EFFECTS of NONVIABLE EGG CONSUMPTION on LARVAL CAT FLEA (SIPHONAPTERA: PULICIDAE) DEVELOPMENT

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In natural environments, female cat fleas, *Ctenocephalides felis* (Bouché), produce blood feces and eggs after the first blood-feeding. The daily fecal production of a virgin male cat flea was 0.0503 mg, significantly less than that of a virgin female 0.8546 mg. Approximately 74% of eggs laid by mated female cat fleas were nonviable. The number of nonviable eggs laid by a mated female was 2.1-fold of that of a virgin female. The diet of male or female flea feces alone was insufficient to allow > 13.33% of larvae to develop into adults. However, 90% of larvae developed into adults when fed on the feces + nonviable eggs diet. Although larvae could not develop to adults when fed with nonviable eggs alone, such eggs may provide critical supplemental nutrients lacking in blood feces and required for larval development. These nonviable eggs may also reduce viable egg cannibalism by larvae. The female cat fleas invested more energy and time than did males to produce feces and nonviable eggs for feeding the conspecific offspring. Thus, females were mainly responsible for providing parental investments to their young after hatching. Mated females laid significantly more eggs with normal appearance than did virgin females, suggesting that males' ejaculates may improve not only the fecundity of females but also the fertility and quality of eggs laid by their mates. This paternal investment, if it exists, may occur before their offspring hatch. Contributions of flea feces and eggs produced by parents to larval development among various fleas were discussed.

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