

Winter colony losses in Austria in 2012/13

- Introduction -

We investigated honey bee colony losses in Austria for the sixth consecutive year using the COLOSS questionnaire. We asked beekeepers for number of colonies wintered in 2012 and number of colonies lost during winter.

- Material & Methods -

The questionnaire was distributed and promoted through a beekeeping journal, the internet (www.Bienenstand.at) and at meetings between February and 20th of June 2013. We received 997 questionnaires representing 19406 colonies (Fig. 1). Loss rate and 95% confidence interval (95% CI) are presented for subgroups.

Fig. 1. Response:

Geographic origin of the 997 operations that answered our questionnaire according to postal code. 91.8% of beekeepers have all their apiaries within 15 km of this area.

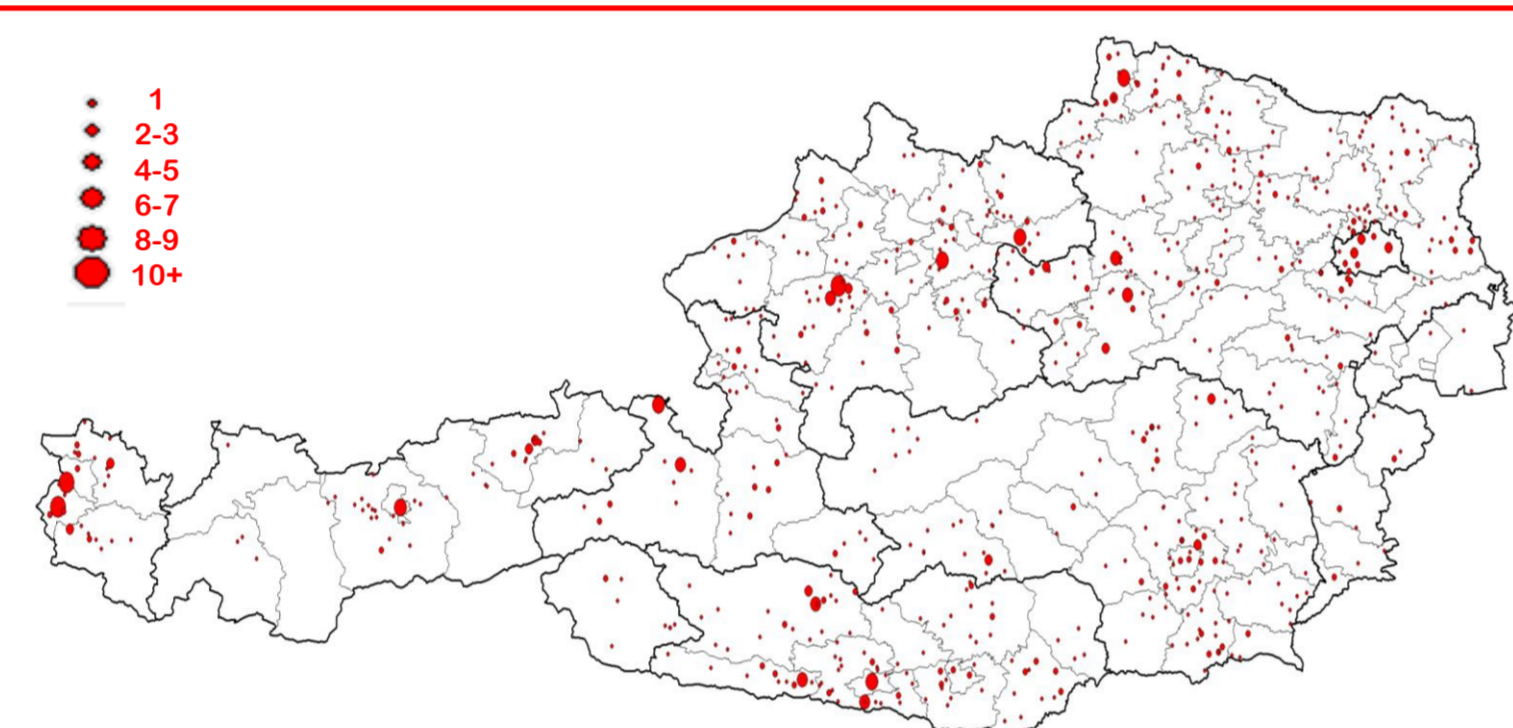


Fig. 2. Six years of monitoring:

Winter loss rate and 95% confidence interval. n=374, 575, 311, 565, 1537, 997 operations overwintering 7676-32471 colonies.

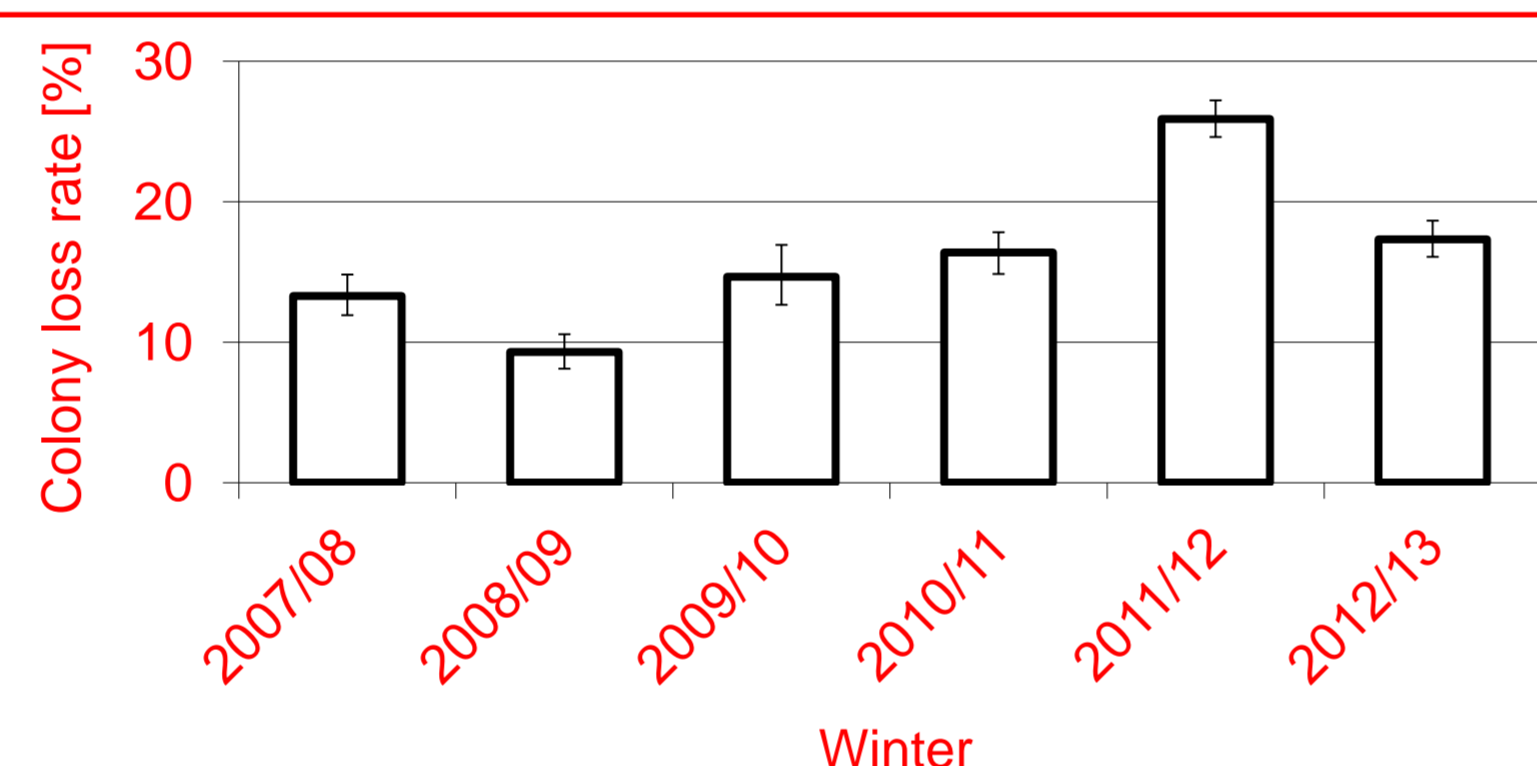


Fig. 3. Losses per district:

Losses for single districts in % are shown using 10 shades of red. White = no data. Map courtesy of www.datamaps.eu.

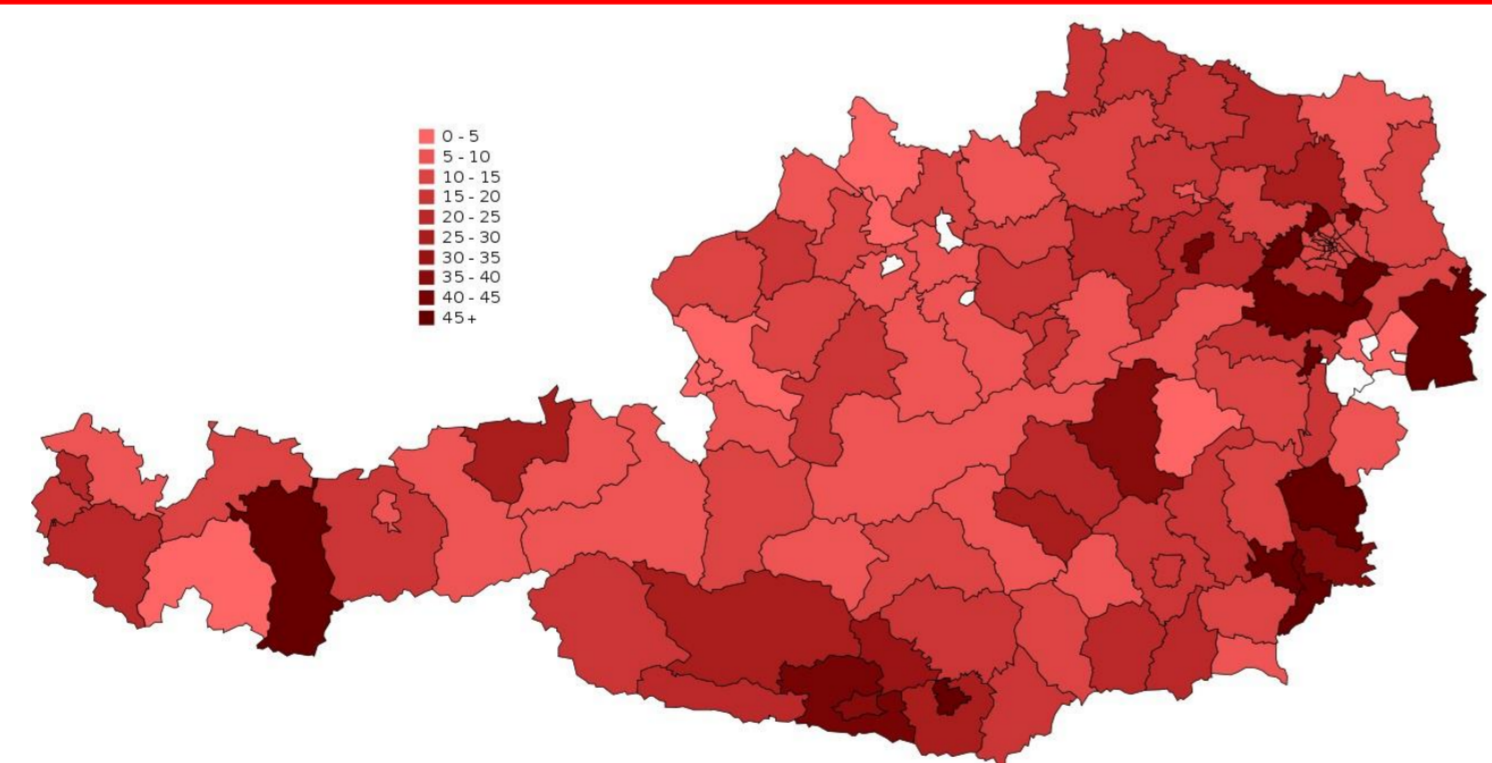


Fig. 4. Operation size:

Winter loss and 95% confidence interval of beekeeping operation categorized by size. n=735, 198, 64 operations, respectively.

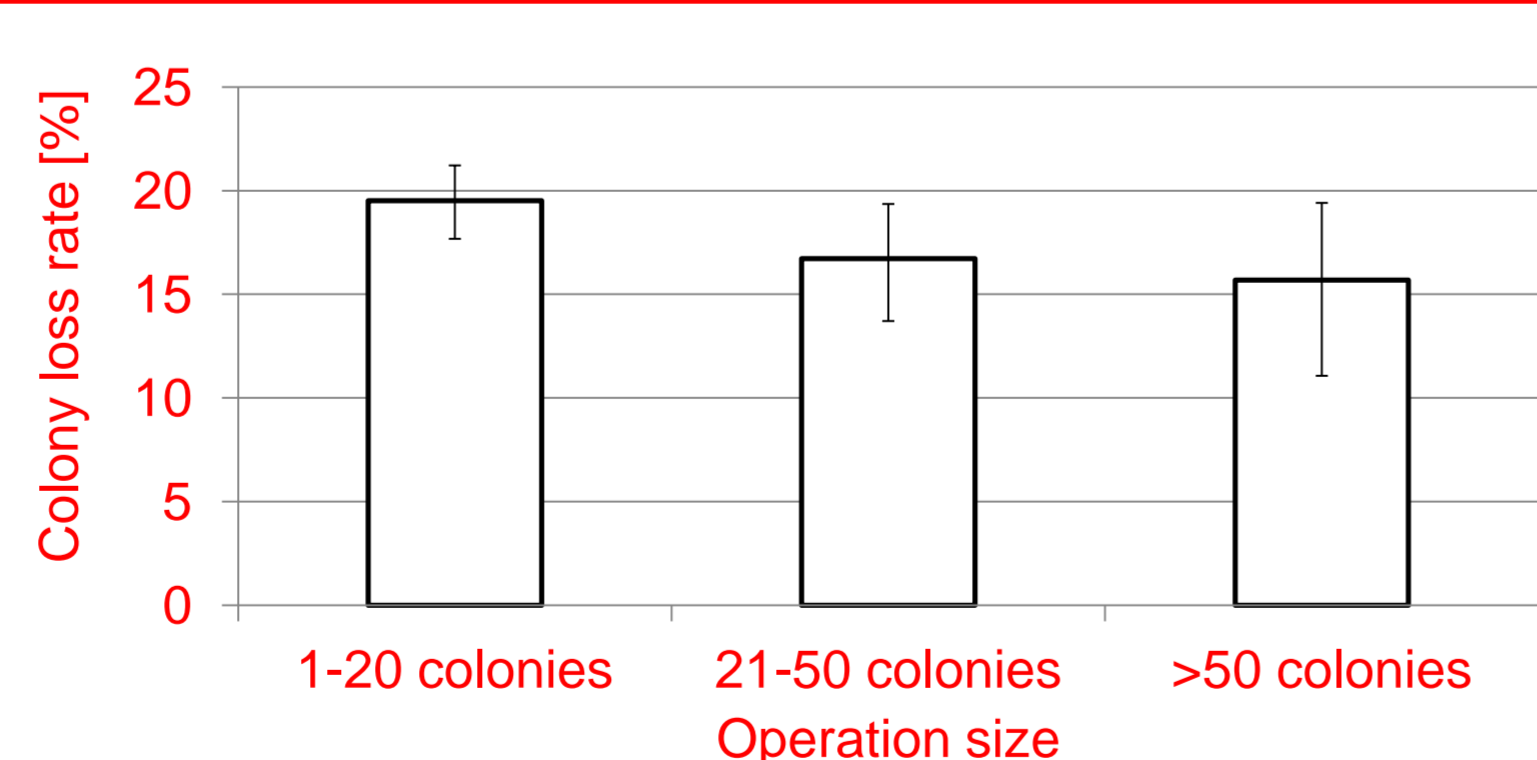
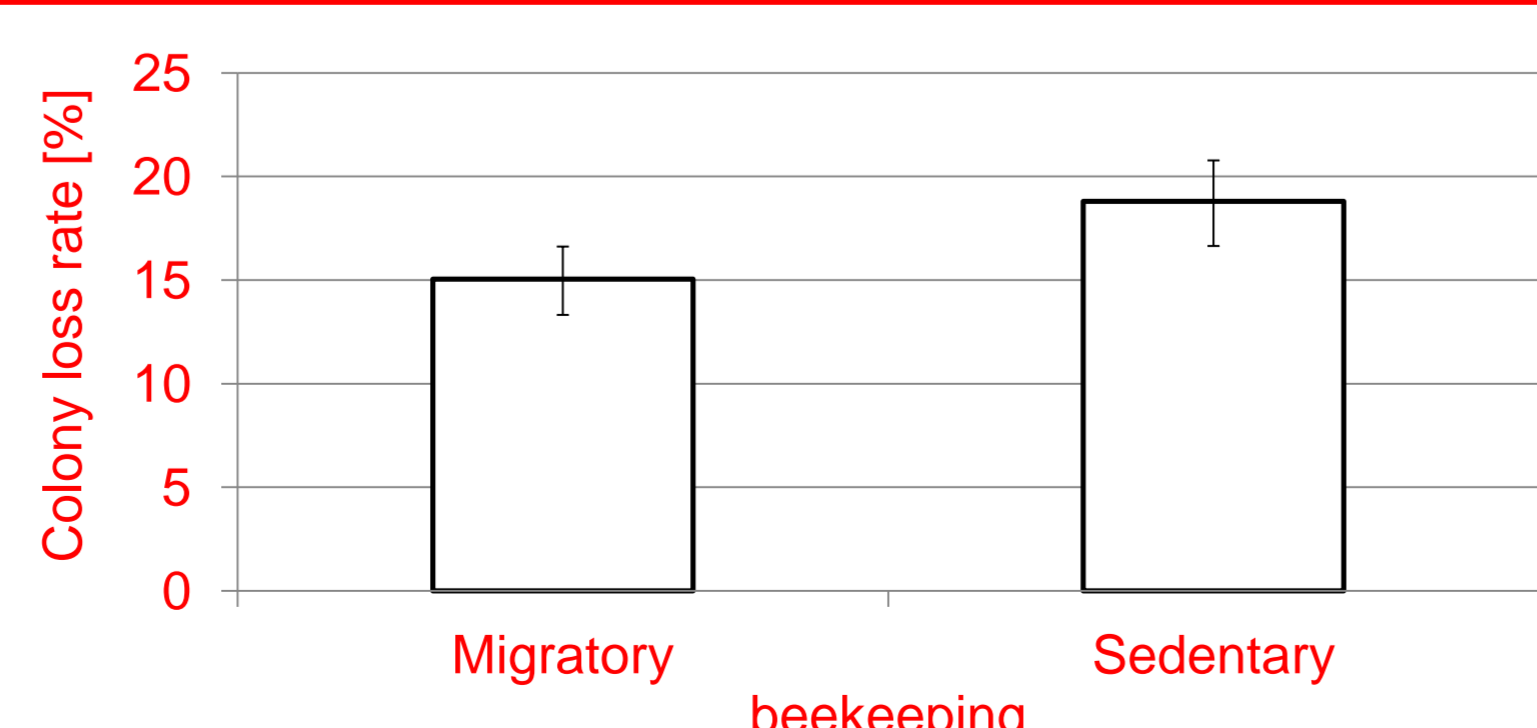


Fig. 5: Transport of colonies:

45.9% of Austrian beekeeping operations transported their colonies. The winter losses (95% CI) of migratory (n=395) were lower compared to sedentary (n=465) operations.



- Results & Discussion -

Total loss rate of honey bee colonies during winter of 2012/13 in Austria was 17.3% (95% CI: 16.1-18.7 - Fig. 2) with marked regional differences (Fig. 3). From this year's analysis and earlier studies we conclude that winter losses are affected by operational factors (as we found for migratory beekeeping - Fig. 5, treatment against *Varroa* in summer - Fig. 7, or drone brood removal - Fig. 8, but not for operation size - Fig. 4 and winter feed - Fig. 6) and environmental factors (as demonstrated here for certain sources of forage - Figure 9). Especially the influence and causative actions of environmental factors need further investigation in future studies.

Fig. 6: Winter feed:

Colonies are mainly fed sugar solution (49.4%), invert sugar syrup (38.9%), hydrolyzed starch syrup (12.7%) and honey (10.5%). Feeding type did not affect winter losses. n=number of beekeeping operations.

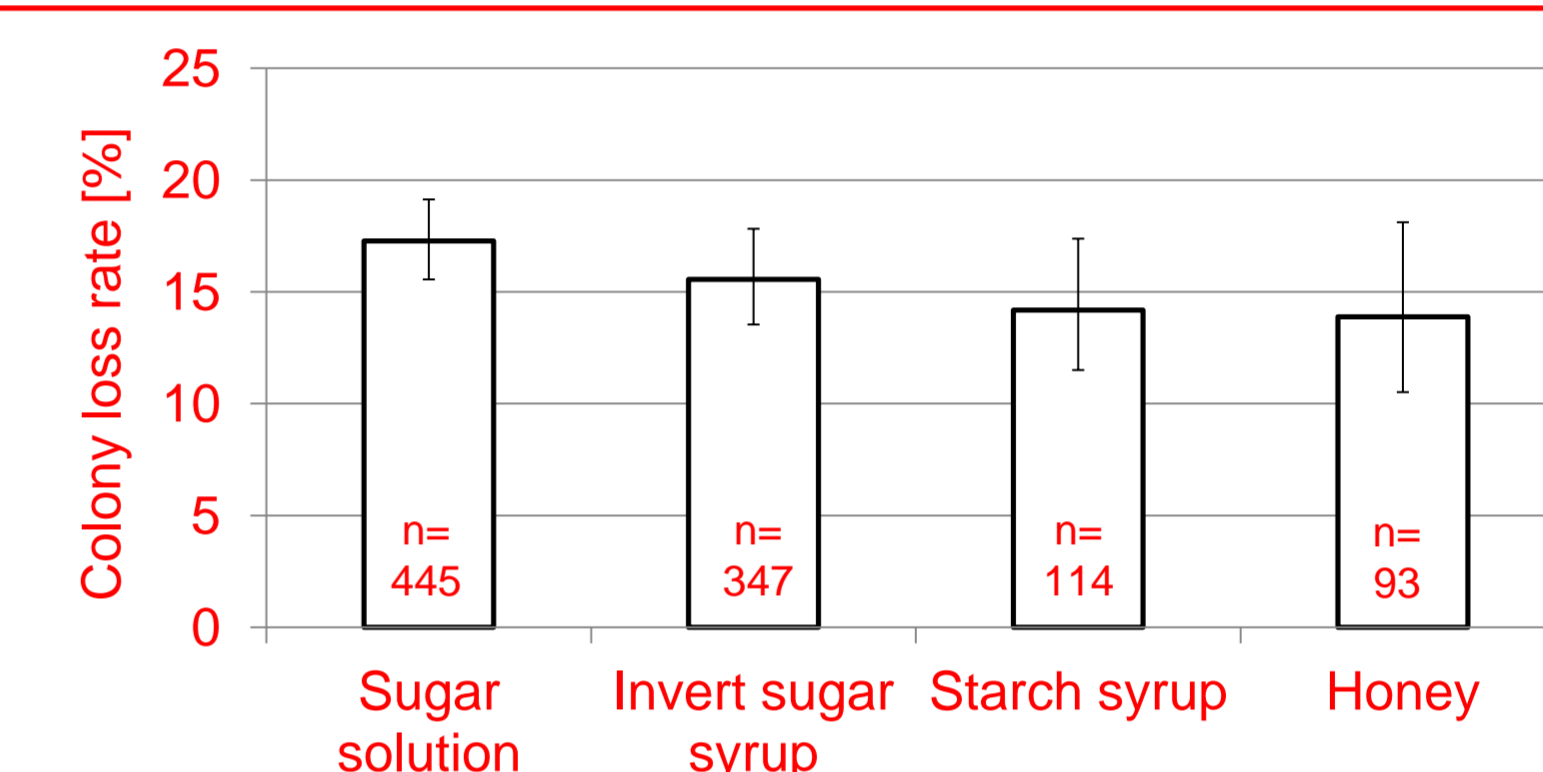


Fig. 7: Varroa treatment in summer:

Effect of treatment of honey bee colonies with the most common products in July, August or September on over-winter mortality. n=number of beekeeping operations.

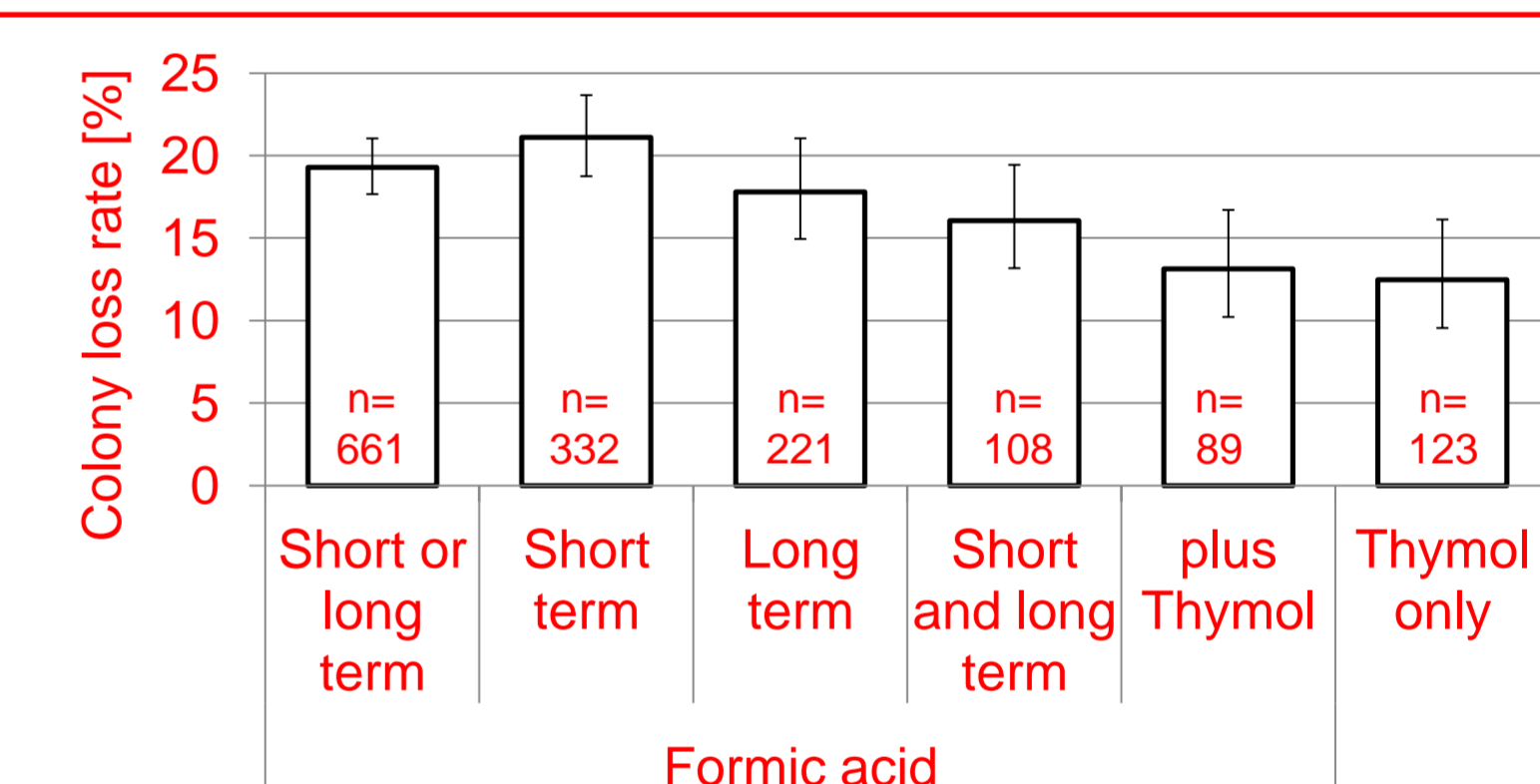


Fig. 8: Drone brood removal:

Operations removing drone brood to reduce *Varroa* infestation levels had significantly lower over-winter mortality (95% CI). n=number of beekeeping operations.

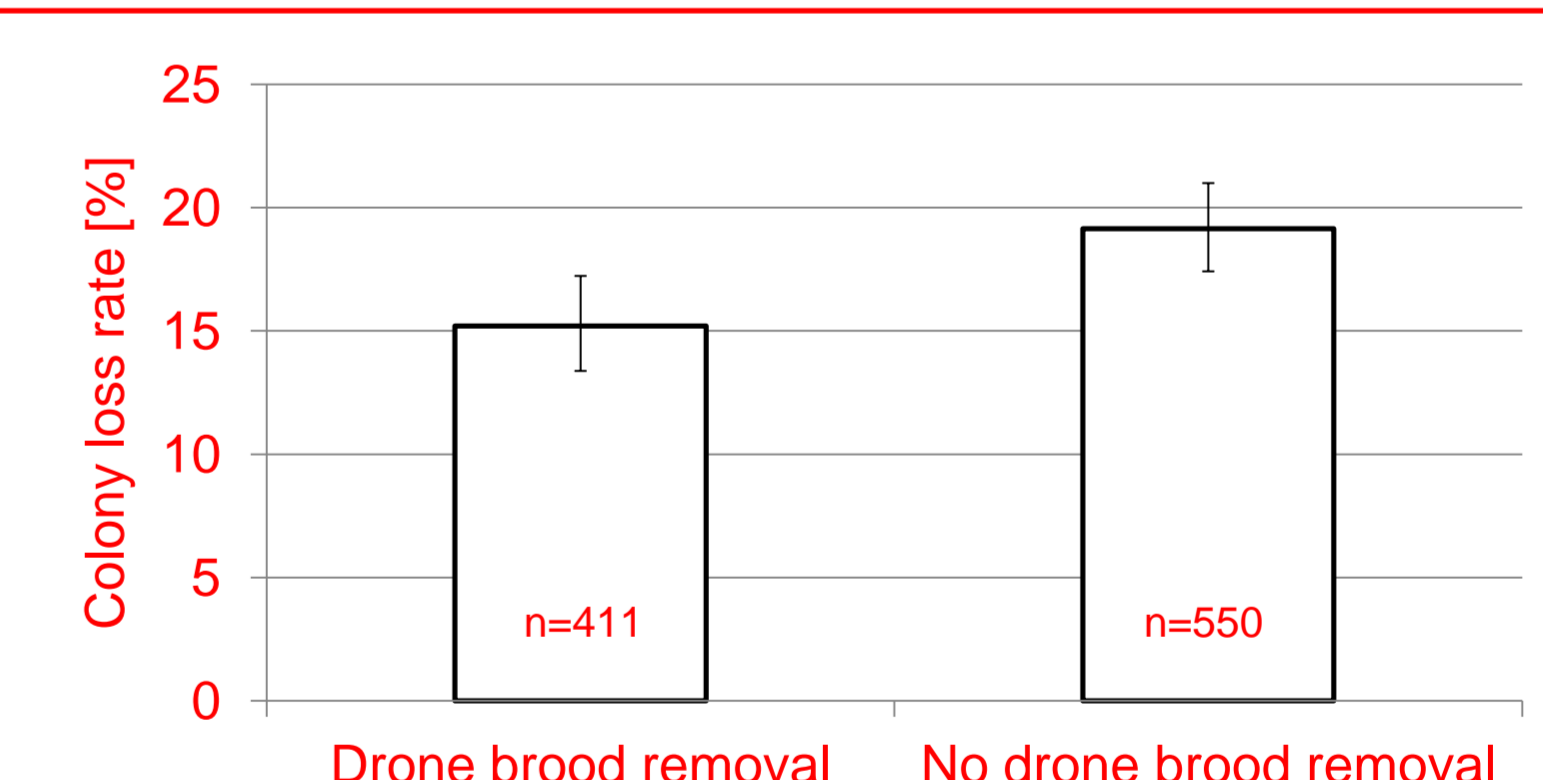
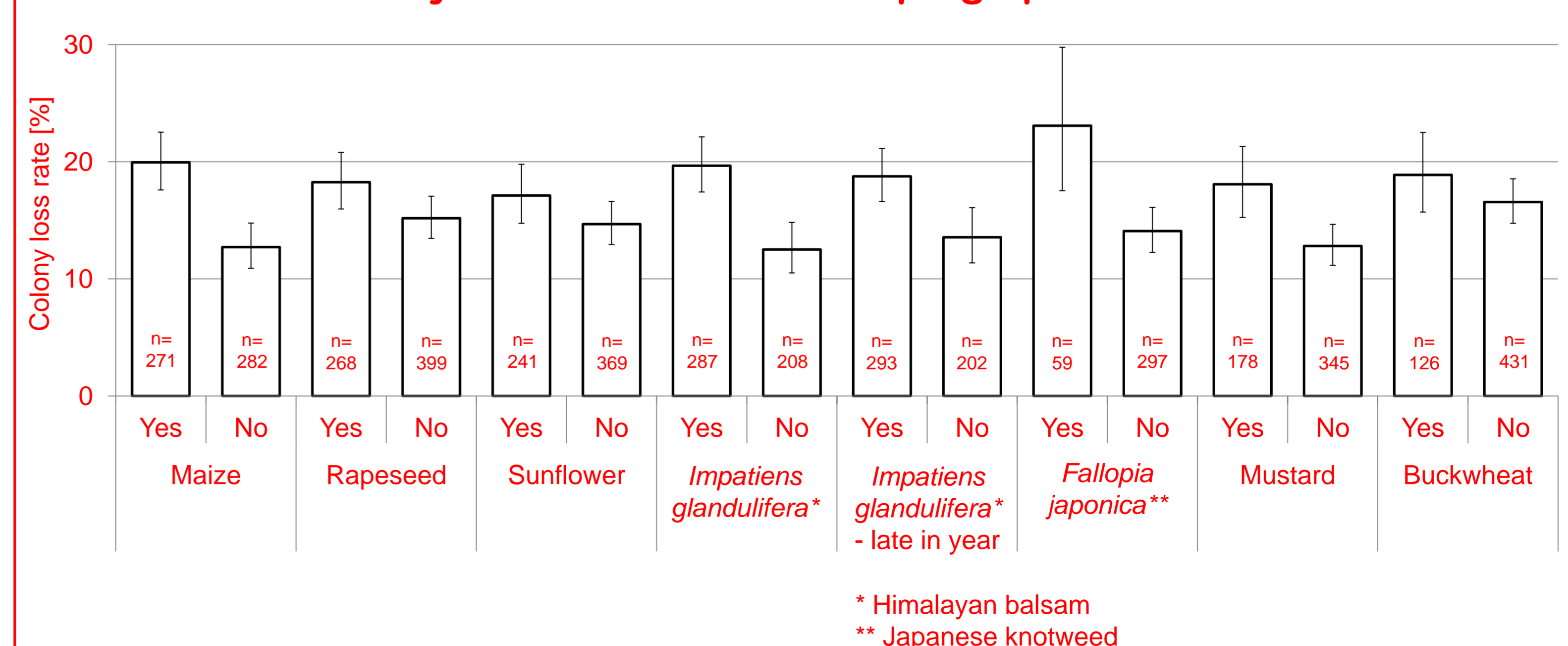


Fig. 9: Honey bee forage:

Effect of different food sources of honey bees according to beekeepers on over-winter mortality. n=number of beekeeping operations.



* Himalayan balsam
** Japanese knotweed