

Influence of Bt maize to epigeic collembolan communities

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Abstract

Epigeic collembolan communities were studied in maize plots at the locality Borovce (N 48 34.831 E 17 43.302) in western Slovakia. The soil type of the area was loamy luvisol chernozem. Hybrids included to the experiment were DK440 and DKC4442YG (Mon 810) sown in 10 repetitions. Each plot was 10 x 10 m in area, isolated with 5 m wide strip of barley from adjacent plots. Pitfall traps were collected in 11 dates from June to October 2012, the captures were analysed after 7 days of installation. *Entomobrya handschini* (together 549 specimens in all traps of nonBt maize and 672 specimens in Bt maize), *Entomobrya marginata* (419 and 466), *Lepidocyrtus violaceus* (147 and 161), *Orchesella cincta* (24 and 32), *Xenylla welchi* (25 and 17), *Orchesella albobfasciata* (11 and 9) and *Pseudosinella octopunctata* (3 and 1) were the collembolan species identified in pitfall traps. The results showed that occurrence of springtails did not depend on maize hybrid, and cultivation of genetically modified maize did not influence their populations. The population of springtails increased in periods when the amount of rainfall was higher.

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Entomobrya handschini



Entomobrya handschini



Entomobrya marginata



Lepidocyrtus violaceus



Lepidocyrtus violaceus



Orchesella cincta



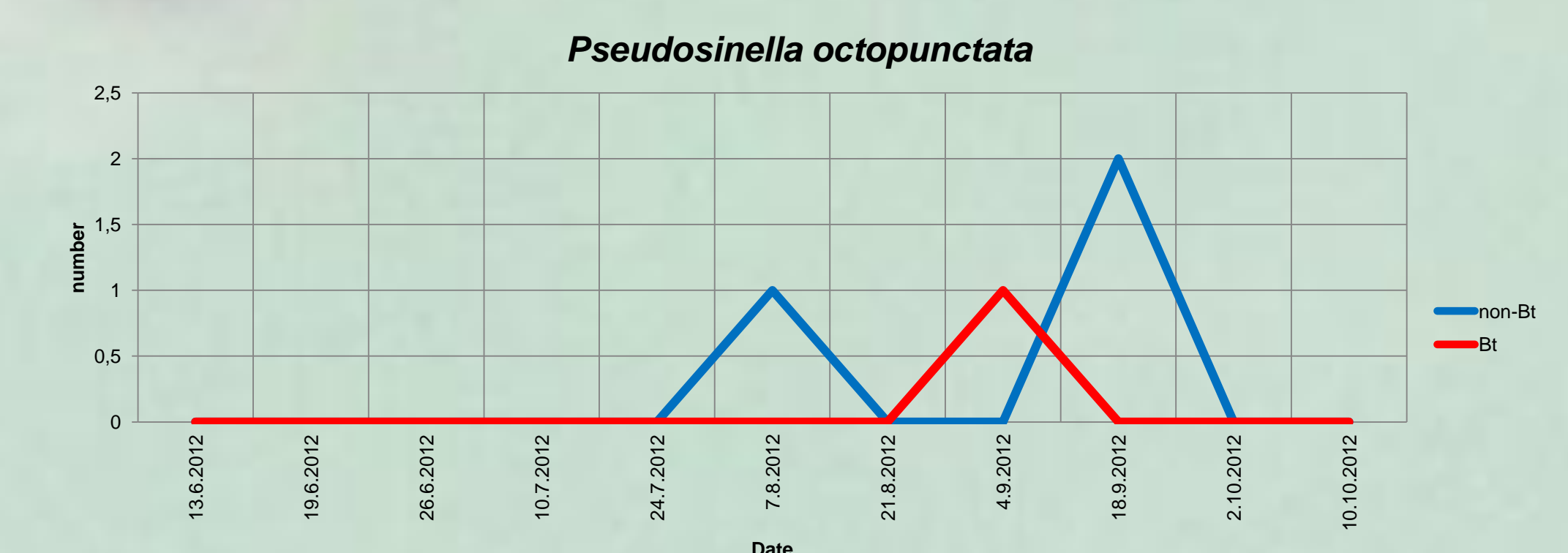
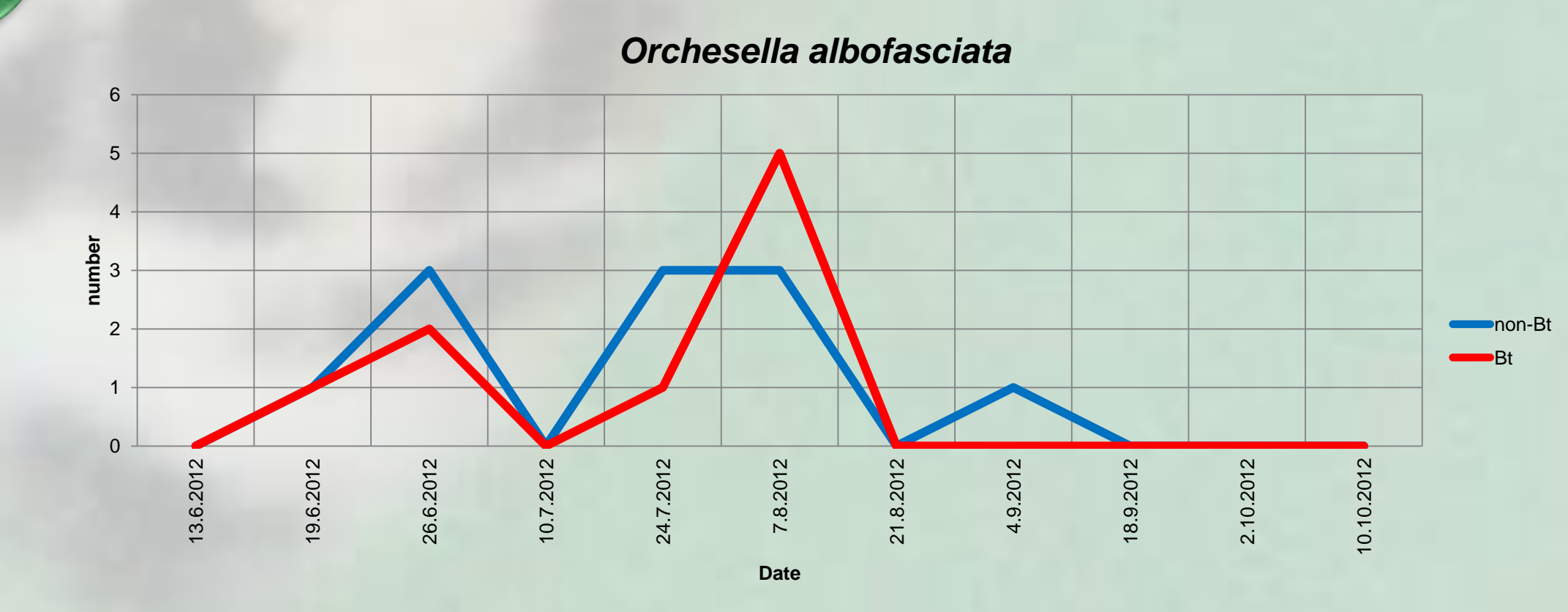
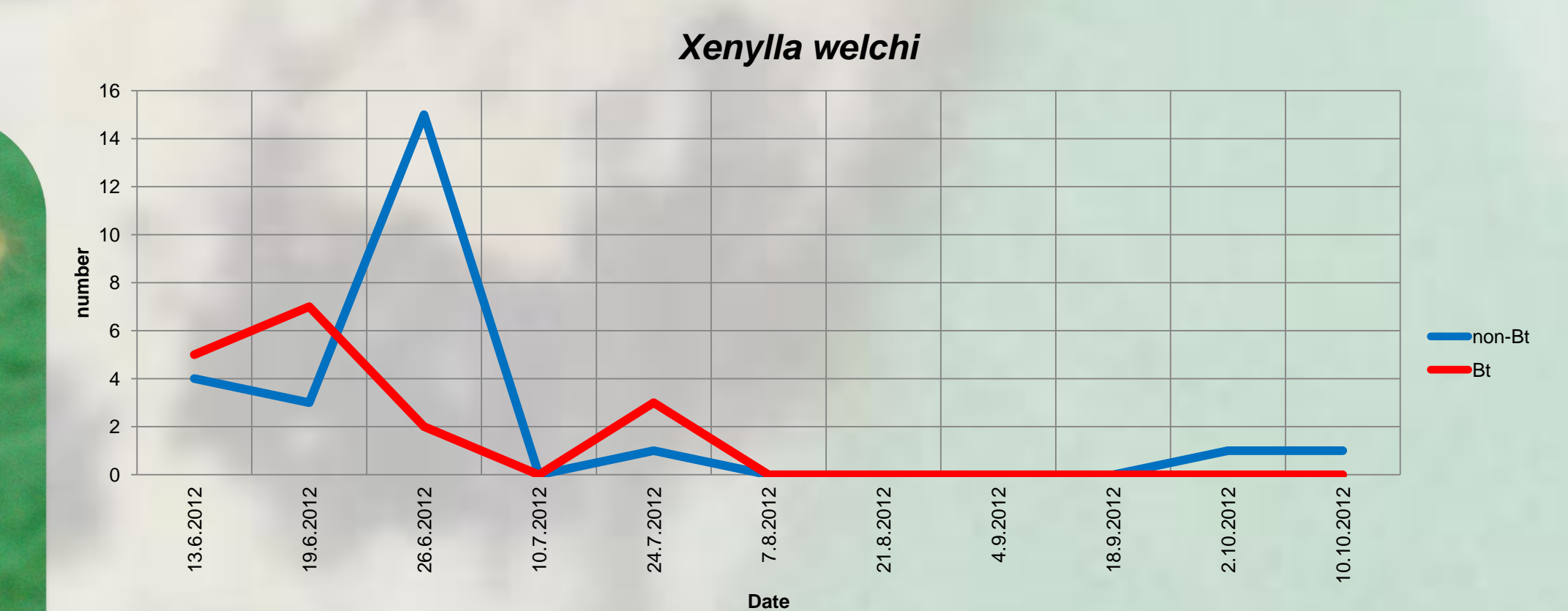
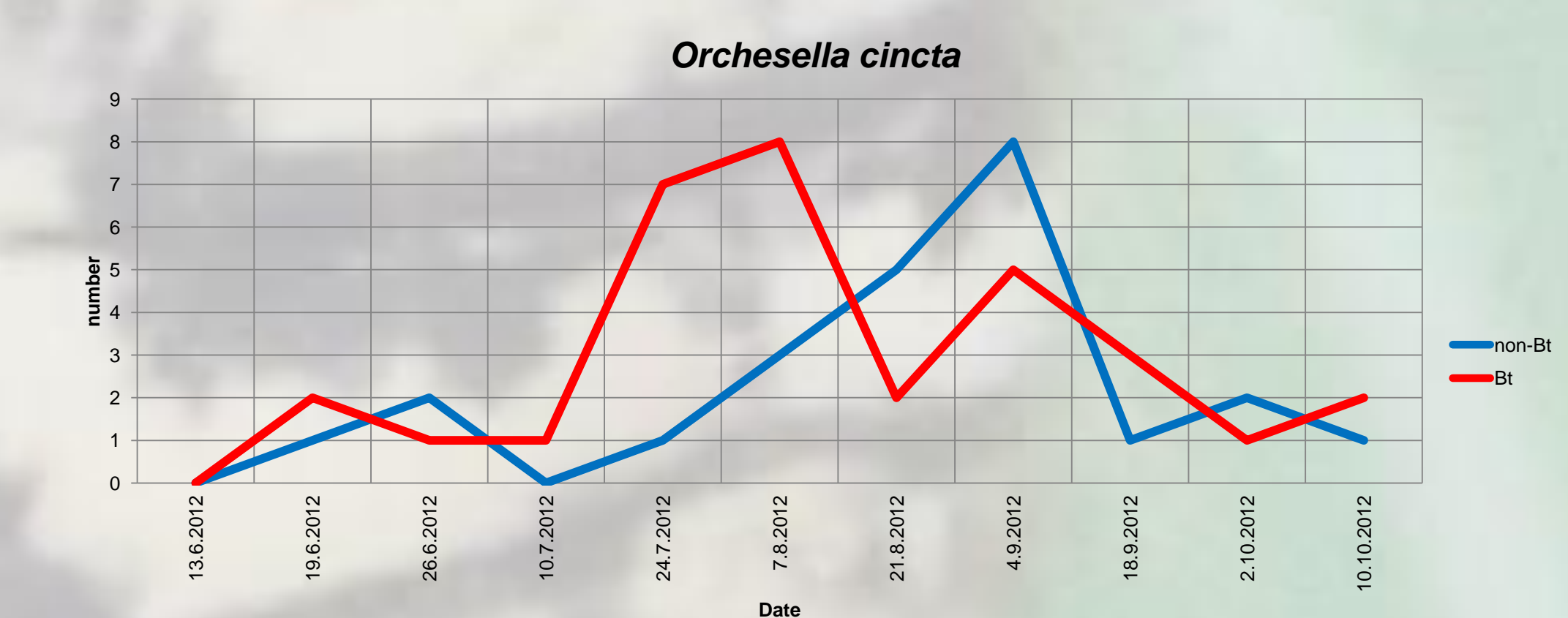
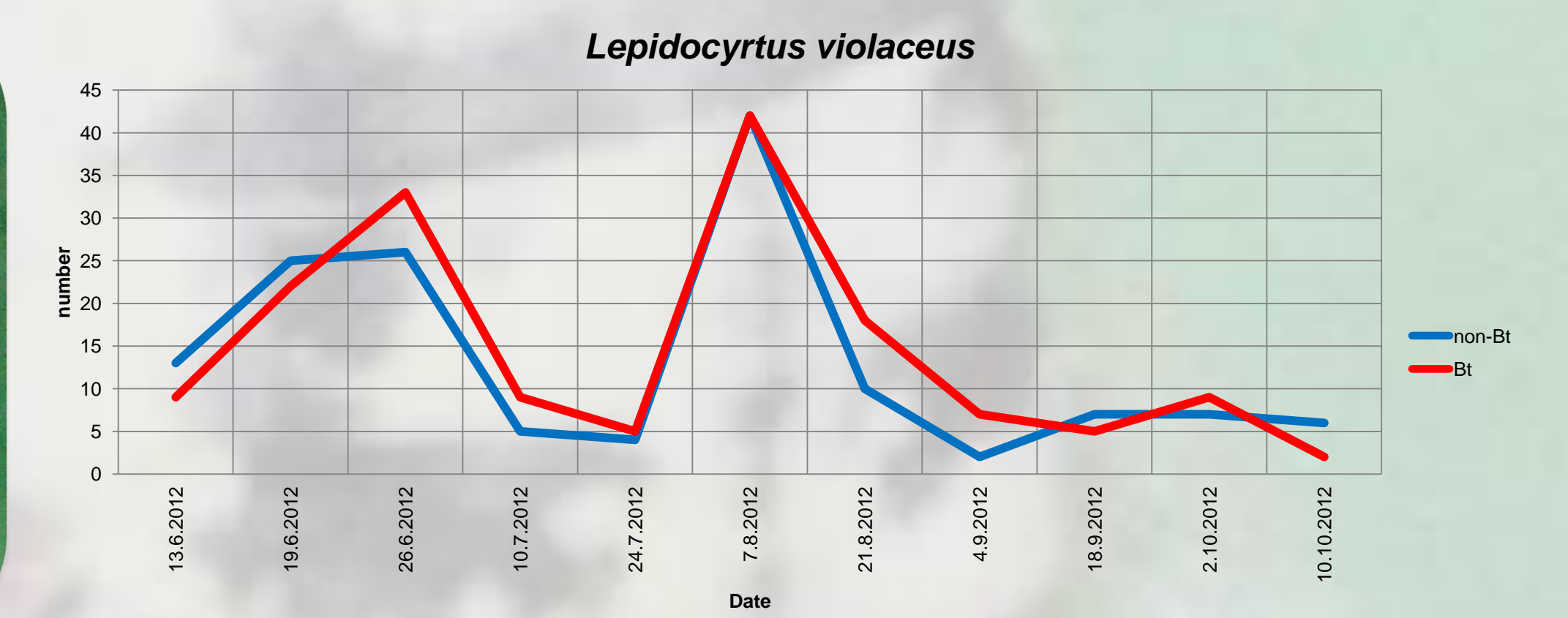
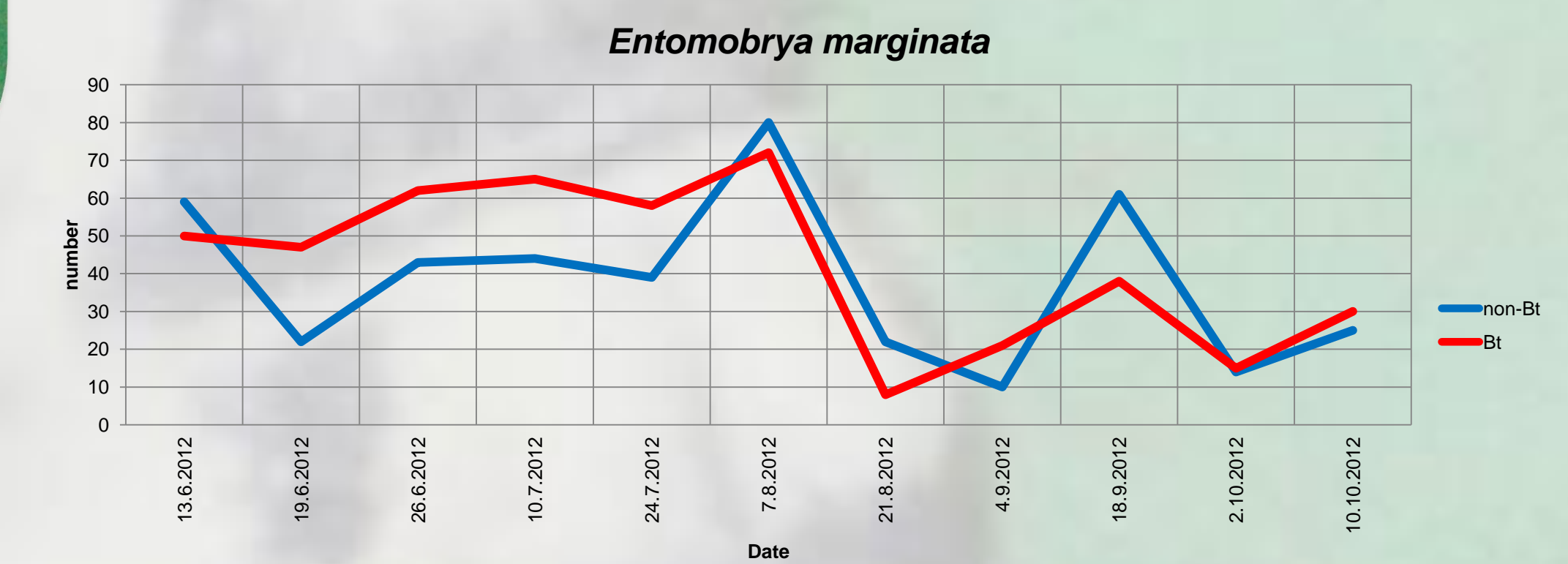
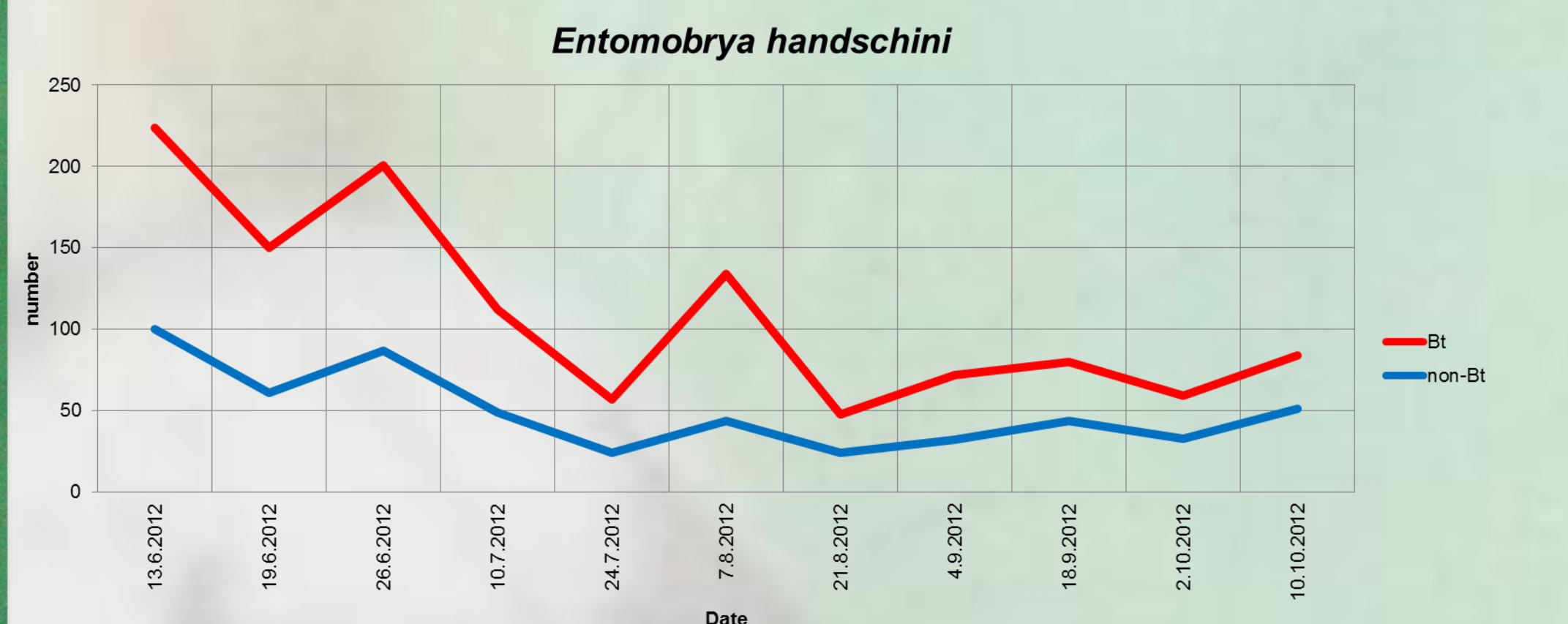
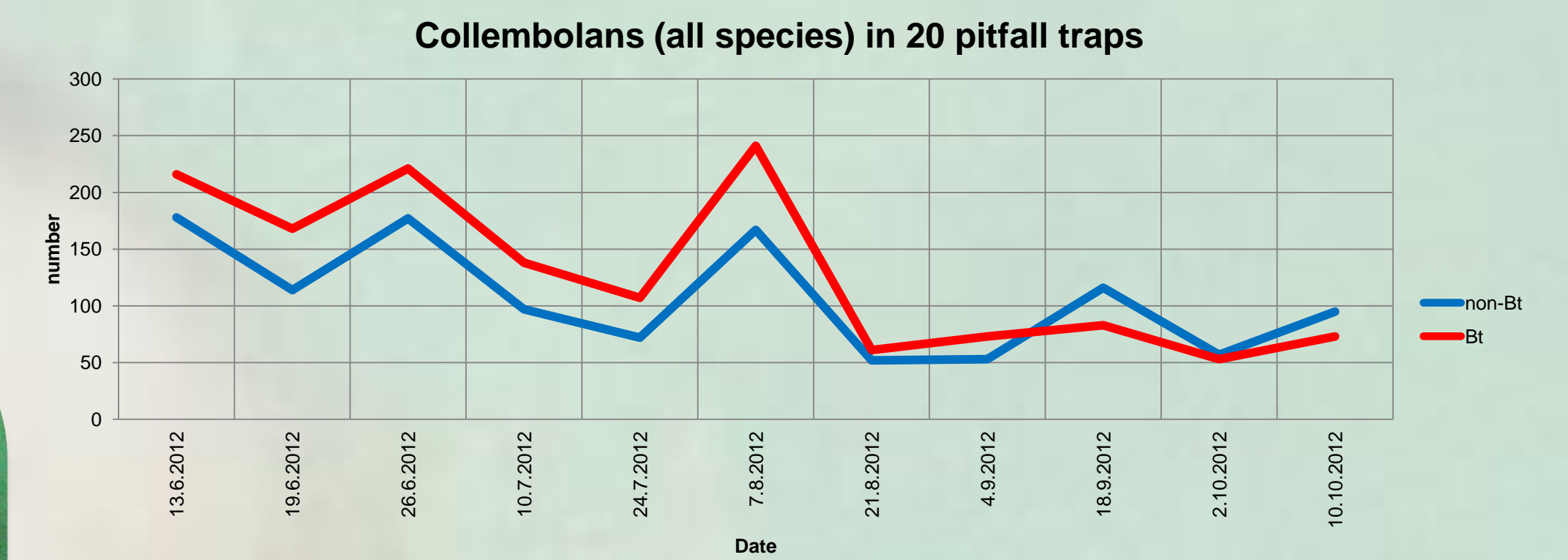
Xenylla welchi



Pseudosinella octopunctata



Population dynamics of collembolans at the locality Borovce, Slovakia during June-October 2012



Material and methods

The study was carried out at the locality Borovce (N 48 34.831 E 17 43.302) in western Slovakia from June to October 2012. The soil type of the area is loamy luvisol chernozem. Hybrids included to experiment were DK440 and DKC4442YG. Each hybrid was sown in 10 repetitions. Each plot was 10 m long and 10 m wide. Each plot was isolated from other plot with 5 m wide grass strip. Dimension of the trial was 80 x 65 m. Springtails were collected by pitfall traps every fourteen days. In each plot there were deployed two pitfall traps. Trap consisted of two standard plastic cups nested together and sunk into the soil so that the rim of the inner cup was flush with the soil surface. Each trap was filled to a 2.5 cm depth with ethylene glycol antifreeze. The antifreeze solution was replaced as necessary. Traps were covered with sheet steel. This served for limiting liquid loss by evaporation and limiting flooding from rainfall. Traps were transported back to the laboratory and then were transferred to 100% ethanol. Data were summarized and compared in Excel. The Statgraphics Centurion XV. was used for assess differences between springtails population in Non Bt and Bt corn.

Results

The most important collembolan species captured in pitfall traps were:

Entomobrya handschini Stach 1922
Entomobrya marginata (Tulberg 1897)
Lepidocyrtus violaceus (Geoffroy 1762)
Orchesella cincta (Linnaeus 1758)
Xenylla welchi Folsom 1916
Orchesella albobfasciata Stach 1960
Pseudosinella octopunctata (Börner 1901)

Pictures show that population dynamics of captured species was different.

It was concluded that cultivation of Bt corn has no effect on the population of springtails. In non Bt corn occurred approximately the same abundance of collembolans as in Bt corn.

Table 1
 Numbers of all collembolans found in pitfall traps on dates studied. Differences between the numbers of springtails in different maize hybrids were not significant in all dates. 10 replicates in each variant; ANOVA

Number of Collembolans	non-Bt	Bt	P-Value
13.6.2012	178	216	0.4892
19.6.2012	114	168	0.1231
26.6.2012	177	221	0.4259
10.7.2012	97	138	0.2421
24.7.2012	72	107	0.5268
7.8.2012	167	241	0.0643
21.8.2012	52	61	0.3128
4.9.2012	53	73	0.1406
18.9.2012	116	83	0.7286
2.10.2012	57	53	0.6217
10.10.2012	95	73	0.8941