Survey of Members 2008
Losses of bee colonies

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Following the survey of SBA members in 2006, a second survey was carried out in the late spring of 2008 as was reported in this journal last November and December.

This brief report on losses of colonies experienced by the respondents to that survey is the first of what is hoped will be a series of several articles covering particular topics of interest to members revealed by that survey. A full report of the whole findings of the survey will ultimately become available, probably through the SBA's web page, but it will clearly be too long a document for "The Scottish Beekeeper".

Over-all losses

The over-all percentage losses observed within our sample for the different periods covered by this survey were as follows, both for the country as a whole and broken down by the main areas (Aberdeen, East, North and West) into which the SBA usually splits its membership. Unfortunately only one beekeeper from the Aberdeen area responded to our request for information, and that respondent's form was far from complete, so our information from that area on this topic is nil. Also we sampled a small number of people from some of the remote islands on this occasion – specifically the Outer Hebrides and Shetland – and in the analysis presented here, these responses have been included with those from the North area.

Area	No of respondents	Summer 2006	Winter 2006-07	Summer 2007	Winter 2007-08
Over-all	44	4.9	17.5	9.4	21.6
Aberdeen	0	-	-	-	-
East	11	12.5	19.7	0.0	25.9
North	11	8.1	15.5	15.7	18.1
West	21	1.8	18.1	9.1	22.4
Unspecified	1	0.0	0.0	0.0	0.0

Clearly the percentage losses experienced by individual beekeepers are much more variable than they are for whole areas. Details of how these are distributed are shown in the four histograms below for all four periods.

Figure 1 here

Figure 2 here

Figure 3 here

Figure 4 here

All four distributions show a strong positive skew, with most respondents only experiencing a low loss rate, but a few experiencing high and sometimes devastating losses. As is to be expected, loss rates experienced in winter are in general higher than those experienced in summer.

The sizes of the beekeeping enterprises reporting these are missing from these histograms. A beekeeper who owns only four stocks and loses three of them has experienced a 75% loss, but this can happen by misfortune without any very serious implication for other beekeepers. However a 75% loss by a beekeeper with 100 stocks might reasonably be taken as implying a serious problem. The scatter-plots below show how these percentage loss rates are distributed among enterprises of different sizes as judged by the number of colonies being kept at the beginning of the period under investigation.

Figure 5 here

Figure 6 here

Figure 7 here

Figure 8 here

It is clear that the larger enterprises do not have either extremely low or extremely high loss percentages, but that these extremes are confined to smaller enterprises, and may be attributed to random fluctuations among small samples.

Losses due to particular causes

Respondents were asked to attribute causes for the losses they had experienced, as far as they were able to. Below are some of the findings from those questions as percentages of losses attributed to the possible specifically suggested causes, both over-all and broken down by Area.

Area	Starvation	Queenlessness	Varroa	"Mary Celeste"	Diet change	Vandalism
Over-all	13.6	17.1	11.6	14.1	0.0	3.0
East	14.7	17.6	5.9	14.7	0.0	0.0
North	36.7	20.4	2.0	4.1	0.0	2.0
West	3.4	15.5	17.2	18.1	0.0	4.3

The leading assigned cause of loss over-all among our respondents is queenlessness, which has always been a risk to beekeepers. It is interesting however that the "Mary Celeste" type loss, which may be identified with Colony Collapse Disorder now ranks second, above starvation which again is a well-known risk, particularly in late spring if weather is inclement. In the North, the rather high percentage loss due to starvation is heavily influenced by the many colonies lost by one larger scale beekeeper in the bad summer of 2007. It is not completely clear on what grounds a respondent attributes a loss to *Varroa* unless because heavy infestation levels had been found before the loss took place. This too is now cited as an important cause of loss. However, change of diet, which had also been suggested as a possible problem, is not cited by any of the respondents to this survey as a cause of loss.

From the results above it is clear that about 40% of losses have not been assigned to any of the main headings above. In many cases respondents simply failed to attribute any specific cause to the loss of a colony. However there was an opportunity to suggest other possible causes, and the following were cited:-

Specified other causes of loss	
Hives overturned by cattle	4 colonies, 1 respondent
"Internal collapse of hive"	1 colony, 1 respondent
Mismanagement	2 lost colonies by 1 respondent
Nosema disease	5 and 1 colonies by 2 different respondents
Theft	1 colony, 1 respondent
Weak colonies in poor weather	8 colonies among 6 respondents with a variety of details
Widespread collapse winter 06-07 – may be nosema or *Varroa*	9 colonies, 1 respondent

The association between "Mary Celeste" type loss and the length of time that *Varroa* has been known to be present in an apiary

One of the interesting results of the 2006 survey was that the data showed evidence of a strong association between the length of time that *Varroa* had been known to be present in an apiary and the risk of experiencing the "Mary Celeste" type of sudden colony loss. The variation between the percentage losses of this type experienced in the North area and other areas suggests that the same association might again be present. However, on carrying out the same test using Binary Logistic Regression as we did in 2006, the level of association found was not significant at the 5% level (the *p*-value obtained was 0.086, which is above the usual significance cut-off value of 0.05). So there is no clear evidence of such an association from the present survey.

Figures follow below

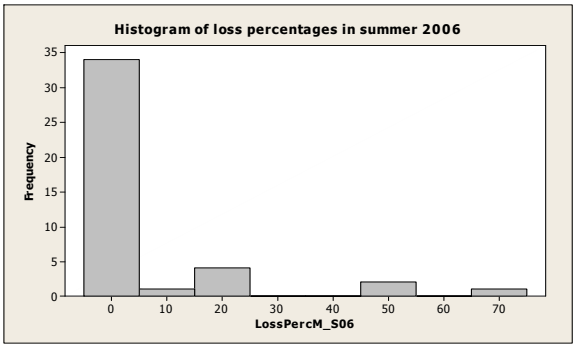

Figure 1

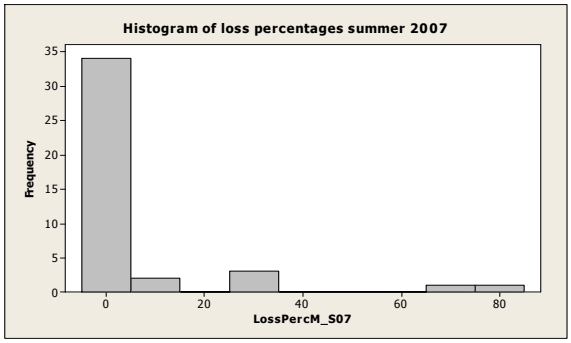

Figure 2

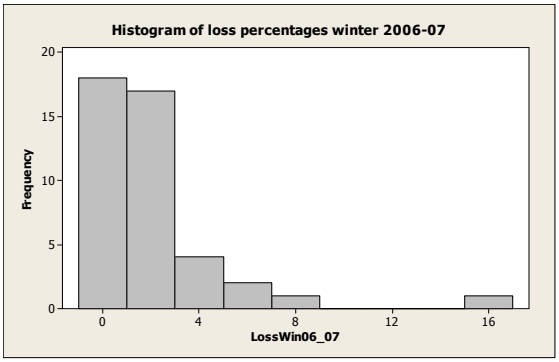

Figure 3

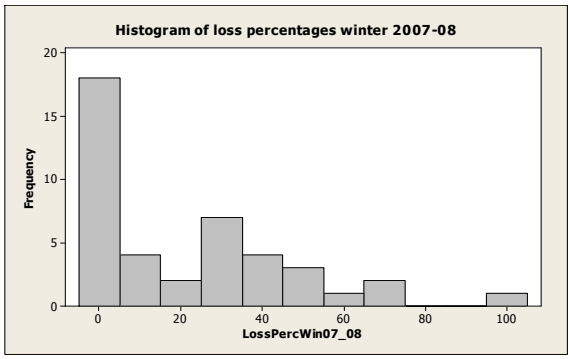

Figure 4

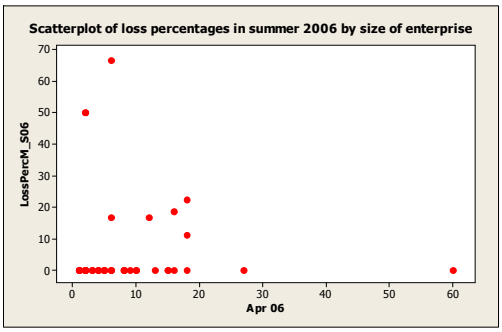

Figure 5

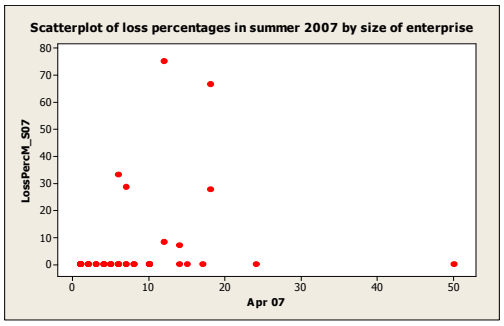

Figure 6

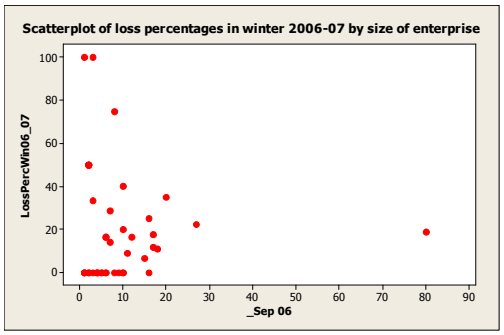

Figure 7

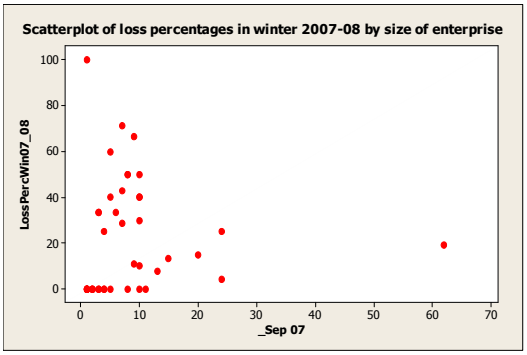

Figure 8