AMBIENT TEMPERATURE, BUT NOT PATERNITY, IS ASSOCIATED WITH IMMUNE RESPONSE IN SAVANNAH SPARROWS (*PASSERCULUS SANDWICHENSIS*)

R .—Las hembras pueden involucrarse en cópulas extrapareja para recibir beneficios indirectos en forma de crías con mayor inmunocompetencia. La calidad de los pichones a menudo es evaluada examinando su función inmune usando la prueba cutánea de fitohemaglutinina (PHA, por sus siglas en inglés), la cual puede predecir el reclutamiento de los pichones. Sin embargo, la prueba de PHA también puede ser influenciada por factores como la temperatura de los nidos. Pusimos a prueba la predicción de que los pichones extrapareja presentan respuestas inmunes mayores ante el desafío de PHA y reclutan a una tasa mayor que los pichones intrapareja en una población silvestre de *Passerculus sandwichensis*. También investigamos la temperatura del ambiente y su relación con la respuesta inmune. Los pichones extrapareja e intrapareja no presentaron diferencias significativas con respecto a la respuesta inducida por la prueba de PHA ni con respecto al reclutamiento. En contraste con otros estudios, encontramos que la respuesta inmune inducida por PHA no se-1-a06 (spue)06 ((P)31.4.6006 (4 -401(r)-16.1(se51(ue l)-12.1(a)-.1(re-401((re-)-16.106n0(q)-(4a)-22 TD .011(d).1(o)6.9(c)((P)3Th6e)-

M investigated the “good genes” benefits of extrapair mating in terms of an improved nestling immune system (Johnsen et al. , Kleven and Li eld , Garvin et al.

We could not use a mixed model with natal nest as a random e ect because there was only one nest from which more than one sibling recruited in . erefore, we ran two ANOVAs, each with one sibling removed. Immune response, nestling sex, rearing environment, and the paternity*environment interaction were not significantly related to lifetime number of fledglings in either model (all $P >$.). However, nestling weight was positively associated with lifetime number of fledglings in both models (both $P <$.), and EPY fledged fewer lifetime young than WPY in one model ($F =$. , df = and , $P =$.), with a similar, nonsignificant trend in the other ($F =$. , df = and , $P =$. (n)-4 Tf 3.2 /F3 17 f .549 0 TD -.00 /G1 1 Tf .759 0 T4ux(s i)-23.30 T4uoremD .0007F3 17(.0405

explain why heavier birds showed a negative relationship or why this interaction was found only in males. It is possible that the heavier males in invested more resources into growth than in immune defenses, a tradeo shown in some studies (Brommer , Soler et al.) that is not always consistent across years (Garvin et al.). Although food availability may mediate mass-dependent e ects on immune response (Brzęk and Konarzewski), and temperature can greatly influence food availability in insectivorous species (Li eld et al.), this is an incomplete explanation for the patterns observed here. Future studies could further examine this interaction between ambient temperature and body mass on PHA-induced immunity in a more controlled environment where manipulation of specific variables, such as nest temperature and food availability, is possible.

We found that both mass and minimum temperature are important factors in assessing a PHA-induced immune response. Individual immune responses to PHA can be a ected by conditions immediately prior to testing (Ewenson et al.), which indicates that the response is somewhat plastic. Some researchers do not use temperature or mass as covariates in their statistical models, even though there is evidence that these factors can contribute significantly to variation (Li eld et al. , Ardia , Martínez-Padilla), whether directly or indirectly. erefore, we urge other researchers to investigate these covariates and other relevant variables such as food availability and parasite prevalence when measuring PHA responses, and also not to assume that these responses predict nestling recruitment.

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