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# RESULTS AND DISCUSSION ON THE 2012/2013 SURVEY ON WINTER COLONY LOSSES

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In recent decades the worldwide beekeeping sector has been facing a grave threat with losses almost 100 times greater than those previously reported. Despite the scale of this problem, the causes underlying this phenomenon still remain unclear, but there is a general consensus that a number of factors are involved. Since 2007, the heightened awareness of this problem among the public and researchers has resulted in research targeted in this area. Hence the COLOSS international network ([www.coloss.org](http://www.coloss.org)) was initiated in 2008 with the aim of quantifying winter losses and establishing the possible causes for these losses. Within the COLOSS network, four working groups were established and each group focused on investigating the problem from a different perspective. One of these groups was the 'Monitoring and Diagnosis Group'. This Group produces an annual international standard questionnaire to collect data from beekeepers which is representative and comparable in different countries. It also collects information on beekeeping practices that allows not only the quantification of winter losses, but also allows an assessment of the possible risk factors. Hence the advantage of beekeepers completing the questionnaire rather than reporting their losses in isolation.

Over the past five years, beekeepers have participated in this survey and the questionnaire is distributed during May each year using different media (email, at meetings, by post, the FIBKA webpage and *An Beachaire*). Completed surveys are returned to Mary F Coffey, the national COLOSS coordinator, who submits the Irish dataset to the international database in the Netherlands for statistical analysis. All personal data, which is submitted voluntarily by beekeepers, is coded before submission and this preserves the anonymity of the participating beekeeper. Irish beekeeper participation over the past number of years has been stable at approximately 15% of the total beekeepers affiliated to FIBKA and as indicated in the distribution map, the respondents have a good geographical spread (Figure 1a).

However, many counties have fewer than ten completed surveys (Figure 1b), and this restricts the analysis of winter losses to a national and provincial level, rather than to county level which might be of more interest to beekeepers. In 2012/2013, the national average winter colony mortality was estimated at 37%, although many individual beekeepers reported losses of 80-100%. At a provincial level, beekeepers in Munster had losses of 43% which was higher than those recorded for Leinster (34.1%), Connacht (31.1%) or Ulster (32.9%).

In the international 2012/2013 dataset (Table 1) beekeepers from 19 different countries completed the questionnaire. The mean percent losses was estimated at 16% losses, but as in previous years as operation size (number of hives per

Figure 1:

a) The geographical distribution of respondents to the COLOSS survey 2012/2013.

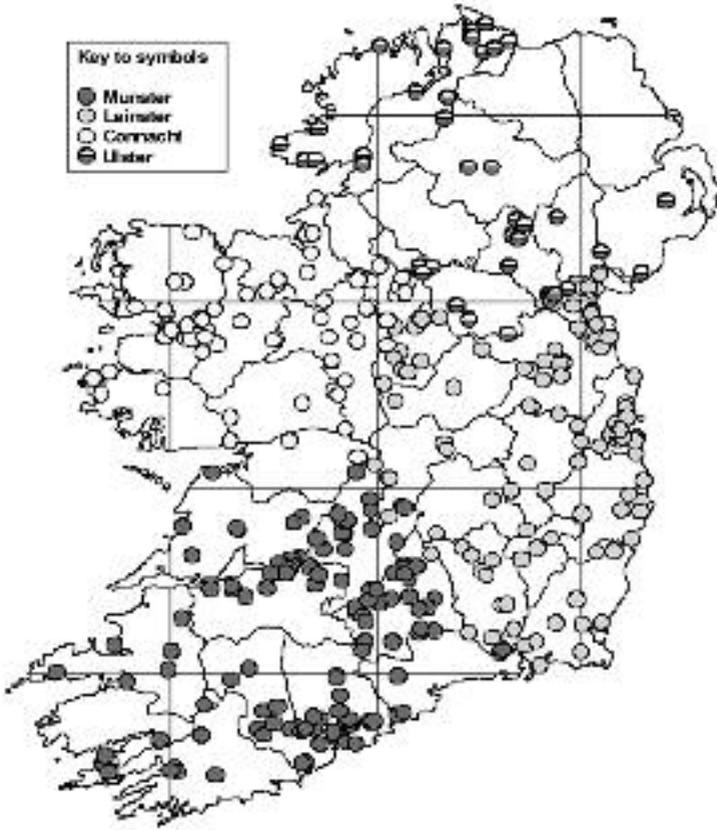
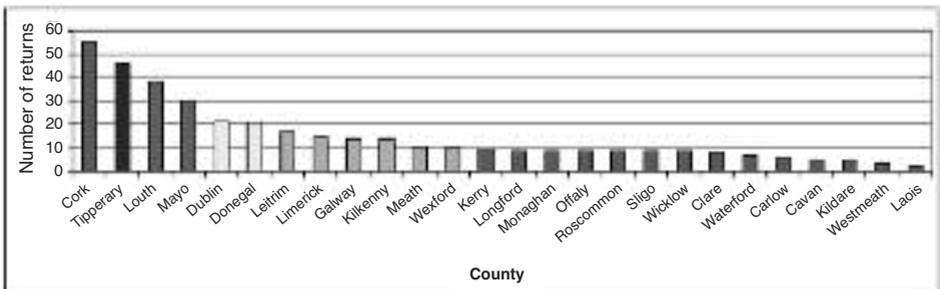


Figure 1:

b) The distribution of the respondents in each county



beekeeper) increased losses decreased (1-50 colonies: losses = 17%; 51-150 colonies: losses = 16% and >151 colonies: losses = 11%). High losses were recorded in Scotland, Ireland, Scandinavia and Baltic countries (Table 1) and a preliminary analysis of the UK/Wales data also estimated losses of approximately 30%, with high regional differences (BBKA report).

**Table 1:** Estimates of winter mortalities in 19 countries participating in the 2012/2013 COLOSS survey. (The data below was released in press conference in July 2013)

Country	Losses %	No. of colonies	No. lost	No. beekeepers	Total beekeepers 2012 (est.)
Algeria	13.45	4665	625	156	22000
Austria	17.2	19621	3373	1000	25099
Bosnia and Herzegovina	6.18	3315	205	72	4115
Croatia	9.52	9832	936	181	9000
Denmark	20.91	14454	3023	1225	4600
Estonia	25.53	3333	851	95	5934
Finland	17.02	10518	1790	260	2800
Germany	15.39	73650	11332	6012	100000
Ireland	37.08	3565	1322	383	2800
Israel	5.9	23663	1397	37	500
Italy (Veneto region)	12.2	1033	126	53	55000
Latvia	19.65	17920	3522	519	4300
Netherlands	13.71	13920	1908	1589	6500
Norway	18.15	15279	2771	473	2800
Poland	18.11	15282	2768	517	51778
Scotland	31.06	470	146	99	1300
Slovakia	9.13	4458	407	120	16300
Sweden	22.62	26080	5898	1737	12000
Switzerland	14.67	18465	2708	1322	16000

In mainland Europe most countries had losses close to 15%, a loss rate which most beekeepers would consider acceptable especially since the arrival of the parasitic mite, *Varroa destructor*. The high losses in the cool temperate climates may be attributed in part to the inclement weather during the active foraging season in 2012 followed by the cold long Spring in 2013. However, when the full dataset is examined (19 countries) it was clear that a number of other factors, including the age of queen heading the over-wintering colony, queen problems during the active season pre winter, *Varroa* treatment and access of foraging bees to oilseed rape and maize were also identified as potential negative impacts on winter colony survival. In general beekeepers that experienced higher than normal queen supersedure and other queen

related problems during the 2012 active season had higher winter losses, while young queens lowered the risk of colony loss. Beekeepers that treated for *Varroa* in late summer and winter were less likely to lose colonies, and situations where foragers had access to maize and oilseed rape were both associated with higher winter losses. However, the negative impact of these crops on the health of the honeybee colony is unclear and the causative explanation for this phenomenon can only be found if studies are carried out at colony level. Closely associated to winter losses is the status of the colony post winter, hence in the 2012/2013 annual survey the proportion of weak colonies was also estimated. When data from the 19 participating countries was considered, the mean proportion of weak colonies post winter was estimated at 11%, however Ireland and Israel were found to have the highest proportion of weak colonies, 24% and 29% respectively post winter, while Switzerland (6%) and Lithuania (8%) had the lowest. The full analysis of the 2012/2013 international colony survey, of which Mary F Coffey is a co-author, is available in a article recently published in the *Journal of Apicultural Research* (van der Zee et al., 2014)

It is clear from the above summary that the annual international COLOSS survey on winter losses is providing important pointers and insights into the possible causes of the high winter losses being experienced by beekeepers worldwide, thus justifying and highlighting the benefits of beekeepers actively participating in this survey. Additional benefits for Irish beekeepers will be gained this year as a number of beekeepers (150 beekeepers geographically distributed) who have kindly agreed to participate in the National Survey on disease prevalence (pp132-135 in this issue of *An Beachaire*) will also complete the annual COLOSS survey on winter losses, thus allowing causative explanation for winter mortalities to be studied at colony level. Typical data collected from this survey in combination with the colony loss survey will subsequently provide for the first time an opportunity to assess the possible correlations between disease load and colony losses.

The dissemination of the questionnaire this year will take on a similar format as that used in previous years. In April, secretaries of local associations will be contacted and requested to assist in its dissemination at local level. Each secretary will be encouraged to organise a meeting for the purpose of completing the questionnaire which has been proven in the past to be an effective means of increasing beekeeper participation while reducing costs and initiating discussions between beekeepers on the possible causes of these losses. If this is not feasible secretaries will be requested to distribute the survey to their members using alternative methods. To accommodate beekeepers who are unable to attend local meetings, the questionnaire will also be on-line on the FIBKA webpage and a hard copy will be made available in the centre pages of the May edition of *An Beachaire*, thus allowing it to be easily completed and removed and returned by post to Mary F Coffey, Teagasc, Oakpark Research Centre, Carlow.

In conclusion we would like to thank all beekeepers who have participated in this survey over the past five years and encourage greater participation this year, thus allowing the Irish dataset to be analysed to county level.