

Comparison of apiculture and winter losses of honey bee colonies in Austria and the Czech Republic

Robert Brodschneider¹, Jiří Danihlík^{2,3}, Zdeněk Klíma^{2,4}, Zdenko Tichý⁴,
 Radek Kobza², Karl Crailsheim¹

¹ Department of Zoology, Karl-Franzens-University Graz, Universitätsplatz 2, 8010 Graz, Austria.
² Czech Beekeepers Association, Staroměstská 2362/A, 370 04 České Budějovice, Czech Republic.
³ Department of Protein Biochemistry and Proteomics, Centre of the Region Haná for Biotechnological and Agricultural Research, Palacký University, Šlechtitelů 11, 783 71 Olomouc, Czech Republic.
⁴ Department of Ecology and Diseases of Game, Fish and Bees, Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences Brno, Palackého 1/3, 612 42 Brno, Czech Republic.

Introduction:

Austria and the Czech Republic have historically shared beekeeping thanks to geographical as well as cultural proximity. We here present a comparison of apiculture in both countries (Table 1) and results of the standardized COLOSS survey on honey bee colony losses during winter 2013/2014.

Material and Methods:

The questionnaire was distributed and promoted through beekeeping journals, internet and at meetings between February and May 2014.

Results:

In total, 556 Czech and 1023 Austrian beekeepers answered the questionnaire (Fig. 1). Average operation size of participants in both countries was ca. 18 colonies. Winter loss rate was 12.8% (95% confidence interval: 11.7-14.0%) in Austria and 6.6% (95% CI: 5.6-7.7%) in the Czech Republic (Fig. 2). Methods used to fight *Varroa destructor* did differ between the two countries (Figure 3) as well as the set of symptoms reported by beekeepers for colony losses (Figure 4).

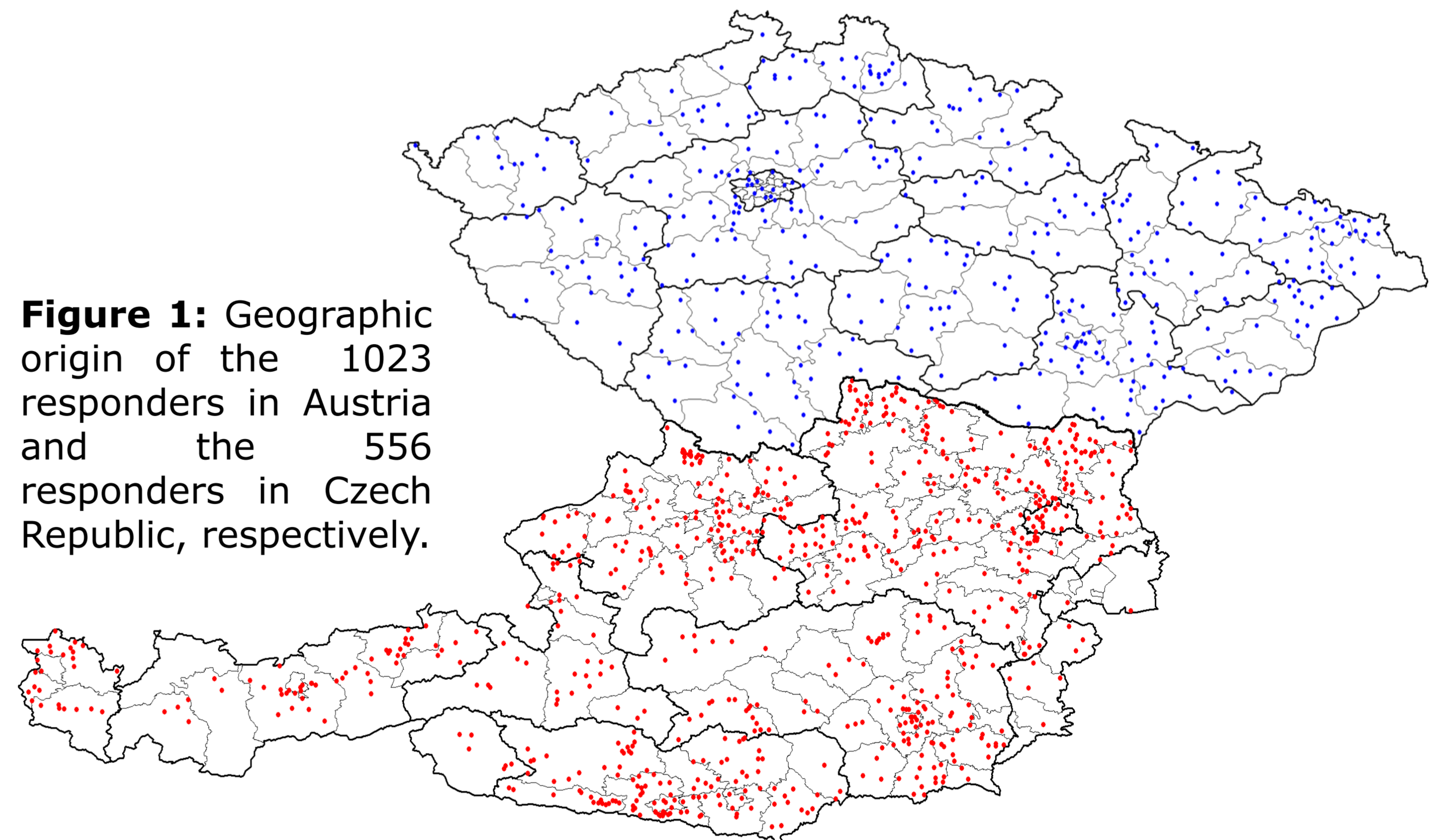


Figure 1: Geographic origin of the 1023 responders in Austria and the 556 responders in Czech Republic, respectively.

Discussion:

Winter losses were low in Austria, compared to previous years, but even lower in the Czech Republic. Despite of many similarities, we also found differences in apiculture, for example in the use of synthetic acaricides or oxalic acid for fighting *Varroa*. Also symptoms reported for winter losses were different. Detailed risk analysis will be performed and data obtained from this survey were submitted to the international dataset. Further cooperation between the two countries is planned.

	Austria	Czech Republic
Number of beekeepers	25207	48132
Number of honey bee colonies	312740	540705
Average operation size	12.4	11.2
Honey bee colonies / km ²	3.7	6.9
Response rate winter loss survey	4.1%	1.2%

Table 1: Comparison of apiculture in Austria and the Czech Republic (data from national beekeeping organizations, this study and other sources).

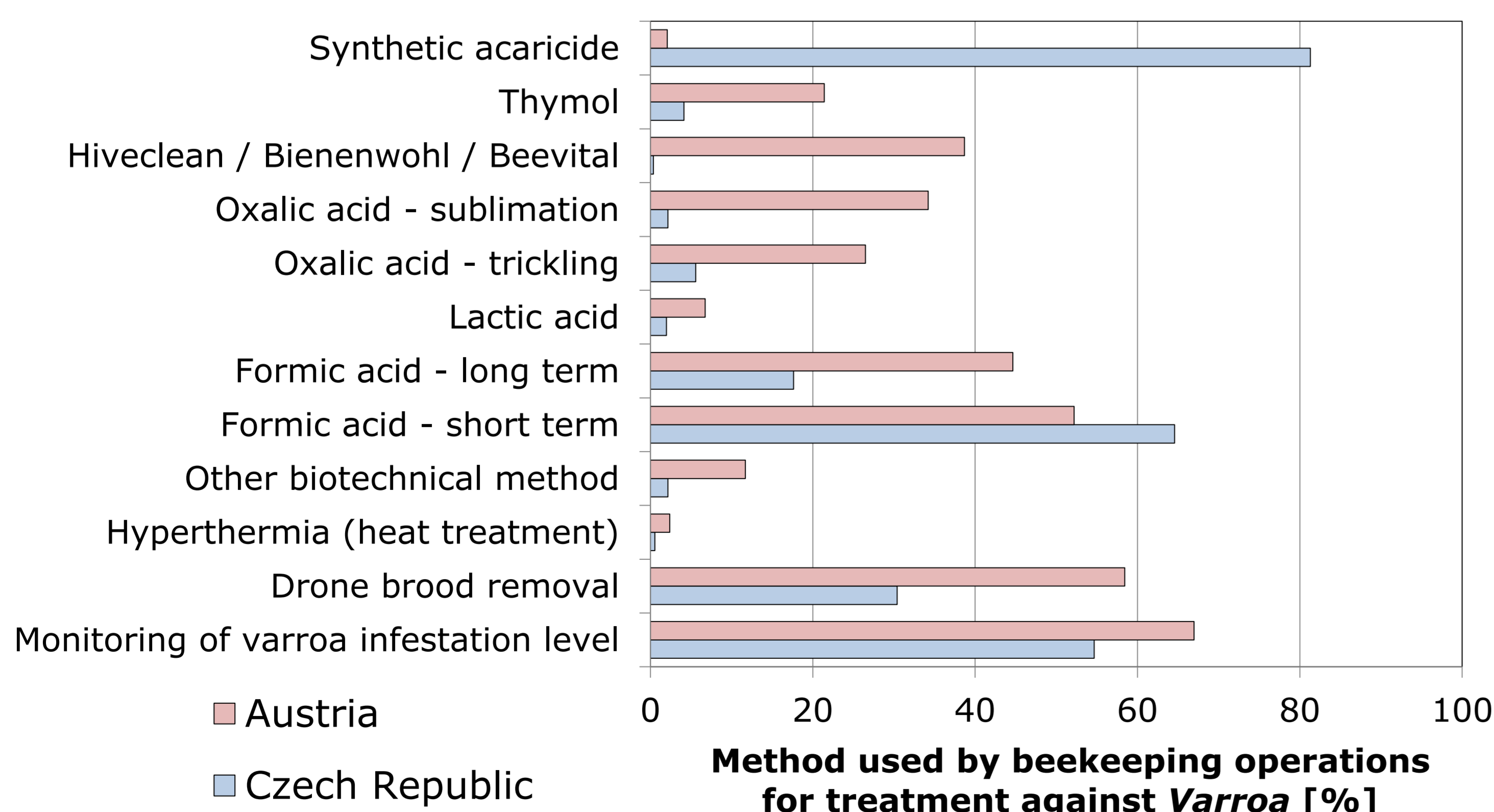


Figure 3: Comparison of treatments against *Varroa destructor* used by Austrian (n=1008) and Czech (n=556) beekeepers between April 2013 and April 2014.

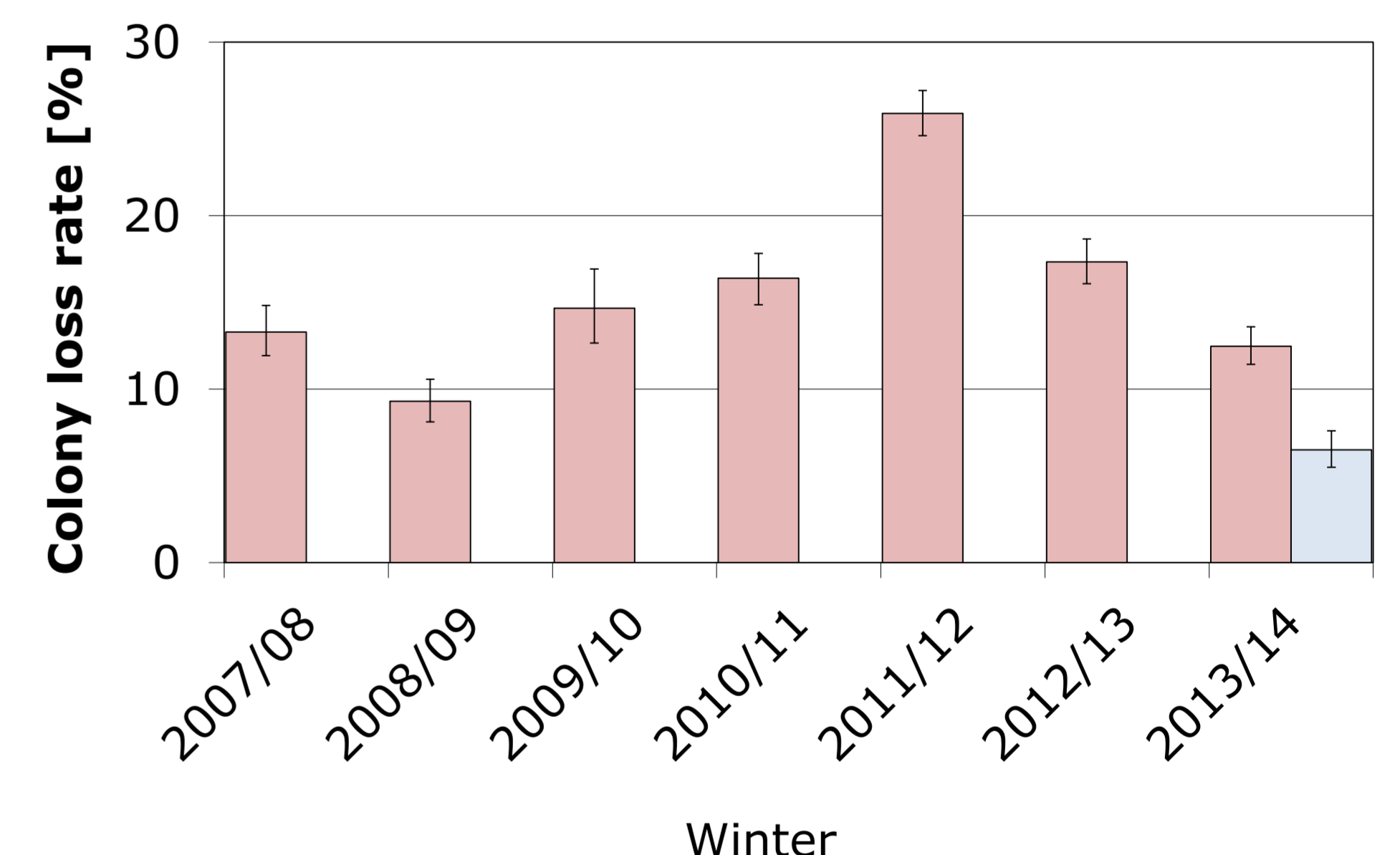


Figure 2: Winter loss rate (and 95% confidence interval) of honey bee colonies in Austria (red) for the last seven years and the Czech Republic (blue) for 2013/14.

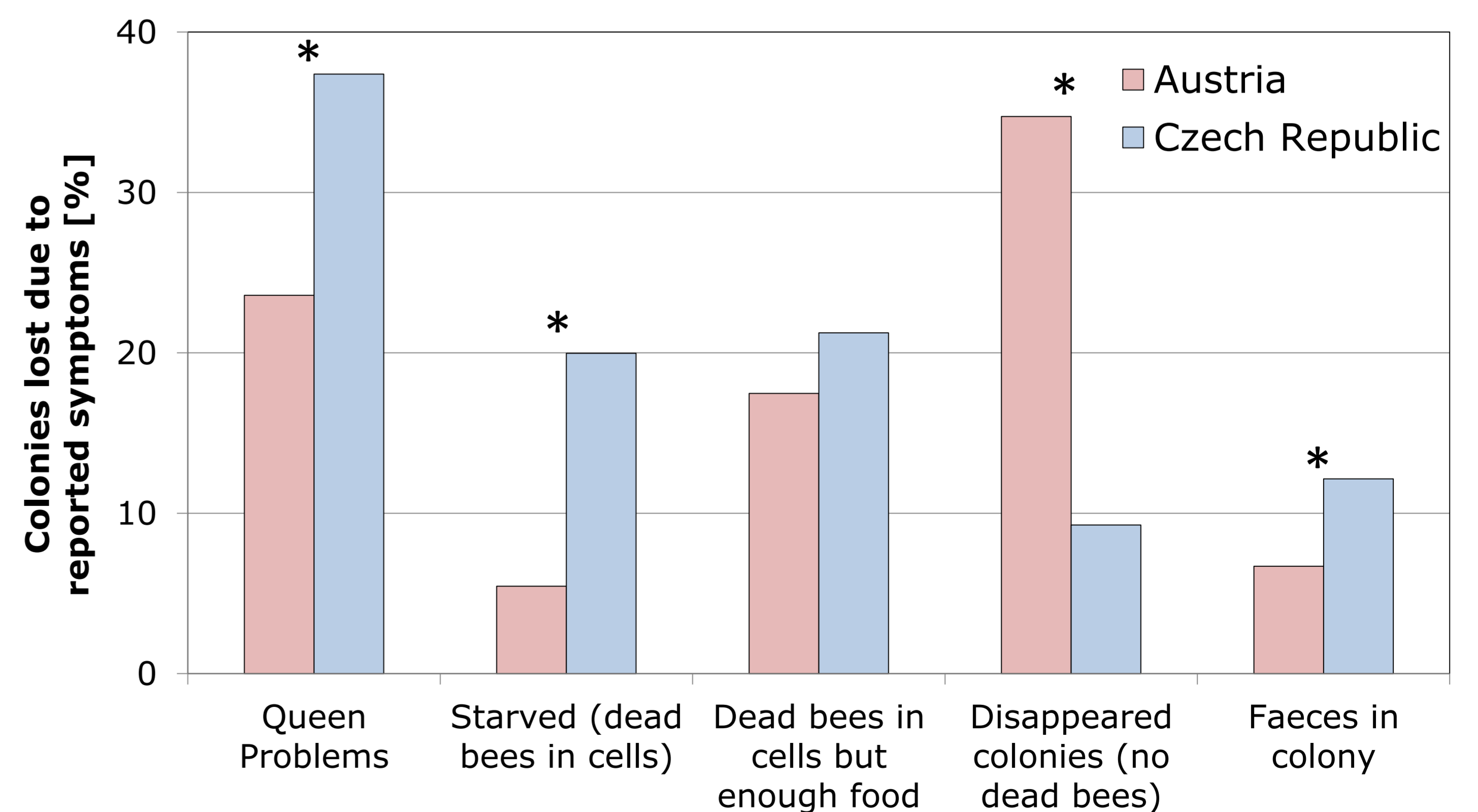


Figure 4: Comparison of symptoms reported by beekeepers for winter losses of honey bee colonies in Austria (n=2114 total reports) and the Czech Republic (n=626). $\chi^2=263.8$; $df=4$; $p<0.001$.