BioOne COMPLETE

MONARCH BUTTERFLY LARVAE (LEPIDOPTERA: NYMPHALIDAE) WITH 3 TUBERCLE PAIRS IN SOUTH FLORIDA

Authors: Farrey, Bethany, and Davis, Andrew K.

Source: Florida Entomologist, 87(3) : 408-411

Published By: Florida Entomological Society

URL: https://doi.org/10.1653/0015-4040(2004)087[0408:MBLLNW]2.0.CO;2

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 29 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

MONARCH BUTTERFLY LARVAE (LEPIDOPTERA: NYMPHALIDAE) WITH 3 TUBERCLE PAIRS IN SOUTH FLORIDA

BETHANY FARREY AND ANDREW K. DAVIS[1]
Department of Environmental Studies, Emory University, 400 Dowman Dr. Atlanta, GA 30322

Monarch butterflies (*Danaus plexippus*) in southern Florida differ from the larger migratory population in eastern North America in that they are a continuously breeding, non-migratory population (Brower 1995). There they persist year-round perhaps because of the warm climate in South Florida, coupled with the year-round occurrence of several species of milkweeds, the host plants of monarchs. Individuals in South Florida are smaller than those in the eastern population (Arango Velez 1996), and are heavily infected with the protozoan parasite, *Ophryocystis elektroscirrha* (Altizer et al. 2000). In southern Florida, two other danaine species occur which have similar but distinctive coloration from monarchs: the queen (*Danaus gilippus*) and soldier (*Danaus eresimus*). The ranges of monarchs and queens overlap completely in Florida, with both species present throughout the state, although monarchs occur more frequently in winter (Brower 1961; Opler 1998). Soldiers occur only in the southernmost portion of the state (Opler 1985). All three species feed on milkweed as larvae.

The morphology of monarch larvae is distinctive, with black, white and yellow striping, 11 segments, and two pairs of tubercles on the dorsal side of segments 2 and 11 (Ackery & Vane-Wright 1984; Scott 1986). These tubercles are sometimes called tentacles (Oberhauser & Kuda 1997) or filaments (Kitching 1985), and their function is unknown in the Danaidae (Kitching 1985). While tubercles are present on segments 2 and 11 in all Danaidae, queens and soldiers also each have an extra pair of tubercles on segment 5 (which is also abdominal segment 1; Ackery & Vane-Wright 1984). Here we report observations of wild monarch larvae in southern Florida with tubercles on segment 5, similar to the queens and soldiers.

On January 5, 2004, in a residential neighborhood in Miami Lakes, FL, we observed approximately 200 monarch larvae (all five instars were represented) feeding on *Asclepias curassavica* in a backyard flower garden. This is not unusual for this backyard, as 3-5 adult monarchs were frequently seen nectaring and ovipositing throughout the year here (B. Farrey, unpublished data). However on this day we also observed 11 larvae (5.5% of total larvae observed) that had a third set of tubercles on the dorsal side of their 5th segment (Fig. 1). Two days later all larvae containing an additional set of tentacles were transported to our lab at Emory University.

The 11 larvae were placed in two separate plastic rearing containers, fed clippings from potted *Asclepias incarnata*, and reared to adulthood. Of the 11 larvae, only 4 individuals survived to adulthood, but we suspect that the individuals that did not survive were infected with the protozoan parasite, *Ophryocistis elektroshirrha*. We observed the four surviving larvae when they prepared to form their chrysalis (hanging in the 'J' position). At this time, the third tubercle pair was still visible, but was reduced (Fig. 2A). Once the chrysalis had formed, they each appeared as normal monarch pupae, with the light green color and gold spots characteristic of this species (Fig. 2A). We subsequently weighed each pupa and recorded weights of 1.01 g, 1.17 g, 1.01 g, and 1.09 g. This is slightly lower than the mass of captive-reared offspring from adults collected at this same site in June 2003 (mean = 1.31 g, SD = 0.11 g, n = 53; A. K. Davis & B. Farrey, unpublished data). After each individual had eclosed and finished expanding its wings, we examined the wing morphology of each and could find no obvious aberrations to the normal monarch wing characteristics (Fig. 2B).

Larvae with three sets of tubercles on segments 2, 5, and 11 are common in many species of Danaidae, including the queens and soldiers found in Florida. We are aware of no other published report of this form in monarch larvae. We offer that this could be due to a mutation or expression of a recessive trait due to inbreeding; or perhaps a rare hybridization event between monarchs and another danaid species.

We thank N. Vitone for help rearing larvae. Sonia Altizer provided helpful comments on the manuscript.

SUMMARY

We report monarch butterfly larvae in South Florida with a third set of dorsal tubercles on their 5th segment. We reared these individuals to adulthood and observed no other physical differences between these and 'normal' type monarchs.

REFERENCES CITED

ACKERY, P. R., AND R. I. VANE-WRIGHT. 1984. Milkweed Butterflies: Their Cladistics and Biology. Cornell University Press, Ithaca, NY.

ALTIZER, S. M., K. OBERHAUSER, AND L. P. BROWER. 2000. Associations between host migration and the prevalence of a protozoan parasite in natural populations of adult monarch butterflies. Ecol. Entomol. 25: 125-139.

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 29 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

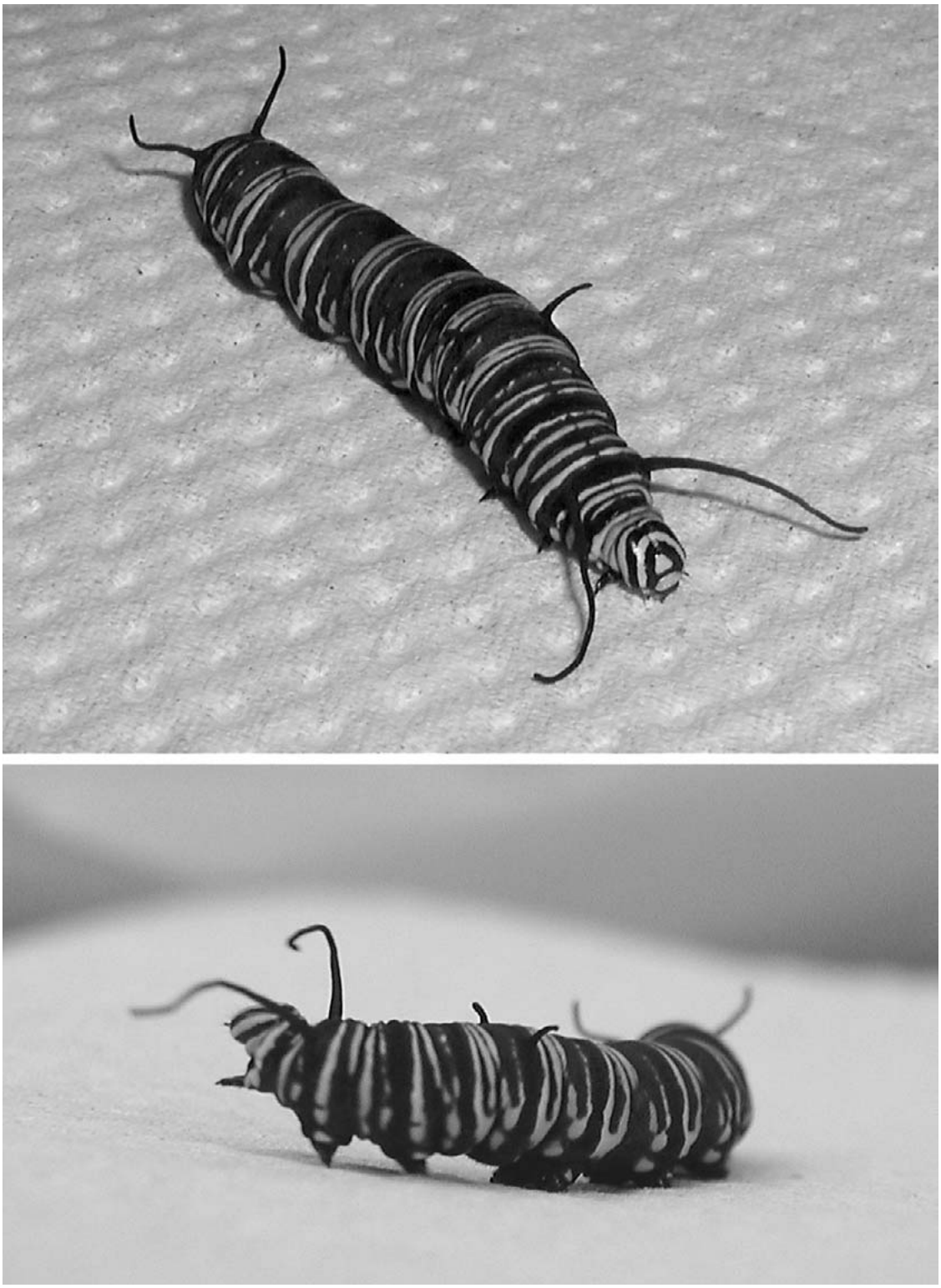


Fig. 1. Two of 11 monarch butterfly larvae with three tubercle pairs found in South Florida. Photos taken by A. K. Davis on Jan. 12, 2004.

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 29 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

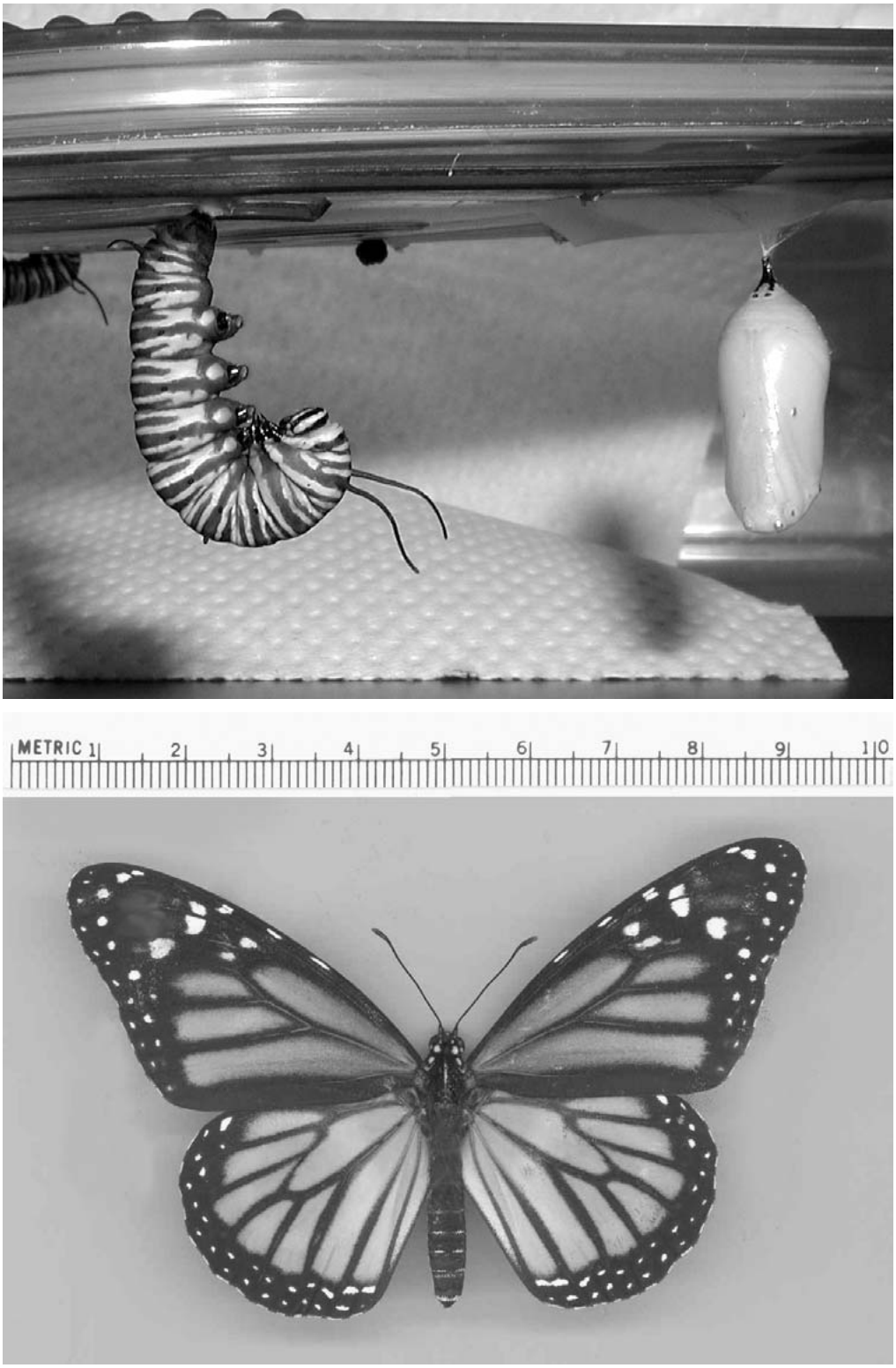


Fig 2. A. The "J" stage and chrysalis of the larvae with three tubercle pairs (note the small third tubercle remnant). B. Adult morphology of one of the 11 aberrant individuals, which was visually indistinguishable from the 'normal' type of individual reared from the same site.

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 29 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

ARANGO VELEZ, N. 1996. Stabilizing selection in migratory butterflies: a comparative study of queen and monarch butterflies. Masters Thesis. University of Florida, Gainesville.

BROWER, L. P. 1961. Studies on the migration of the monarch butterfly I. breeding populations of *Danaus plexippus* and *D. gilippus berenice* in south central Florida. Ecology 42: 76-83.

BROWER, L. P. 1995. Understanding and misunderstanding the migration of the monarch butterfly (Nymphalidae) in North America: 1857-1995. J. Lepidopterist's Soc. 49: 304-385.

KITCHING, I. J. 1985. Early stages and the classification of the milkweed butterflies (Lepidoptera: Danainae). Zool. J. Linnean Soc. 85: 1-97.

OBERHAUSER, K., AND K. KUDA. 1997. A Field Guide to Monarch Caterpillars (*Danaus plexippus*). University of Minnesota, St. Paul.

OPLER, P. 1998. A Field Guide to Eastern Butterflies. Houghton Mifflin Company, New York.

SCOTT, J. A. 1986. The Butterflies of North America. Stanford University Press, Stanford, CA.

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 29 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use