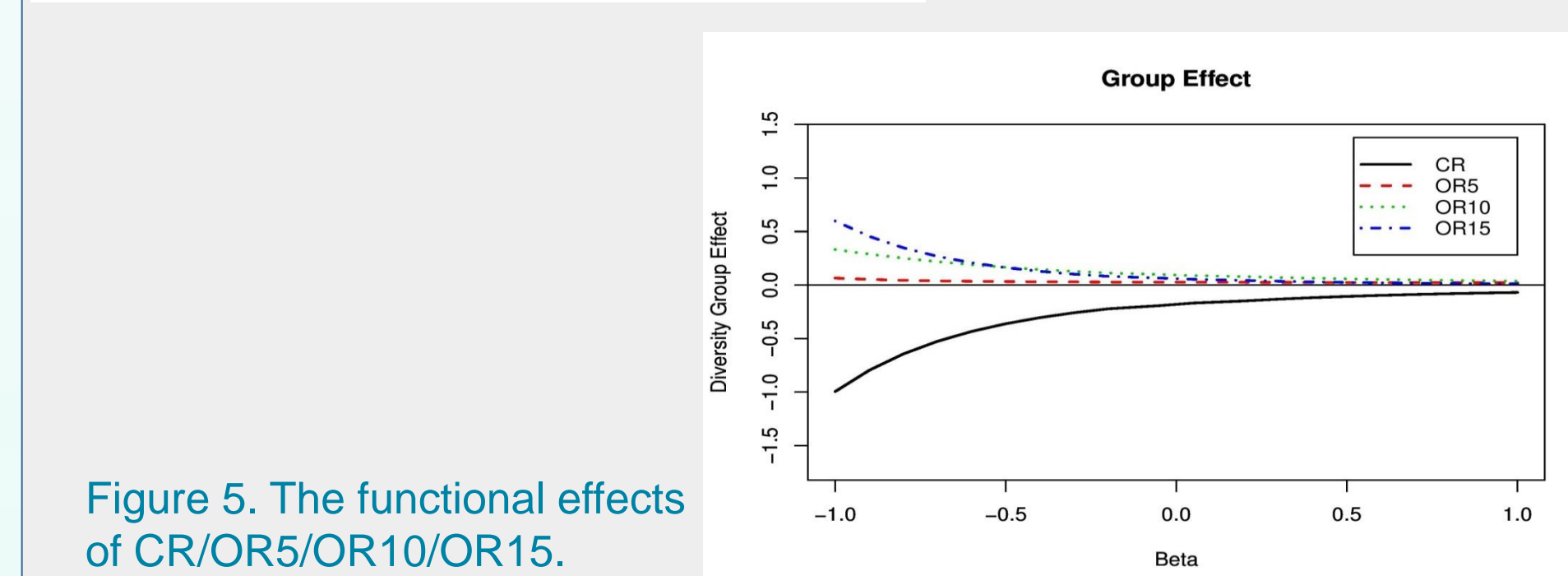


Figure 5. The functional effects of CR/OR5/OR10/OR15.

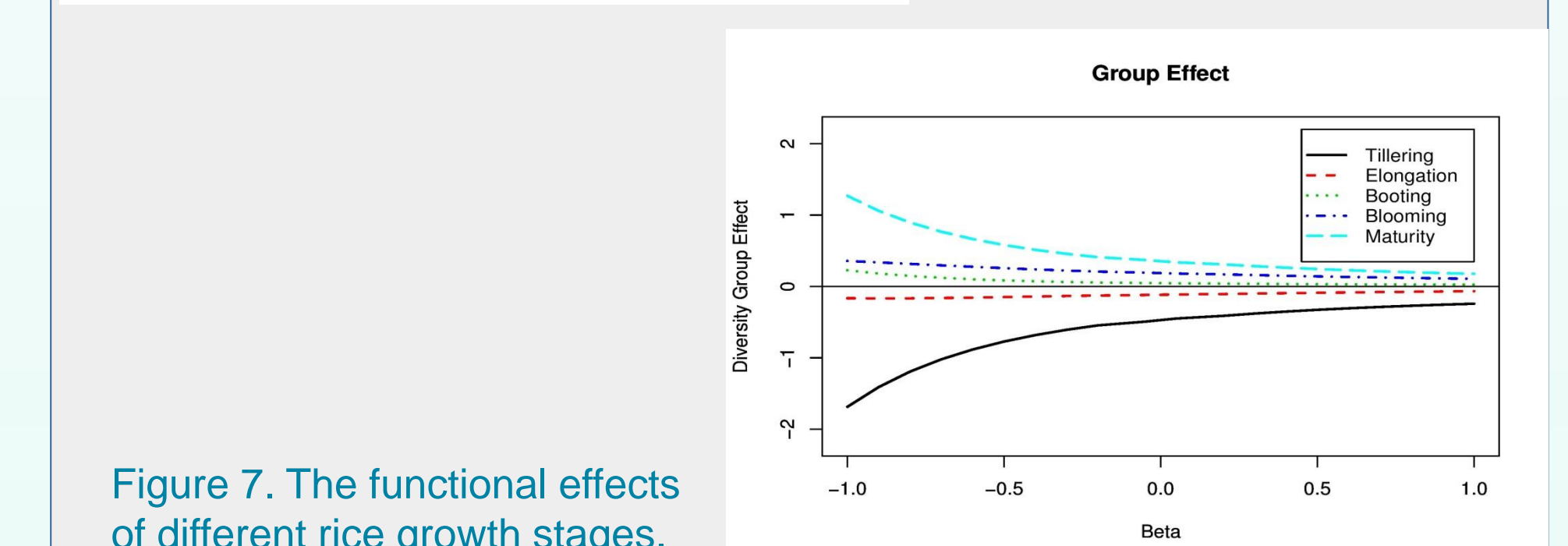


Figure 7. The functional effects of different rice growth stages.

## Method & Material

1) Study sites and farming operation  
The case study was conducted in Wanzai County Jiangxi Province. Totally 23 paddy fields (5 for CR and 6 for OR5/OR10/OR15) were selected as study sites (Figure 1).

The organic rice systems (OR5, OR10 and OR15) follow the rules of China Organic Product Standard (GB/T 19630.1-2011), which is free of chemical fertilizers and pesticides; Conventional farmers mainly rely on pesticides, herbicides and synthetic fertilizers.

### 2) Sampling

Spider suction samples were undertaken from June to August 2015, occurred five times during the rice growing period, namely tillering stage, elongation stage, booting stage, blooming stage and maturity stage.

## Result & Discussion

A total of 1893 spider individuals were collected representing 44 species from 13 families (Figure 2.)

The results showed that spider diversity in organic paddy fields were higher than that of conventional paddy field.

The higher biodiversity are mostly attributed to the practices of organic systems, especially, banning the use of pesticides and chemical fertilizers, crop rotation, cover crop for the winter, and maintenance of a heterogeneous landscape around field edges. Especially cover crop during the winter, which ensures higher spider diversity in rice fields in the coming year. In the long run, spider richness increase in organic rice field.

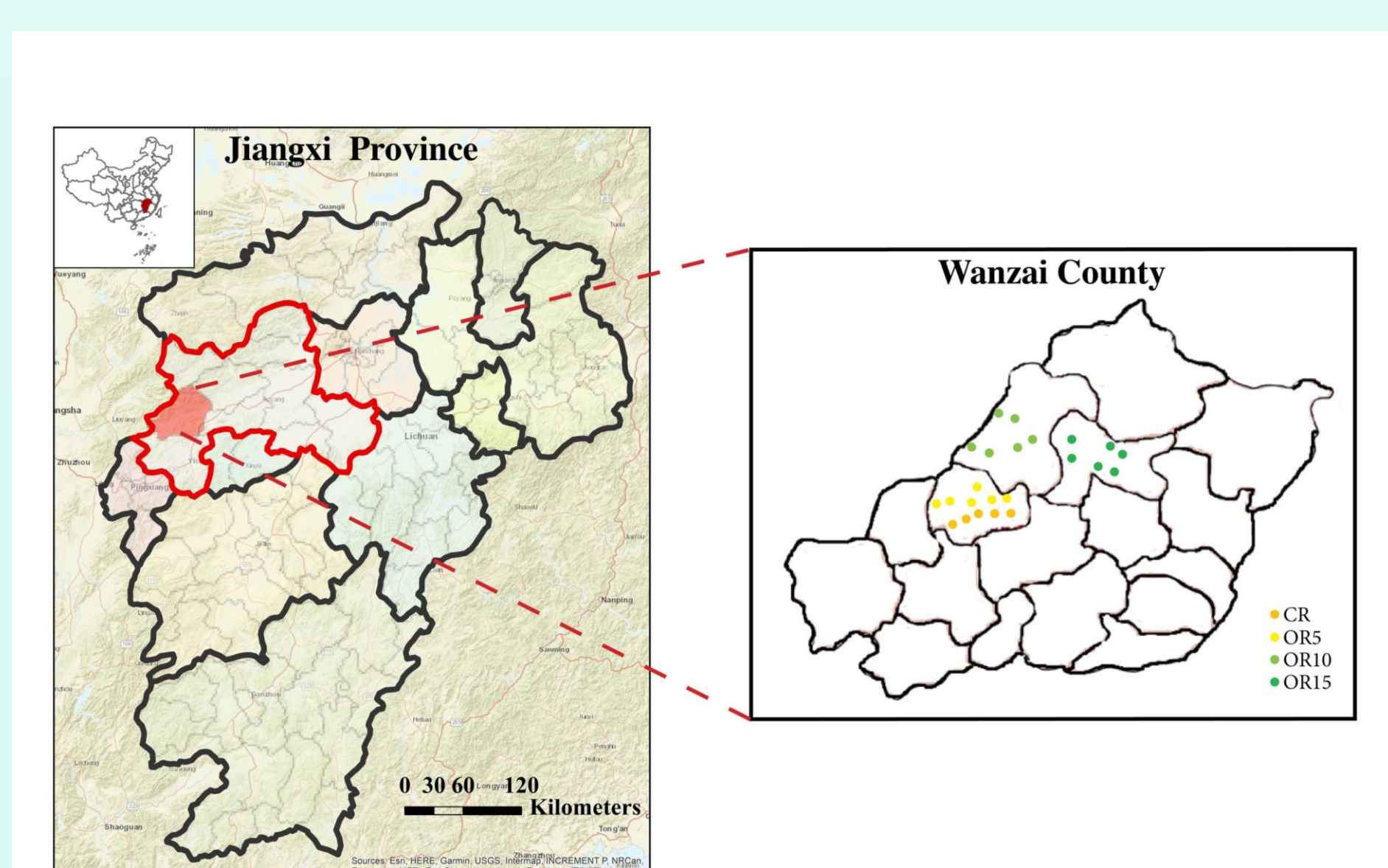


Figure 1. Location of sampling sites in Wanzai County, Jiangxi Province, China.

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