Diet, Maturity and Male-Male Competition in Male Tree Weta

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Eligible for student prize

The Wellington tree weta (*Hemideina crassidens*) is a sexually dimorphic, polygynandrous species in which adult males fight for access to females, using their large mandibles. Males can mature at the eighth, ninth or tenth instar, and thus show large differences in head and mandible size. We hypothesised that male weta would use nutrient intake during development, and specifically the level of protein in their diet, as a cue for head size at maturity. We predicted that adult males on a high protein diet would mature at a later instar, than male weta raised on a low protein diet. In addition, if protein is a limiting factor in the wild, few males should make it to the tenth instar. We analysed morphological measurements in adult males that had been raised on high and low protein diets in the laboratory, and adult males caught from the wild. We found that the proportion of tenth instar males was greatest in the high protein group, and there were significant differences in overall head length as a proportion of body size between the three groups. Few tenth instar males were observed in the wild caught group. Intra-specific combat trials demonstrated that males with large heads won the greatest number of bouts, and that bouts between males with the most similar size heads were longer than those with very dissimilar size heads. We conclude that nutrient intake during development is an important determinant of final instar in adult males, and thus could potentially have an important influence on mating success in this species.