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Short communication

A comparison of jump performances of the dog flea, *Ctenocephalides canis* (Curtis, 1826) and the cat flea, *Ctenocephalides felis felis* (Bouché, 1835)

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Abstract

Jump performances of *Ctenocephalides canis* and *Ctenocephalides felis felis* have been measured and compared on unfed young imagos. The mean length of the *C. felis felis* jump was 19.9 ± 9.1 cm; minimum jump was 2 cm, and the maximum was one 48 cm. The *C. canis* jump was significantly longer (30.4 ± 9.1 cm; from 3 to 50 cm). For height jump evaluation, grey plastic cylindrical tubes measuring 9 cm in diameter were used. Their height was increasing from 1 to 30 cm by 1 cm. Groups of 10 fleas of the same species were deposited on the base of the tube. The number of fleas which succeeded in jumping above the tube was recorded. The mean height jump carried out by 50% of fleas was calculated after linearisation of the curves: it was 15.5 and 13.2 cm for *C. canis* and *C. felis*, respectively. The highest jump was 25 for *C. canis* and 17 cm for *C. felis*. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: *Ctenocephalides canis*; *Ctenocephalides felis felis*; Jump performance

1. Introduction

In normal conditions, when fleas are in the hair of a dog or a cat, they walk. Jumping is usually performed by young imagos to catch the host and by adult fleas to leave it when they

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are disturbed or when the animal temperature decreases during anaesthesia or after the host's death (Franc, 1998). Research on jump performance of fleas has been performed essentially on *Xenopsylla cheopis* (Bennet-Clarck and Lucey, 1967; Rothschild et al., 1973; Cullen, 1975; Rothschild and Schlein, 1975; Rothschild et al., 1975). Data on *Ctenocephalides felis felis* performance are rare: Rothschild et al. (1973) consider this species being capable of executing a standing leap 33 cm high. No data are available for *Ctenocephalides canis*. Jump length and height of *C. felis* and *C. canis* young imago were measured and compared in similar conditions.

2. Materials and methods

Two colonies of fleas were used. The *C. felis felis* originated from a wild strain harvested from a cat and maintained in our laboratory on cats since 1990. The *C. canis* colony was originally harvested on a dog and maintained in our laboratory on dogs since 1999. For each experiment, unengorged young adult fleas (<3 days) were used. The sex ratio was about 40% males–60% females.

For length jump experiments, a one square metre piece of white sticky plastic was placed horizontally, the upper face being sticky. In the centre, a 2 cm diameter zone was left unsticky. Two fleas of the same species were deposited together in the centre. Their first jump length was individually measured. The experiment was conducted on 450 fleas for each of both species. Temperature and RH were 21°C and 60%, respectively.

For height jump evaluation, grey plastic cylindrical tubes measuring 9 cm in diameter were used. Their height increased from 1 to 30 cm by 1 cm. Groups of 10 fleas of the same species were deposited on the base of the tube. The number of fleas that succeeded in jumping above the tube was recorded. 50 fleas of each species were used for each height, that is to say 1500 fleas for each of both species. Performances of each species were compared using a Student's *t*-test for length and a Chi-square analysis for height. Differences were considered significant at $p < 0.05$.

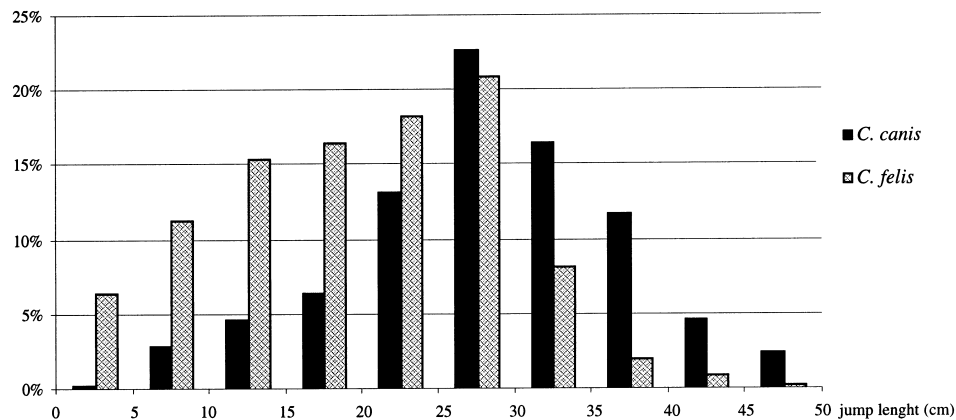


Fig. 1. Distribution of length jump for the two flea species.

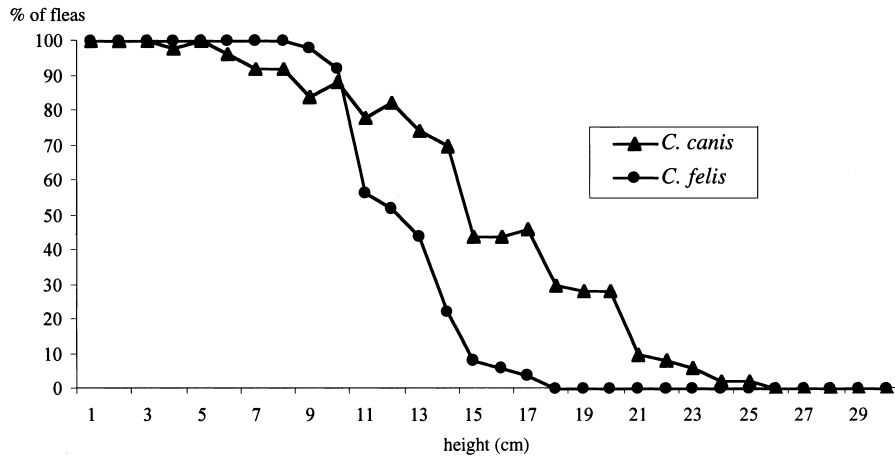


Fig. 2. Percentage of fleas which succeeded in jumping above the height.

3. Results and discussion

450 *C. felis felis* have performed a mean length jump of 19.9 ± 9.07 cm. The minimum jump was 2 cm and the maximum one was 48 cm. *C. canis* jumps were significantly longer ($p < 0.001$): mean jump length was 30.4 ± 9.1 cm (from 3 to 50 cm). Distribution of jump of the two flea species is reported in Fig. 1.

The percentage of fleas which succeeded in jumping above the height is reported on Fig. 2. The mean height jump carried out by 50% of fleas was calculated after linearisation of the curves: it was 15.5 and 13.2 cm for *C. canis* and *C. felis*, respectively. The higher jump was 25 for *C. canis* and 17 cm for *C. felis*. When comparing distribution of jump using 5 cm groups by a Chi-square test, *C. canis* jumps significantly higher than *C. felis* ($p < 0.001$). Unfed young imagos of *C. canis* had better jump performances than *C. felis felis*.

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