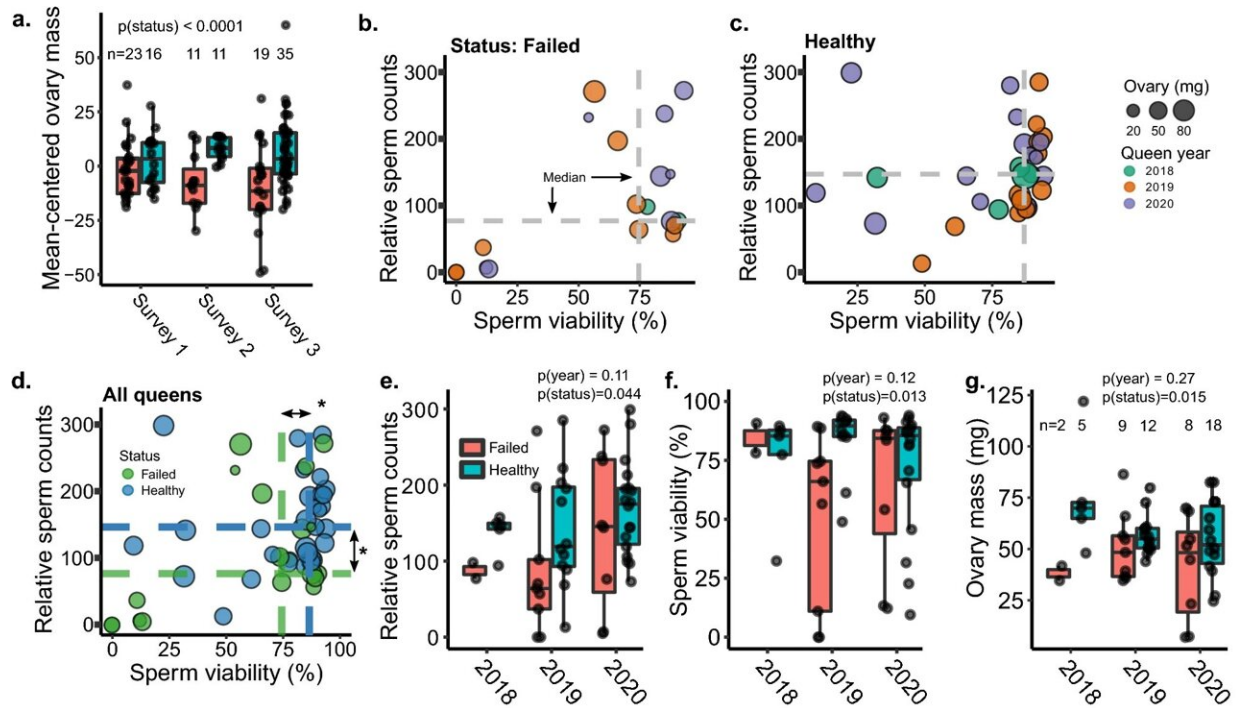


Sick queen bees have shriveled ovaries, putting their colonies at risk

October 25 2022



Fertility metrics of failed and healthy queens. In all cases, years indicate the year the queen was reared. (a) Ovary masses of failed and healthy queens collected across three different surveys conducted in British Columbia and Pennsylvania (analyzed using a linear mixed model with status as a fixed effect and source location as a random effect). Because the average ovary size differed between surveys, data were mean-centered by survey prior to analysis to better highlight the effect of status. Boxes represent the interquartile range, bars indicate the median, and whiskers span 1.5 times the interquartile range. (b) Queens rated as ‘failed’ (spotty brood pattern, drone layer, or dwindling adult population) or (c) ‘healthy’ (contiguous worker brood patterns, medium-strong adult population) by

local beekeepers in British Columbia were collected in the summer of 2020. Sperm viability and sperm counts were determined by fluorescent imaging, and wet ovary weight was measured on an analytical balance. **(d)** Statistical analyses on data presented in **(b)** and **(c)** were conducted using either a linear mixed model (ovary mass and sperm counts) or a generalized linear mixed model fitted by maximum likelihood (sperm viability). In the statistical models, queen age (0, 1, or 2 years, which corresponds to queens reared in 2020, 2019, and 2018, respectively) and health status (healthy or failed) were included as fixed effects and source location was included as a random effect. Asterisks indicate statistical significance (p

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