



FLIGHT HEIGHTS OF MIGRATING BUTTERFLIES—(Note). Four species of butterflies known to migrate (C. B. Williams. 1930. The Migration of Butterflies. Oliver & Boyd, London, 473 p.): the long-tailed skipper, (*Urbanus proteus* (L.)); the cloudless sulphur (*Phoebis sennae* (L.)); the buckeye, (*Junonia lavinia* (Cramer)); and the gulf fritillary, (*Agraulis vanillae* (L.)), were observed 7 Oct. 1975 from 2:00-5:00 PM at the University of Florida experimental farm, Green Acres, Alachua Co., Fla. Temperature was ca. 29°C and the wind was from the SE at 5-7 m/s. Flight heights were measured by sighting along 2 equivalent 15 m rows of 5 0.9 m posts, the rows forming an angle of 120° with a 3 m post at the apex. All posts were marked at 0.3 m intervals (flight heights estimated at 1 ft intervals). The angle was bisected by the apparent flight direction of the butterflies (toward the SE, against the wind). Flight height measurements were made over a plowed field on the southern arm of the angle, and over a 10 m wide divider for 2 plowed fields (consisting of bahiagrass 0.3 m in height) on the eastern arm.

The flight patterns of each of 3 species were different (*A. vanillae* will not be discussed because of its small sample size). *Urbanus proteus* is a strong, swift flier with little variance in its flight path. *Phoebis sennae*, a slower flier than *U. proteus*, exhibited continuous high-amplitude oscillations in its flight path. *Junonia lavinia* maintained a slow flight, nearly without oscillations. Mean flight heights of the 3 species (Table 1) were significantly different from each other over both the plowed field and the grass. The grass significantly raised the mean flight heights of the skipper and buckeye, whereas the mean flight height of the sulphur was high enough so that it was not affected by the grass ( $p < 0.05$  for all t-tests; calculations made using mid-value of each interval).

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TABLE 1. COMPARISON OF FLIGHT HEIGHTS OF 4 SPECIES OF MIGRATORY BUTTERFLIES OVER A PLOWED FIELD (A) AND OVER 0.3 M BAHIA GRASS (B), IN METERS.

Species	A			B			A-B Significance
	n	$\bar{x} \pm 95\% \text{ CI}$	Range	n	$\bar{x} \pm 95\% \text{ CI}$	Range	
<i>Phoebis sennae</i>	60	1.03 ± 0.30	< 3-3.0+	39	0.95 ± 0.14	0.3-1.5	ns
<i>Urbanus proteus</i>	408	0.65 ± 0.05	< 3-2.1	295	0.74 ± 0.07	< 3-3.0+	p < 0.05
<i>Junonia lavinia</i>	30	0.29 ± 0.15	< 3-0.9	14	0.47 ± 0.19	< 3-0.9	p < 0.05
<i>Agraulis vanillae</i>	1	0.75		1	0.45		