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Inbred bumblebees 'face extinction threat'

By Mark Kinver Science and environment reporter, BBC News



The study offered a good insight into the potential consequences for species found on the UK mainland. Some of the UK's rarest bumblebees are at risk of becoming extinct as a result of inbreeding, research suggests.

The lack of genetic diversity is making the bees more vulnerable to a number of threats, including parasitic infection, say scientists in Scotland.

They warn that some populations of bees are becoming increasingly isolated as a result of habitat loss.

The findings are being presented at the British Ecological Society's annual meeting at the University of Leeds.

Lead researcher Penelope Whitehorn, a PhD student from Stirling University, said the study of moss carder bumblebees (*Bombus muscorum*) on nine Hebridean islands, off the west coast of Scotland, offered an important insight into the possible consequences of inbreeding.

"The genetic work had already been carried out on these bumblebees, so we knew that the smaller and more isolated populations were more inbred than the larger populations on the mainland," she told BBC News.

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"And as it was an island system, it could work as a proxy for what could occur on the mainland if populations do become isolated from each other as a result of habitat fragmentation."

The study is believed to be the first of its kind to investigate inbreeding and immunity in wild bees.

Uncertain future

Ms Whitehorn found that, although the inbreeding did not seem to affect the bees' immune system directly, it did make the insects more susceptible to parasitic infection.



The ideal habitat on the Hebridean islands offers the resident bee populations a fighting chance

"We found that isolated island populations of the moss carder bumblebee with lower genetic diversity have an increased prevalence of the gut parasite *Crithidia bombi*," she explained.

"Our study suggests that as bumblebee populations lose genetic diversity the impact of parasitism will increase, which may increase the extinction risk of threatened populations."

She added that the populations of the bees on the islands were "quite healthy because the habitat was so good", but inbreeding did have a range of other consequences, such as the production of infertile males.

"If inbreeding occurs on mainland Britain, where the habitat is not so good, then species may well be threatened," Ms Whitehorn suggested.

Other studies of invertebrates have found other costs as a result of inbreeding, such as a loss of general fitness in the species in question.

Habitat loss is resulting in populations of bees becoming more and more isolated from their neighbours, effectively leaving them as island populations.

Ms Whitehorn cited the example of the short-haired bumblebee (*Bombus subterraneus*), which finally became nationally extinct in the late 1980s when a parasitic infection placed increased

pressure on the remaining populations, which were already vulnerable as a result of fragmented habitats.

To date, recent attempts to re-introduce the population back into the UK from New Zealand - where it had been introduced from Britain in the late 19th Century, have not been successful.

The Bumblebee Conservation Trust said efforts to conserve bumblebees were vital as the creatures played a key role as pollinators, especially when it came to wild flowers and commercial crops.

The UK currently has 24 species of bumblebee, after seeing two species become nationally extinct in recent decades.

Of the remaining species, one quarter have been identified as being in need of conservation to prevent them from disappearing from the British landscape.