THE CUBAN LIZARDS OF THE *ANOLIS HOMOLECHIS* COMPLEX

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ABSTRACT

The *homolechis* complex of Cuban anoline lizards consists of seven species: *A. quadriocellifer*, *A. homolechis*, *A. mestrei*, *A. allogus*, *A. ahli*, *A. rubribarbus*, and *A. imias*. Of these species, *homolechis* and *allogus* are island-wide, *mestrei* is restricted to the western provinces of Pinar del Río and Habana, *ahli* to Las Villas Province, *rubribarbus* and *imias* to Oriente Province, and *quadriocellifer* to the Península de Guanahacabibes in extreme western Pinar del Río Province. Although previously considered as a subspecies of *A. homolechis*, *A. quadriocellifer* clearly is specifically distinct from *A. homolechis* and merits specific status. Analysis of the variation in various scutellar characters of *homolechis*, as well as information on dewlap color, allows for the recognition of five subspecies of *A. homolechis*, of which the nominate subspecies with a white to gray dewlap is widely distributed throughout Cuba and the Isla de Pinos. The remaining subspecies, herein proposed, all with yellow to orange dewlaps, occupy regions more or less peripheral to the main body of *A. h. homolechis*. The status of extreme eastern Oriente populations, as well as those at Banes in Oriente, is left undecided; in both these areas, white and yellow dewlapped lizards occur sympatrically but accurate data for individual specimens is lacking. The apparent sympatry of white and yellow dewlapped *A. homolechis* without intergradation on the northern Camagüey coast is discussed in detail.

Variation in *A. allogus*, as well as the relationships of this species with the nominal species *A. ahli* and *A. rubribarbus*, both of which are apparently allopatric to *A. allogus*, is given in detail. There is evidence for the intergradation of *allogus* and *rubribarbus* in northern Oriente, but this evidence is equivocal and material is lacking from critical areas. The recognition of *ahli* as a species distinct from *allogus* rests principally on philosophical grounds, since these two "species" differ in few meristic characters. Although no subspecies of *A. allogus* have been designated, it seems likely that additional material will ultimately show that this species also has a number of distinctive populations along the length of Cuba.

Anolis imias remains known from only a pair of specimens; the type locality ("Imías") has been changed, since data from the collector indicate that these lizards were not taken on the xeric southern Oriente coast (where further search has not revealed them) but rather from the mountains north of Imías. There is no question that *imias* is a distinctive species, which combines the characteristics of *A. homolechis* and *A. allogus; A. imias* appears to be sympatric with *A. allogus* and not with *A. homolechis*.

Anolis mestrei is limited to the province of Pinar del Río (except for an occurrence in Habana Province near the Pinar del Río border). This very distinctive species occurs sympatrically with both *A. homolechis* and *A. allogus*.

The Cuban anoles of the *Anolis homolechis* complex have been discussed in detail by Ruibal and Williams (1961). The complex, as defined by them, is composed of *A. homolechis* Cope, *A. mestrei* Barbour and Ramsden, *A. allogus* Barbour and Ramsden, *A. ahli* Barbour, *A. rubribarbus* Barbour and Ramsden, and *A. imias* Ruibal and Williams. In a later paper, Ruibal (1964) included the above species in a *homolechis-sagrei* group along with *A. ophiolepis* Cope and *A. sagrei* Duméril and Bibron. This group is defined (Ruibal, 1964:478) by having the tail laterally compressed, ventrals not in transverse rows, head scales keeled, supraorbital semicircles usually not in contact, body scales small, head short-snouted, and no green color phase. Additionally the ventral scales are either keeled or smooth; although most of the species here discussed have these scales smooth, occasional individuals of normally smooth scaled species have the ventrals keeled. Only a single trinomial is now in use, *A. h. quadriocellifer* Barbour and Ramsden, for the population on the Península de Guanahacabibes.

The present paper is based on collections now in the American Museum of Natural

History (AMNH) made by myself and associates in Cuba and the Isla de Pinos between 1954 and 1960. My work there was under the auspices of two National Science Foundation grants (G-3865 and G-6252) which allowed me to spend a total of slightly more than 15 months on the island, collecting extensively in all provinces. As far as the *homolechis* complex is concerned, it is unfortunate that some of the more significant material was collected during the summer and early fall of 1960, at a time when Ruibal and Williams had more or less completed their own study of the complex. They had access to my material and data taken between 1956 and 1959, but my 1960 specimens were not available to them or to myself for study until I returned from the field in the Antilles in 1962.

Rather than being chauvinistic, I have a valid reason for concentrating on my own material: color is a most important character in members of this complex, as it is in most *Anolis,* and for color my own material is carefully documented. In some areas, color is of extra importance in *A. homolechis,* and usage of non-documented material might cloud the clarity of my own data. Where my material was inadequate or where I knew of specimens from especially pertinent or interesting regions, I have borrowed them. This supplemental material has been drawn especially from the Museum of Comparative Zoology. Many of their lizards, collected by Rodolfo Ruibal and Ernest E. Williams, are equally as well annotated as mine. Dr. Williams, aside from extending me the courtesy of a loan of these lizards, has also acted as my intermediary in borrowing the type material of the Cuban species described by Ahl (1924, 1925) from the Berlin Museum (BM), through Günther Peters. I have borrowed smaller amounts of material from the Instituto de Biología, Academia de Ciencias, La Habana (IB), the Illinois Natural History Survey (INHS), the Museo Felipe Poey (MFP), the Museum of Zoology at the University of Michigan (UMMZ), and the United States National Museum (USNM); for the loan of these lizards I am grateful to Orlando H. Garrido, Philip W. Smith, Miguel L. Jaume, Charles F. Walker, Doris M. Cochran, and James A. Peters. There are also a few specimens in my own collection (AS) as well as some very recent material, collected by Richard Thomas and Sr. Garrido, in the Albert Schwartz Field Series (ASFS). In the field, I have had the assistance of several students without whose cooperation such numbers of *Anolis* would not have been taken. I wish particularly to thank Edwin B. Erickson, John R. Feick, William H. Gehrmann, Jr., Ronald F. Klinikowski, David C. Leber, James D. Smallwood, Jr., Barton L. Smith, Willard M. Stitzell, Richard Thomas, and George R. Zug for their participation in my work. In addition, a trip to the extreme eastern tip of Cuba by boat was ably organized by Porfirio Azcuy and Armando García, and made in the company of Donald R. Price, Frank C. Sentz, Jr., and Ronald F. Klinikowski. Some of the specimens from the southern coast of the Península de Guanahacabibes were secured by Messrs. Feick and Gehrmann, Dr. Robert S. Howard, and Sr. García. During the latter portion of my Cuban field work, Messrs. Klinikowski and Leber were recipients of National Science Foundation Undergraduate Research Participation grants under my direction.

The color portraits are the work of David C. Leber. All were made from living lizards and the dewlap and body colors are as accurately and painstakingly executed as possible. Unfortunately, when Mr. Leber was in the field with me (1960), we did not collect all the species or subspecies of the *homolechis* complex, so that the gallery of portraits is incomplete. I am very grateful to Mr. Leber for his attention to detail and for his extreme cooperation in making these portraits, and to George C. Gorman for his permission to use living lizards recently collected by him in Cuba. All stylized color designations in the text refer to Maerz and Paul (1950).

Of the eight species included by Ruibal in the *homolechis-sagrei* group, four (*homolechis, allogus, sagrei, ophiolepis*) are island-wide in distribution. Two (*imias, rubribarbus*) are limited to Oriente Province, one to Pinar del Río Province (*mestrei*), and one to Las Villas Province (*ahli*). The island-wide species often have great apparent hiatuses in their distribution; for instance, *A. allogus,* which occurs close to Cabo de San Antonio in western Cuba and close to Cabo Maisí in eastern Cuba and is abundant in the forests of Pinar del Río,

Camagüey and Oriente provinces, is unknown from the central intermediate provinces of Matanzas and Las Villas. In the latter province, *A. allogus* is represented by *A. ahli* which has a limited distribution in the Sierra de Trinidad. There are also wide areas whence *A. homolechis* is unknown; although some of these gaps are likely due to lack of collecting, others are almost as likely due to absence of suitable habitats for *A. homolechis.* Of the seven species discussed in the present paper, two are island-wide and the others are restricted to local areas in Pinar del Río, Las Villas and Oriente provinces.

I have examined in detail 1424 lizards of the seven species discussed in the present paper. Of these, 994 are specimens with which I had personal experience in the field and they form the main body of the study material. Snout-vent lengths in millimeters were taken on all specimens, and the following counts were made:

1) scales across the snout at the level of the first (counted from the anterior border of the orbit) canthal scale.

2) number of scales between the supraorbital semicircles at their closest approximation; a count of 0 indicates that the semicircles are in contact and counts of 1 and 2 show that the semicircles are separated by this number of scales.

3) scales between the supraorbital semicircles and the interparietal scale, written as a fraction (2/2, 2/3, 3/3, etc.) for each specimen, with each half of the fraction the count on the right and left sides in a particular lizard.

4) fourth toe lamellae on phalanges II and III.

5) number of postmental scales

6) number of loreals on one side

I also checked the prenasal scales (whether transversely divided or not), whether the ventral scales were keeled or not, and the presence of brachial and supracarpal keeling. The latter feature, one which distinguishes specimens of *A. homolechis* from *A. allogus* for instance, was verbally quantified into the categories "present," "present but weak" and "absent." In *A. homolechis,* the single supracarpal keel is rarely "present" and is more often "present but weak" but in most specimens is "absent." This categorization is subject to the vagaries of any such verbalization and observation, and other workers may not reach the same conclusions on this datum as have I, but it does serve a purpose in showing the variation in this character as seen by myself.

Anolis quadriocellifer Barbour and Ramsden

Originally named from three specimens (MCZ 11867, MCZ 11906-07) from the Ensenada de Cajón near the extreme western tip of the Península de Guanahacabibes, *A. quadriocellifer* was later (Barbour, 1937: 127) considered a subspecies of *A. homolechis.* Ruibal and Williams (1961:230 *et seq.*) confirmed the subspecific status of *quadriocellifer,* basing their conclusions primarily on material, collected by myself and parties from localities toward the base of the Península de Guanahacabibes, which appeared to be intergradient between *A. homolechis* and *A. quadriocellifer.* Fresh specimens collected in 1960 and unavailable to Ruibal and Williams suggest reassessment of the status of *quadriocellifer.*

Before proceeding, a brief description of the extreme western portion of Cuba helps in the visualization of the habitats and geography of the area under discussion. Western Cuba is formed by a hook-shaped peninsula, its shaft pointed west, the Península de Guanahacabibes; the terminal portion of the peninsula ends in Cabo de San Antonio. To the east, the peninsula is attached to the Cuban "mainland" by a narrow (12 km) isthmus, on which lies the town of Cayuco. Extending southwestward from the isthmus is an ancillary peninsula about 40 km in length which culminates in Cabo Corrientes and which forms the barb portion of the hook. From Cayuco in the east to Cabo de San Antonio in the west is about 80 km airline, very slightly south of due west (Fig. 1).

The Península de Guanahacabibes is quite varied ecologically. Its northern margin is swampy; its southern edge is typically composed of limestone escarpments and balconies topped by extensive areas of *diente de perro* limestone giving a xeric and bare aspect to the countryside. The central portion of the peninsula supports hardwood forests; there are (as at Vallecito de San Juan) lakes and ponds surrounded by dense hardwood forest. In the Cabo de San Antonio area, the forests are dry and open, with the

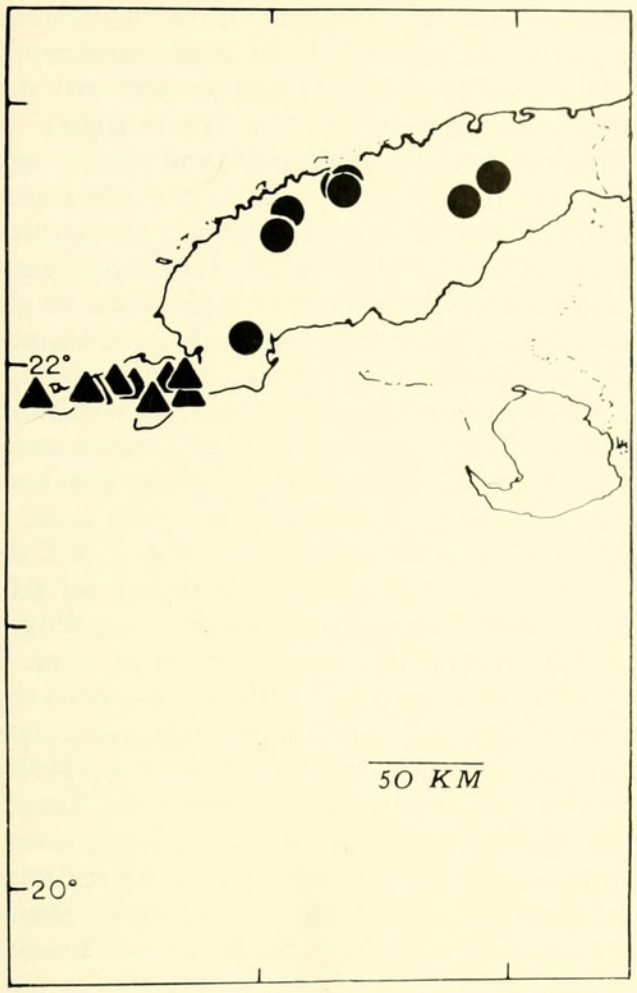

Figure 1. Map of extreme western Cuba (Pinar del Río Province) showing localities whence specimens of two species of anoles (*Anolis quadriocellifer*—solid triangles; *Anolis mestrei*—solid circles) have been examined.

aspect of xeric forests throughout the Antilles. The rainfall varies between 115 and 125 cm annually (Marrero, 1951:442), below the mean annual rainfall for Cuba. Despite the relatively small amount of rain, the red soils in the central portion of the peninsula support, as noted above, fine stands of dense hardwoods. The maximum relief of the Península de Guanahacabibes is about 10 m above sea level, and the country is generally flat. To the east, where the peninsula abuts against the Cuban "mainland," lie the plains of Remates, distinctly different in character from the peninsula itself. These grassy plains are forested in pines and palms (*Acoelorhaphe wrighti*) and are characterized by the occurrence of many small to fairly large lakes in open or lightly forested savannas. The transition between these plains and the hardwood forests of the peninsula west of Cayuco is abrupt. I have not visited the region between Cayuco and Cabo Corrientes, but Vaurie (1957:301) noted that the Cabo Corrientes section was forested; the status of *A. quadriocellifer* in this latter area has been reported by Garrido and Schwartz (MS).

Access to the peninsula has always been difficult and this accounts for the sparse records of amphibians and reptiles from this area. In 1957, a poor and very rocky road led from Cayuco to a sawmill village (La Majagua) 10 km southwest of Cayuco at the edge of the hardwood forest and proceeded thence to the northwestern coast of Cabo Corrientes and the north shore of the Ensenada de Corrientes (the large and open embayment formed by the Península de Guanahacabibes on the north and the Cabo Corrientes peninsula on the east). In 1957, two visits to the north shore of the Ensenada de Corrientes were made by John R. Feick, William H. Gehrmann, Jr., and Armando García; on one visit they were accompanied by Robert S. Howard. In 1958, George R. Zug and I, along with Sr. García, collected along the southern coast of the peninsula and later made an unsuccessful attempt to reach the Valle de San Juan, a (then) small settlement in the central portion of the peninsula about 10 miles west of Cayuco. Although we did not reach our goal because of the combination of heavy rains and earthen roads, I did have an opportunity to see this heavily forested central portion of the peninsula. In 1960, a new gravel road had been constructed to Valle de San Juan, and David C. Leber and I reached that (now larger) settlement with ease from Cayuco, and we were able to observe and collect in the dense forests of this section. In December 1958, in the company of Ronald F. Klinikowski, Donald R. Price and Frank C. Sentz, Jr., and under the capable guidance of Armando García, I visited the type locality of *A. quadriocellifer* at Ensenada de Cajón near Cabo de San Antonio, travelling by boat from Esperanza on the northern coast of Pinar del Río Province. Orlando Garrido (*in litt.*) advises me that it is possible now to reach Cabo de San Antonio by road, but the trip is long and arduous and cannot be accomplished during the rainy season. There are few settlements of any size on the peninsula proper and the greatest number of people are at the peninsula's base in the Cayuco area; some wood-

cutters, fishermen, and farmers live scattered along roads and coasts in at least the central section and near the cape.

Anolis quadriocellifer (at Ensenada de Cajón) is easily recognized by the presence of a pair of black triangular scapular spots outlined by a more or less continuous white line or series of white spots. There is also a series of three or four vertical white flank bars made up of white dots, and there may also be one or a pair of parallel white longitudinal flank lines. If there are two white flank lines, the upper lies at the level of the bottom of the black scapular triangle, and the lower begins above the axilla and proceeds posteriad. The black scapular patches occur in males and females; in the latter sex the patches lie lateral to the constriction forming the first of about four pale dorsal rhombs, a pattern typical of females and immatures of several members of the *homolechis* complex. There is some variation in the intensity and expression of the black scapular patches in topotypes. One of the largest males examined (AMNH 83174) lacks black pigment in this region, and other males and females have the spot less well expressed but still indicated. Even in the absence of the black pigment, there is, in topotypes, a conspicuous remnant of the white patch outlines. Occasional males have a white dot in the center of each black patch.

The dewlap color of topotypical *A. quadriocellifer* is a dirty (grayish) yellow with three orange to red horizontal bars. A salient scale character of *A. quadriocellifer* is the presence of keeled supracarpal scales; these scales have usually three fairly distinct keels on their upper surfaces. I have recorded the supracarpal keels as weak in one male topotype with a snout-vent length of 38 mm, and absent in three males with snout-vent lengths of 30 and 32 mm and a female with a snout-vent length of 33 mm. Other young and subadult *quadriocellifer* of similar size have the keels well expressed; apparently this character is not regularly shown in very young individuals. The largest male topotype examined has a snout-vent length of 50 mm and the largest female 33 mm.

In contrast to these characters of *A. quadriocellifer* are those of *A. homolechis*. This species lacks any black scapular patches, vertical white flank barring, or prominent longitudinal white flank lines. The dewlap (in *homolechis* from the province of of Las Villas westward to include Pinar del Río Province—see Pl. 1, upper right) is variably white to grayish and lacks any definite pattern except for some specimens which have obscure indications of grayish bars on a whitish ground. The supracarpal scales are either smooth or have but a single keel; use of the term keeled for the *homolechis* supracarpals is somewhat of an exaggeration, since the scales are more tectiform than truly or strongly carinate. Some western *homolechis* have the supracarpal keel more distinct than others, but the keeling is quite variable in the species and of little significance. The largest male Pinar del Río *homolechis* examined has a snout-vent length of 57 mm and the largest female 46 mm.

Although not particularly pertinent to the present problem, it should be noted that two specimens of *A. quadriocellifer* (AMNH 83189, FN 6679, male, snout-vent length 47 mm; AMNH 83183, FN 2657, male, snout-vent length 49 mm) have keeled ventrals. Both *homolechis* and *quadriocellifer* are normally characterized by having smooth ventral scales.

The presumed intergradient specimens between *homolechis* and *quadriocellifer* are a series of 27 lizards from six localities, as follows (east to west): 1) north shore, Ensenada de Corrientes, 47 km W Cayuco; 2) north shore, Ensenada de Corrientes, 45 km W Cayuco; 3) north shore, Ensenada de Corrientes, ca. 40 km W Cayuco; 4) north shore, Ensenada de Corrientes; 5) western coast, Cabo Corrientes; 6) 7 km SW Cayuco. As a group, these specimens have dewlaps which vary between yellow to yellow-orange; the yellow-orange effect is due to the rather indiscriminate mottling of yellow and red pigments to give an overall orange or yellow-orange color. The specimens from farthest west on this southern coast of the peninsula were recorded as having the dewlap yellow-orange, whereas those from Cabo Corrientes had the dewlaps yellow and those from 7 km SW Cayuco orange. As a series these specimens from various southern coast localities differ from topotypical *quadriocellifer* in dewlap color, since none had the three red dewlap bars which occur on more western *quadriocellifer*.

As far as the black shoulder patch is con-

cerned, none of the Ensenada de Corrientes specimens shows it. However, the position of the black *quadriocellifer* patch is still marked very clearly in most specimens by the remnants of the white outline; additionally, the white dotted flank stripes are a conspicuous feature of the series. At least three males (AMNH 83183—both specimens; AMNH 83189, FN 6651) have the shoulder patch darker brown than the brown ground color; interestingly, AMNH 83183 includes the specimens from 7 km SW Cayuco and thus very close to the region where *homolechis* and *quadriocellifer* were presumed to intergrade.

The supracarpals of the Ensenada de Corrientes specimens were stated (Ruibal and Williams, 1961:231) to be intermediate between the 2 to 3 keeled supracarpals of *quadriocellifer* and the smooth to unicarinate supracarpals of *homolechis*. The keeling is indeed variable in this entire series, but to my eye no more so than in topotypical *quadriocellifer*. I have recorded the supracarpal keeling as weak in seven specimens (snout-vent lengths 46 to 51 mm), absent in one male (snout-vent length 47 mm), and present in all other lizards. There are no small juveniles available from the Ensenada de Corrientes region, so no comment can be made about presence of supracarpal keeling in very small specimens. I do not consider that the number of supracarpal keels is intermediate (1 or 2 keels) between the situation in *quadriocellifer* and that of *homolechis*.

In effect, then, the Ensenada de Corrientes series seems to be very distinctly allied to topotypical *A. quadriocellifer* but to lack the prominent black scapular patches and the distinctly barred dewlap (although both red and yellow pigments occur in the dewlap color).

In the summer of 1960, between Cayuco and Valle de San Juan (16.3 km W Cayuco), specimens of *A. quadriocellifer* and *A. homolechis* were collected synotopically, often on the same trees. Both situations of syntopy (11 km W Cayuco; Valle de San Juan) were in cut-over *monte* (hardwood forest); a third locality (13.2 km W Cayuco) yielded only *A. homolechis* (Fig. 2). A total of 16 *A. quadriocellifer* and seven *A. homolechis* were taken at these two localities; this should not be interpreted that the former was more abundant than the latter but rather that, once we realized that both species were present, we concentrated on securing *quadriocellifer* in preference to *homolechis*.

The *A. homolechis* from these two localities are fairly easily dismissed. They had white dewlaps, lacked either black or brown scapular patches or white outline remnants thereof, and lacked longitudinal white flank lines or vertical white flank stripes. In color and pattern they are indisputably *A. homolechis* and show no *A. quadriocellifer* traits. They are slightly unusual, however, in that two have the supracarpal keel rather more prominent than usual. The same variation occurs in two of the specimens from the intermediate (8.2 mi. W Cayuco) locality. In all series, however, there are individuals with smooth and weakly keeled supracarpals.

The *A. quadriocellifer* from these two localities are extremely interesting. The dewlaps were recorded as yellowish orange without transverse bars (Pl. 1, upper left). The dorsal pattern is very similar to that of topotypical *quadriocellifer*, with prominent black, white-outlined shoulder patches and vertical flank barring. In one male (AMNH 96522, FN 8668) the patches are much paler and brown but are still visible and outlined with white. The lateral longitudinal lines are seldom present, but may be represented by a longitudinal series of white dashes (AMNH 96522, FN 8671) along the lower sides. Most peculiarly, some specimens show, in addition to the black shoulder patches, a second pair of patches in series along the back; these individuals are thus even more patterned dorsally than are topotypes. Occasional males have a white dot in the center of each shoulder patch.

All specimens from these two localities have the supracarpals keeled (recorded as weakly so in four lizards with snout-vent lengths varying between 47 and 50 mm), and three have the ventrals keeled (AMNH 96522 + FN 8670; AMNH 86523, FN 8698).

In summary, the *A. quadriocellifer* from between Cayuco and Valle de San Juan resemble topotypes in dorsal pattern but are unlike the more southern material from Ensenada de Corrientes in this feature. On the other hand, the Cayuco-Valle de San Juan specimens resemble the southern *A.*

quadriocellifer in dewlap color but are unlike topotypes.

The syntopic occurrence of *A. quadriocellifer* and *A. homolechis* suggests strongly that these two forms are not conspecific. The fact that at the places of syntopy, *A. homolechis* does not demonstrate any characters tending toward *A. quadriocellifer* re-enforces this contention and likewise suggests that the two species are (at least here) genetically isolated.

How, then, may we interpret the supposed intergradient populations from along the northern shore of the Ensenada de Corrientes? I suggest that these lizards lack the definitive dorsal pigmentary pattern of more northern *quadriocellifer* (which occupy arid forests at Cabo de San Antonio and mesic forests at Valle de San Juan) in response to the open and unshaded habitats which they occupy on these southern open and bleak shores. Restriction or obsolescence of dark pattern elements in populations of lizards occupying open and dry areas is a common phenomenon. The lack of a well patterned dewlap in these southern lizards may be a similar or cognate response to more sunny and open situations, resulting in an overall paling of colors. This explanation may not be used to account for the patternless but bright dewlaps of the Valle de San Juan lizards which occur in mesic forest. Were the distribution of these three populations more completely known, it is not unlikely that all or some of them could with complete justification be separated nomenclatorially. Although there is very definite overlap in degree of expression of the scapular patches between all three populations (since some topotypes are indistinguishable on this character from Ensenada de Corrientes lizards, for instance) the three populations are generally quite distinctive as far as both dorsal pattern and dewlap color is concerned.

Attention should be directed to another area of overlap without intergradation between *A. homolechis* and *A. quadriocellifer*. There is a series of 18 *A. homolechis* (AMNH 83182, AMNH 83184) from 3 km W Bartoli sawmill village (= La Majagua), 10 km SW Cayuco; these lizards are typical white dewlapped *homolechis* with smooth to weakly keeled supracarpals. The two *A. quadriocellifer* from 7 km SW Cayuco overlap the range of *A. homolechis* in this area; in this connection it should be noted that these two *quadriocellifer* (AMNH 83183) are those which have (of all the "southern" lizards) the scapular patches fairly well defined. Geographically they are from a region which is intermediate between the pallid south coast material and the well patterned interior specimens of *A. quadriocellifer*.

Scale counts on 40 *A. quadriocellifer* (topotypes plus Valle de San Juan-Cayuco lizards) are: snout scales between first canthals 5-7 (mean 6.0, mode 6), scales between supraorbital semicircles modally 1 (32 of 37 specimens), scales between supraorbital semicircles and interparietal modally 3/3, fourth toe lamellae 16-21 (mean 18.2, mode 18), postmentals 2-6 (mean 4.6, mode 4), loreals 19-42 (mean 27.2). Counts on 25 Ensenada de Corrientes specimens are: snout scales between first canthals 5-8 (mean 6.3, mode 6), scales between supraorbital semicircles modally 1 (15 of 22 specimens), scales between supraorbital semicircles and interparietal modally 3/3, fourth toe lamellae 14-21 (mean 17.6, mode 18), postmentals 2-7 (mean 4.0, mode 4), loreals 16-35 (mean 24.5). The largest male *A. quadriocellifer* has a snout-vent length of 55 mm, the largest female 40 mm. These data are summarized in Table 3.

Thirty one *A. homolechis* from the areas of overlap of this species with *A. quadriocellifer* have the following counts: snout scales between first canthals 5-9 (mean 7.1, mode 7), scales between supraorbital semicircles modally 1 (27 of 29 specimens), scales between supraorbital semicircles and interparietal modally 3/3, fourth toe lamellae 12-21 (mean 18.0, mode 17), postmentals 2-5 (mean 3.2, mode 4), loreals 18-28 (mean 22.5). The largest male from this series has a snout-vent length of 58 mm, the largest female 41 mm. Meristic scale differences between these *A. homolechis* and *A. quadriocellifer* are slight; most striking are the mean and modal number of snout scales, lower mean of postmentals, and lower mean of loreals in *homolechis*.

Additional scale data on 122 *A. homolechis* from Pinar del Río Province are: snout scales between first canthals 5-8 (mean 6.0, mode 6); scales between supra-

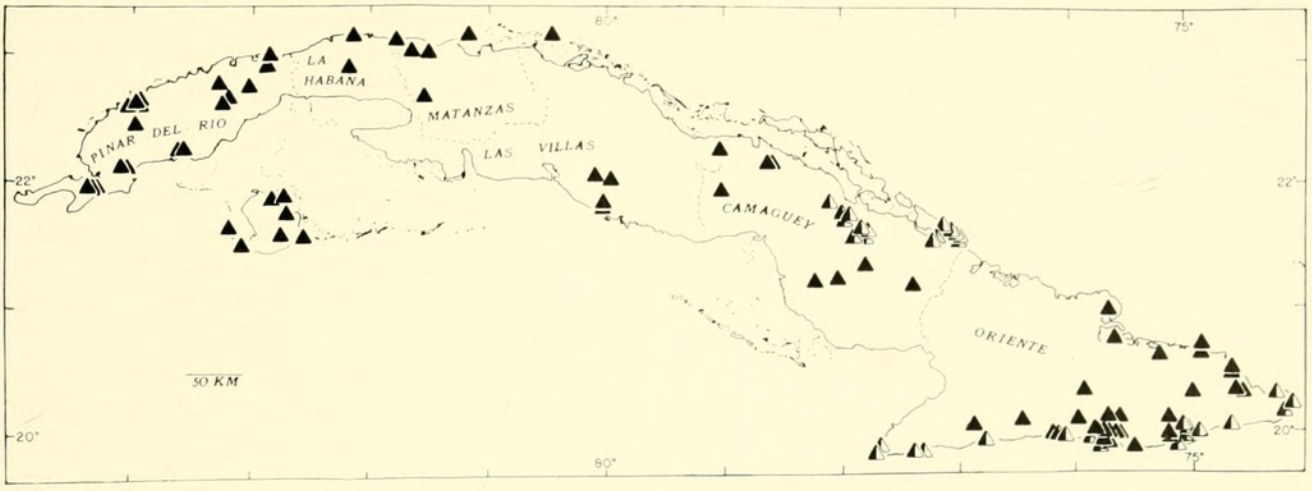

Figure 2. Map of Cuba, showing localities whence specimens of *Anolis homolechis* have been examined. Solid triangles represent localities for white dewlapped *A. homolechis*, semi-solid triangles for non-white dewlapped (yellow to orange) *A. homolechis*. The population at Banes is here regarded as being primarily white dewlapped (solid triangle) and those of extreme eastern Oriente as non-white dewlapped (semi-solid triangles). Figure 3 shows the provinces of Camagüey and Oriente in greater detail.

orbital semicircles modally 1 (103 of 116 specimens), scales between supraorbital semicircles and interparietal modally 3/3, fourth toe lamellae 16-22 (mean 18.7, mode 18), postmentals 2-5 (mean 3.1, mode 4), loreals 15-34 (mean 23.3). Comparison of the data for the two lots of *A. homolechis* shows that the specimens from the area of overlap with *A. quadriocellifer* differ somewhat from their more eastern relatives, namely in having a higher mean and mode of snout scales, and higher mean and mode of fourth toe lamellae. In at least the snout scales, more eastern *homolechis* are more like *quadriocellifer* than *homolechis* from the area of sympatry between the two species. The high mean number of postmentals in the two samples of *A. quadriocellifer* (4.6 and 4.0) is equalled or exceeded only by series of *A. homolechis* from various Camagüey localities (Sierra de Cubitas, Playa Santa Lucía, Los Ballenatos, Cayo Sabinal, with means from 4.0 to 5.2) far to the east in east-central Cuba.

Although I am convinced that *A. quadriocellifer* and *A. homolechis* are two distinct species, moreover I am not at all sure that they are closely related. The presence of multiply keeled supracarpal scales in *quadriocellifer*, for example, would tend to ally that species with *A. allogus*. The latter never has the dorsal pattern of *quadriocellifer* and modally has the prenasal scale transversely divided, a condition not observed in any *quadriocellifer*. There are additional and trenchant scale and ecological differences which separate the two. Militating against regarding *A. quadriocellifer* and *A. allogus* as conspecific is the fact that a specimen of *A. allogus* was collected 11 km west of Cayuco, within the known range of *A. quadriocellifer;* this *allogus* was typical of its species in all meristic data and shows neither pattern nor scale tendencies toward *quadriocellifer*. The Península de Guanahacabibes has been a small center of endemicity in western Cuba; *Leiocephalus carinatus zayasi* Schwartz, *L. macropus koopmani* Zug, *L. stictigaster stictigaster* Schwartz and *Dromicus andreae peninsulae* Schwartz and Thomas plus two as yet unnamed forms of *Ameiva auberi* Cocteau are endemic subspecies known only from the Península. *A. quadriocellifer* has differentiated further than any of these and has reached specific rank.

Presumably *A. homolechis* occurs only on the eastern portion of the peninsula near its base. As far as my material is concerned, the westernmost records for this species are Valle de San Juan (16.5 km W Cayuco) and 3 km W La Majagua, 10 km SW Cayuco. The eastern limits of *A. quadriocellifer* are 6.9 mi. (11 km) W Cayuco and 7 km SW Cayuco, overlaps of 3.3 miles (5.3 km) in the former case and about 6 km in the latter (Figs. 1 and 2). *A. homolechis* seems to be the more recent invader into the territory of *A. quadriocellifer*, since the former is widespread throughout Cuba and succeeds

in penetrating the Guanahacabibes forest only along its eastern margin whereas *A. quadriocellifer* is widespread and common throughout both xeric and mesic situations on the peninsula but seems not to occur far beyond (if at all) the eastern forest margin. Comments on the habits of *A. quadriocellifer* have been made by Garrido and Schwartz (MS).

Specimens of *A. quadriocellifer* examined (all from Pinar del Río Province, Cuba): Ensenada de Cajón, 24 (AMNH 83174); north shore, Ensenada de Corrientes, 47 km W Cayuco, 1 (AMNH 83190); north shore, Ensenada de Corrientes, 45 km W Cayuco, 10 (AMNH 83189); north shore, Ensenada de Corrientes, ca. 40 km W Cayuco, 5 (AMNH 83188); north shore, Ensenada de Corrientes, 6 (AMNH 83186—2 specimens; AMNH 83187); western coast, Cabo Corrientes, 3 (AMNH 83185); 7 km SW Cayuco, 2 (AMNH 83183); Valle de San Juan, 10.2 mi. W Cayuco, 5 (AMNH 96523); 6.9 mi. (11 km) W Cayuco, 11 (AMNH 96522). Specimens of *A. homolechis* examined from the area of sympatry: 3 km W Bartoli sawmill village (= La Majagua), 10 km SW Cayuco, 18 (AMNH 83182—9 specimens; AMNH 83184—9 specimens); Valle de San Juan, 10.2 mi. (16.3 km) W Cayuco, 4 (AMNH 96528); 8.2 mi. (13.1 km) W Cayuco, 6 (AMNH 96525); 6.9 mi. (11 km) W Cayuco, 3 (AMNH 96524).

Anolis homolechis Cope

Anolis homolechis is one of the most widespread Cuban anoles, since it occurs from one end of the island to the other, on the Isla de Pinos, and on some (and probably many) of the off-shore islands and cays. Ruibal (1961:99) characterized this species as an inhabitant of forest margins, small clearings or along paths in forest in areas of moderate sunlight rather than deep shade. Ruibal (1964:497) later stated that *A. homolechis* occurs to high elevations (almost 6000 feet—1830 meters) in the Sierra Maestra as well as in the lowlands, and that in some areas it has adapted to man-made plant associations in gardens, farms, and pastures. Although *homolechis* is indeed generally associated with forests, these forests are not necessarily dense. Favored areas are open or cut-over woods or arid coastal forests wherein the trees are widely spaced and there is limited shade; since *homolechis* is a lizard of filtered sunlight (Ruibal, 1961), such open woods offer an ideal habitat for it. In my experience, *A. homolechis* may be encountered in almost any situation where there are trees; isolated trees in pastures, for instance, may have a few *A. homolechis* upon their trunks. Wooded situations of any sort are utilized; although *A. homolechis* generally shuns deep shade, in some areas it and the shade dwelling *A. allogus* occur precisely syntopically within the same dense woods. Such situations are optimal for *allogus* but presumably less so for *homolechis*.

The body color of *A. homolechis* is generally some shade of brown with about four chevrons on the dorsum; the shade of brown varies from tan to rich chocolate brown or velvety black. There are occasional longitudinal lines indicated on the flanks. Females have a dorsal pattern of pale tan median rhombs which extend from the neck onto the tail. Maximal size of males is 62 mm snout-vent length, of females 46 mm.

Ruibal (1961:99) first pointed out that there were some populations wherein the usual white or gray dewlap of *A. homolechis* was yellow in color. This statement was later (Ruibal and Williams, 1961:228-235) amplified in detail. Areas where *A. homolechis* males have non-white or non-gray dewlaps are all in western Cuba (Fig. 2). These regions include (in Camagüey Province) the Sierra de Cubitas and areas between that range and the north coast, Playa Santa Lucía near the Camagüey-Oriente border, Los Ballenatos (islets in the Bahia de Nuevitas) and (in Oriente Province) the southern coast between Cabo Cruz to just east of the Bahia de Santiago, the region about Cabo Maisí, and Banes. In addition to these localities, I have taken yellow dewlapped *homolechis* on Cayo Sabinal on the northern Camagüey coast. I have collected specimens from all these areas of *homolechis* with yellow dewlaps with the exception of Banes. Two other facts are pertinent. Ruibal and Williams (1961:245) stated that *A. homolechis* from Loma de Cunagua in Camagüey Province have yellow dewlaps; this is an observational error since all of my material from that locality has the typical white dewlap of the species. Secondly, apparently the Banes pop

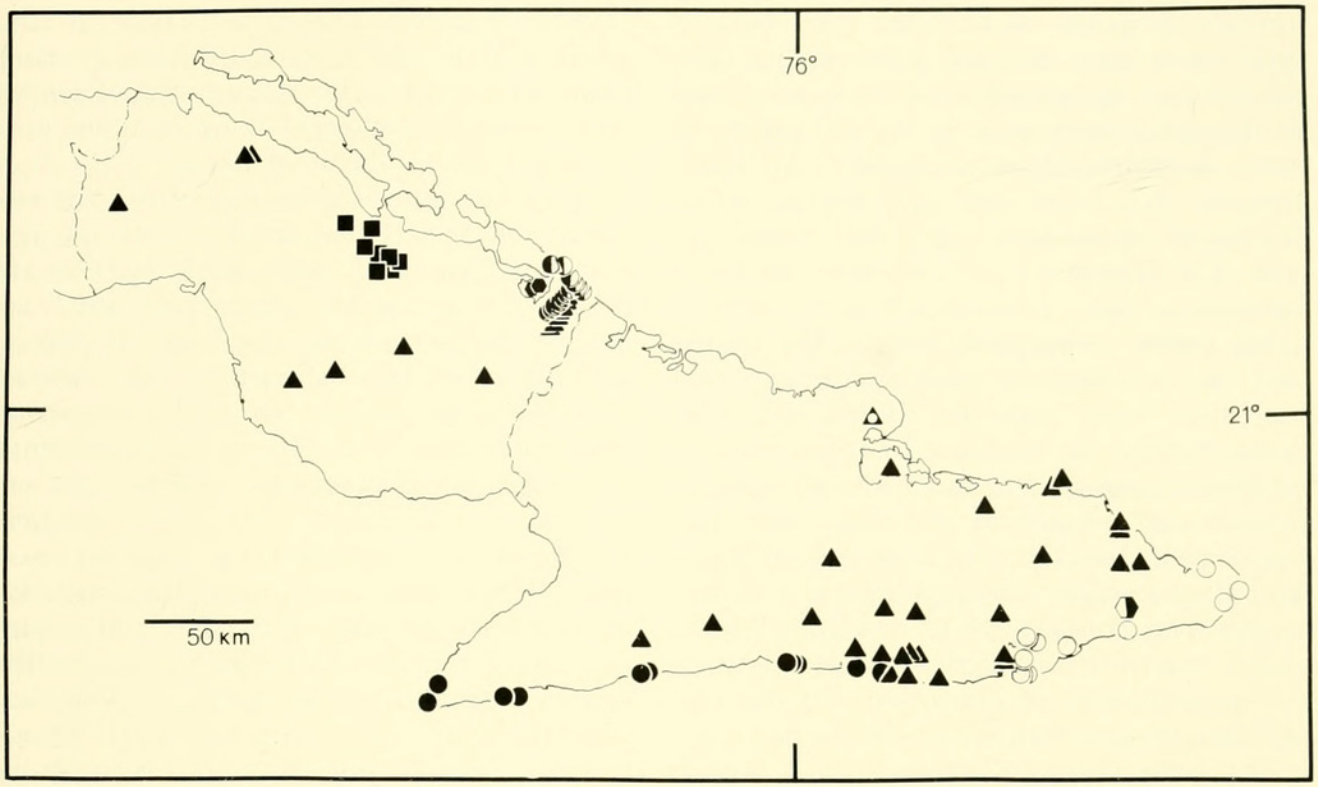

Figure 3. Map of Camagüey and Oriente provinces, Cuba, showing details of distribution of subspecies of *A. homolechis* and *A. imias* (semi-solid hexagon). Solid triangles = *A. h. homolechis;* solid squares = *A. h. jubar;* solid hexagons = *A. h. balaenarum;* semi-solid circles = *A. h. cuneus;* solid circles = *A. h. oriens;* open circles = populations of uncertain status from Bahía de Guantánamo to Río Yumurí. Population at Banes (triangle with included circle) uncertain, but apparently consists of both white and yellow dewlapped individuals. Adjacent symbols (semi-solid circles and solid triangles) south of Playa Santa Lucía in northeastern Camagüey Province represent area of apparent intergradation between *A. h. homolechis* and *A. h. cuneus.*

ulation is not exclusively yellow dewlapped. Dr. Williams (*in litt.*, 31 January 1967) advised me that only one of seven *A. homolechis* in the Museum of Comparative Zoology was recorded (by Chapman Grant) as having a yellow dewlap; the balance of the series reportedly had white dewlaps. There is no fresh material from the Banes area, so the situation there remains anomalous.

The status of these yellow dewlapped populations has been left undecided. Ruibal and Williams (1961:234) suggested that they might represent distinct subspecies, distinct species, or *homolechis* ecotypes adapted to the more stringent conditions of coastal areas, since all but the Sierra de Cubitas population are coastal or nearly so in distribution. Their detailed study of the white and yellow dewlapped lizards in the Playa Santa Lucía area revealed no specimens which were intermediate in dewlap color in a transect by road from the beach to a distance of 21 km inland. They collected only yellow dewlapped *homolechis* from the beach to a distance 12 km inland; from 13 to 17 km inland they collected primarily white dewlapped specimens, but at two stations within this distance they took two yellow dewlapped specimens. Between 18 and 21 km they secured only white dewlapped lizards (Fig. 3). There is thus a sharp zone of demarcation between the yellow and white dewlapped forms in this particular region and no evidence of orthodox intergradation of dewlap color. My own more limited experiences in the Playa Santa Lucía area precisely parallel theirs, both as to distances involved and dewlap color. In this region, lizards with white or yellow dewlaps act, in their zone of contact, as good species.

A second area of yellow dewlapped *homolechis* is on the southern Oriente coast (Fig. 3). Between Cabo Cruz and the Bahía de Santiago—a distance of 190 km—all *homolechis* collected by myself and others (if dewlap color in life was noted in the field) have yellow dewlaps. At Aguadores, just east of the Bahía de Santiago, the same

situation prevails, so that the physical embayment at present is not a convenient eastern limit to the distribution of these yellow dewlapped lizards as it is for subspecies of some southern Oriente reptiles. At Playa Juraguá, 3.7 miles east of Siboney, white dewlapped specimens occur exclusively, yet only 1.5 kilometers to the west of Playa Juraguá at Arroyo de la Costa we secured solely yellow dewlapped lizards. The transition here is extremely sharp and, as reported for Playa Santa Lucía by Ruibal and Williams, there is no evidence of intermediates. At Playa Juraguá also, there was no discernible area of overlap of the two forms, nor any obvious break in the xeric coastal forest habitat; the yellow dewlapped form occurred to the west and the white dewlapped form to the east in this immediate region without any gradual zone of transition. To the east of Playa Juraguá only white dewlapped specimens have been collected (at 9.1 mi. E Siboney, Laguna de Baconao, Caimanera).

I have had less experience with *A. homolechis* in a third area of yellow dewlapped males—that between the Bahía de Guantánamo east to Cabo Maisí and thence west to the mouth of the Río Yumurí on the north coast (Figs. 2 and 3). Specimens collected by Richard Thomas on the United States Naval Base to the east of the Bahía de Guantánamo had dewlaps which varied from white or pale gray to pale yellow; often the white dewlapped specimens also had yellowish suffusions. At the mouth of the Río Yumurí on the north coast, males had the dewlap white with a yellowish tinge or pale yellow. A similar situation occurs at a locality 14.5 mi. W Baitiquirí in this section of southern coast, where both white and very pale yellow dewlapped specimens were taken from dry woods.

The final mainland area where I have collected yellow dewlapped *homolechis* is the Sierra de Cubitas (Fig. 2). Here the population is completely yellow dewlapped and no white dewlapped specimens occur. That yellow dewlapped specimens are not restricted to the Cubitas massif alone is attested to by Ruibal and Williams, who reported (1961:245) yellow dewlapped males from between Esmeralda and Jaronú to the north of the Sierra de Cubitas and from "near Banao" to the south of the range. I can confirm these findings, since yellow dewlapped specimens were collected on the north side of the Cubitas in rich lowland forest 11.9 mi. (19 km) northwest of Banao and on the south side of the mountains at a locality 2 km southeast of Banao.

Specimens of *A. homolechis* from the environs of the Bahía de Nuevitas on the northern Camagüey coast near the Oriente border also are yellow dewlapped; localities include the two of the three islands known collectively as Los Ballenatos, Cayo Sabinal (a large island which forms the northern or seaward margin of the bay), the Playa Santa Lucía area noted previously, and San Jacinto (Ruibal and Williams, 1961:245). One yellow dewlapped specimen has been reported from Banes, some 130 km to the southeast in northern Oriente Province, and many from the Sierra de Cubitas area to the northeast at a distance of about 45 km. Whether these three areas of yellow dewlapped *homolechis* are in actuality continuous is presently unknown. There are no annotated specimens known to me from any areas between them nor were any known to Ruibal and Williams; they suggested (1961:232) that the Bahía de Nuevitas and Sierra de Cubitas populations might be separated by the savanna extending north to the coast near the Río Máximo. However, this savanna is not known to be inhabited by any *homolechis*. Therefore, I do not know if there is an interposed white dewlapped population separating the yellow dewlapped populations in the Sierra de Cubitas and about the Bahía de Nuevitas. There may be physical barriers between the Nuevitas and Banes populations, but there is at present no evidence that white dewlapped *homolechis* occur in the intermediate area, and the situation at Banes itself requires clarification. In summary, one can with some justification presume that there is a continuous yellow dewlapped population of *A. homolechis* from the Sierra de Cubitas to the Bahía de Nuevitas and Playa Santa Lucía (and thence to Banes?) without interruption by white dewlapped *homolechis*. If this is the case, then in some areas (i.e., Playa Santa Lucía) the distribution of the yellow dewlapped populations is fairly narrow (17 km wide).

In areas other than those discussed above, the dewlap of *A. homolechis* is variable in color but this variation appears not to be correlated with geography in any reason-

able manner. Ruibal and Williams (1961: 232) pointed out that "the dewlap may be pure white or there may be two or three grey stripes on a white background . . . Both these types show no systematic geographical distribution and may actually be found in the same population." Thus, specimens of *A. homolechis* from extreme western Cuba in the area of sympatry with *A. quadriocellifer* and extreme eastern Cuba on the southern Oriente coast at Laguna de Baconao, as well as material from the Isla de Pinos, all appear to be identical in having the dewlaps white or gray, and not yellow.

As Ruibal and Williams (1961:232) pointed out, those populations which both they and I refer to as having yellow dewlaps are not identical insofar as pigmentation and/or pattern of the dewlap is concerned. They stated that the Sierra de Cubitas lizards have a yellow dewlap with a broad white margin, whereas the Playa Santa Lucía males have the dewlap a deeper yellow or orange color with a narrow white margin and one or two stripes of white or light yellow. My notes on lizards from these two localities agree quite well with their comments. Specimens from 2 km SE Banao (AMNH 83181) were recorded as having the dewlap yellow (PL. 9 L 7) with a white margin and a fairly extensive white basal area anteriorly. Males from Los Ballenatos (AMNH 83176) were recorded as having the same yellow or pale orange shade. Verbal descriptions of dewlaps of *homolechis* from the Sierra de Cubitas area include yellow and dull orange, whereas specimens from Playa Santa Lucía were yellow to orange, with occasional specimens rather yellowish tan (= mustard). On Los Ballenatos the dewlaps were yellow and orange, and on Cayo Sabinal yellow.

The southern Oriente coastal population in general has the dewlap deeper or brighter orange, with colors near Pl. 10 F 1. Even in this lot of specimens there is some variation since some individuals were reported to have the dewlap yellow. The distinctly pale yellow dewlaps of lizards from east of the Bahía de Guantánamo to the mouth of the Río Yumurí has been previously noted.

Complete complements of scale counts were taken on 844 *A. homolechis* from throughout the range of the species, including both white and yellow dewlapped populations. The samples and their sizes are as follows: 1) Península de Guanahacabibes (area of sympatry between *A. homolechis* and *A. quadriocellifer*)—31; 2) Pinar del Río Province—122; 3) Isla de Pinos—61; 4) Habana-Matanzas-Las Villas provinces—34; 5) Camagüey—96; 6) Sierra de Cubitas and associated lowlands (yellow dewlap)—68; 7) Playa Santa Lucía (yellow dewlap)—84; 8) Los Ballenatos (yellow dewlap)—15; 9) Cayo Sabinal (yellow dewlap)—9; 10) Oriente (white dewlap) except specimens from coast between Playa Juraguá and Bahía de Guantánamo—122; 11) Oriente coast (white dewlap) between Playa Juraguá and Caimanera—16; 12) Oriente coast (yellow dewlap) between Cabo Cruz and Playa Juraguá—65; 13) Oriente coast (white to pale yellow dewlap) between Bahía de Guantánamo and Río Yumurí—121.

Without discriminating between locality or region, the total variation in *A. homolechis* in the scale data I have taken from throughout its range may be summarized as follows: snout scales between first canthals 4-9, supraorbital semicircles separated by one scale or in contact (depending on population), scales between supraorbital semicircles and interparietal usually 2/2 or 3/3, fourth toe lamellae 14-22, postmentals 1-7, loreals 12-41. The supracarpal scales are either smooth or with a single median, rather inconspicuous, keel. The largest male has a snout-vent length of 62 mm and is from Los Ballenatos, whereas the largest females have snout-vent lengths of 46 mm and are from Pinar del Río and Oriente provinces. In many samples there are very few to no females, and in others (from areas where both white and yellow dewlapped populations occur together or in close juxtaposition) I have not utilized data from females since they are not assignable to either population with certainty. Considering the robust size of males from Los Ballenatos I suspect that females (at present unrepresented) from these islets will be found to exceed even the largest females noted above. Variation in the listed scale characters and size can be seen in Table 1, but further limited discussion is offered below.

1) *Size*. The largest male *A. homolechis*

from Los Ballenatos is no unusually large giant. Eight of 15 males from Los Ballenatos have snout-vent lengths in excess of 58 mm, for instance, and six males have snout-vent lengths of 60 mm or greater; 60 mm is the largest size (specimen from the Guantánamo-Yumurí sample) recorded for any non-Ballenatos male. Males with snout-vent lengths of 58 mm (the next largest maximum) are included in the samples from Guanahacabibes, Habana-Matanzas-Las Villas, and Playa Santa Lucía. These localities include both white and yellow dewlapped populations. The smallest maximally sized males (snout-vent lengths 52 mm) are from Cayo Sabinal (yellow dewlaps). Camagüey (white dewlaps) and Sierra de Cubitas (yellow dewlaps) have maximally sized males with snout-vent lengths of 53 and 54 mm respectively.

The largest females are from Pinar del Río and Oriente provinces. Smallest maximally sized females (40 and 41 mm) occur in the samples from Guanahacabibes, Sierra de Cubitas, and Playa Santa Lucía.

Isla de Pinos material of both sexes is comparable in size to that of western Cuba, although Isla de Pinos females are not known to reach quite the large size of Pinar del Río females.

2) *Snout scales between first canthals.* The highest mean for snout scales (7.1) is that already mentioned for the series of *A. homolechis* from the area of sympatry with *A. quadriocellifer.* The lowest mean (5.3) is for the Guantánamo-Yumurí sample (white to pale yellow dewlaps). Most samples have ranges of 5 to 8 scales, but counts of 4 occur in two samples and 9 in four. The mode of snout scales is usually 6 (eight samples), but modes of 7 (two samples: Guanahacabibes, Cayo Sabinal with a weak mode) and 5 (one sample: Guantánamo-Yumurí, with a very strong mode of 5) also occur. The series from Los Ballenatos has no mode, with equal frequencies (four specimens) for counts of 5, 6, and 7; the Camagüey (white dewlaps) sample is bimodal, with 30 specimens each having counts of 5 and 6.

3) *Scales between supraorbital semicircles.* Of the 13 samples, nine modally have 1 scale between the semicircles and four have modes of 0 (semicircles in contact) scales between the semicircles. The four series with the semicircles in contact are Playa Santa Lucía (yellow dewlap), Los Ballenatos (yellow dewlap), Cayo Sabinal (yellow dewlap), and southern Oriente coast (yellow dewlap). Of the yellow dewlapped samples, only that from the Sierra de Cubitas modally has 1 row of scales between the semicircles. The white to pale yellow dewlapped sample from extreme eastern Oriente (Guantánamo-Yumurí) also modally has 1 row of scales between the semicircles.

When the modal condition is 1 scale between the semicircles, very few or no specimens have the semicircles in contact; thus, no Isla de Pinos *homolechis* (61 specimens) has the semicircles in contact, only two of 105 Pinar del Río lizards have them in contact, and eight of 116 Oriente (white dewlapped) have these elements in contact. The only serious contradiction to this statement is the series of white to pale yellow dewlapped lizards from the eastern Oriente coast, where 43 of 119 specimens have the semicircles in contact (the series modally has 1 scale between the semicircles).

The reverse of the above statement is also true; if the series modally has the semicircles in contact, few specimens have the semicircles separated by 1 row of scales. This is most obvious in the Cabo Cruz-Playa Juraguá (yellow dewlap) sample where of 42 lizards whose dewlap color was definitely noted in life, only 12 have the semicircles not in contact. The weakest contact modes are those from Los Ballenatos and Cayo Sabinal, but the samples in both cases are small (15 and nine specimens). Additionally, when the Ballenatos sample is broken down by islands, all specimens (3) from Ballenato del Medio have the semicircles separated whereas all but two from the small Ballenato have the semicircles in contact.

Occasional specimens have the semicircles separated by 2 scales: 41 lizards of all examined have this condition. Two scales occur in nine samples, with the highest frequency (13.3 percent) in the Habana-Matanzas-Las Villas specimens and the lowest (1.5 percent) in the Sierra de Cubitas sample. Interestingly, 2 scales as a minor variant are not known from the yellow dewlapped populations associated with the Bahía de Nuevitas (Playa Santa Lucía, Cayo Sabinal, Los Ballenatos—a total of 108 lizards).

4) *Scales between supraorbital semicircles and interparietal.* The modal condition of 3/3 scales between the semicircles and the interparietal occurs in eight of the 13 samples. Samples with 2/2 scales as the mode are Playa Santa Lucía (yellow dewlap), Los Ballenatos (yellow dewlap), south Oriente coast between Cabo Cruz and Santiago (yellow dewlap), extreme eastern Oriente (white to pale yellow dewlap), and southern Oriente coast between Playa Juraguá and Caimanera (white dewlap). Noteworthy are the 3/3 mode on Cayo Sabinal (in contrast to 2/2 on Los Ballenatos), the weak 2/2 mode at Playa Santa Lucía (28 specimens with 2/2, 23 with 3/3), the 3/3 mode in the Sierra de Cubitas, and the strong mode of 2/2 in the Cabo Cruz-Playa Juraguá sample (when annotated specimens alone are considered).

Total variation for the entire lot of *A. homolechis* in scales between the semicircles and the interparietal varies from 1/1 (three specimens from three samples) to 6/6 (one specimen from Oriente). Combinations other than 2/2 or 3/3 are minor variants in most large samples, with most lots having six combinations. Least variation is shown in the material from Los Ballenatos and Cayo Sabinal, but in both cases the samples are small; at Los Ballenatos, only two categories (2/2, the mode, and 2/3) were encountered whereas on Cayo Sabinal there are three categories (2/2, 2/3, and 3/3, the mode).

5) *Fourth toe lamellae.* Means of fourth toe lamellae vary from 16.9 (Oriente coast, white to pale yellow dewlap) to 19.4 (Habana-Matanzas-Las Villas). There is no clear-cut trend from west to east but high means (19.1) occur on Los Ballenatos and Cayo Sabinal, whereas adjacent Playa Santa Lucía has a lower mean of 18.2. The modal number of fourth toe lamellae varies from 16 (Oriente coast, yellow dewlap) to 19 (Isla de Pinos, Camagüey white dewlap, Los Ballenatos).

6) *Postmental scales.* Means vary from 3.0 (Camagüey) to 5.2 (Los Ballenatos), with Playa Santa Lucía and Cayo Sabinal having means of 4.9 and 5.0. The three samples from the Bahía de Nuevitas area (Los Ballenatos, Playa Santa Lucía, Cayo Sabinal) stand out strongly as a group with their high mean number of postmentals; the next highest mean is 4.0 in the Sierra de Cubitas. Modal numbers of postmentals vary between 3 (Habana-Matanzas-Las Villas, Camagüey) to 6 (Los Ballenatos and one of two bimodes on Cayo Sabinal).

7) *Loreals.* Mean number of loreals varies from 20.9 (Los Ballenatos) to 27.9 (Playa Santa Lucía). The next lowest mean (27.1) is for Cayo Sabinal lizards, adjacent to Playa Santa Lucía.

8) *Supracarpal keeling.* The modal condition in 11 samples is absence of keeling, and the supracarpal scales are smooth. Occurrence of a fairly prominent keel has already been pointed out for some Guanahacabibes and Pinar del Río lizards; two lizards from Camagüey, five from Oriente, two from Oriente south coast yellow dewlapped, and one from extreme eastern Oriente were recorded as having fairly prominent keels. The general Oriente sample has the highest incidence of weak keels (39 of 119 lizards).

9) *Keeling of female head scales.* Head scales of female *A. homolechis* are multicarinate in contrast to the much smoother and unicarinate scales of males. A major exception to this statement are Isla de Pinos females. In these specimens the head keels are much lower and much more like the male condition. In most cases, confirmation of sex of specimens can be easily had by checking the carination of the head scales; in the Isla de Pinos series this is not true and reliance must be placed on the presence or absence of enlarged postanal scales and the well developed dewlap in males, rather than on the lack of head carination in males and its presence in females.

Nomenclatural Arrangement

From the above discussion it is evident that there are several populations of *A. homolechis* which characteristically have colored (in contrast to white or gray) dewlaps and which additionally are distinguishable from the basic *A. homolechis* stock in certain head scale numbers and arrangements, as well as size. These populations occupy compact and meaningful ranges. There is no doubt that these populations are definable and that their nomenclatural recognition adds to our knowledge of the variation, evolution, and zoogeography of the Cuban anoles.

On the other hand, the situation outlined

by Ruibal and Williams at Playa Santa Lucía still seems to pertain for two of these populations: (1) white and yellow dewlapped specimens occur together or very close to one another in some localities, (2) generally no orthodox intergradation is known between lizards with white or yellow dewlaps, and (3) under more ordinary circumstances one might with justification regard the white and yellow dewlapped populations as comprising two species which are virtually allopatric but which on occasion are sympatric. I cannot of course completely refute this latter possibility: white and yellow dewlapped individuals may well represent two full species—there is no evidence to contradict this suggestion. On the other hand, in habits, habitat, physiology (Ruibal, 1961, compared the temperature reactions of both white and yellow specimens without finding striking differences), gross aspect, size, and all such attributes, the white and yellow dewlapped lizards seem either identical or very close to one another. Another possibility is that there are two species involved, and that dewlap color is geographically variable (white, grey or yellow) in one (*A. homolechis*) and regularly yellow to orange in the other. Either of these two postulates is extremely difficult to affirm or deny on the basis of the material or data presently at hand. It seems far better, given what information is available, to regard both white and yellow dewlaps as part of the variation of *A. homolechis* and to search elsewhere for explanations of the peculiarity of sympatric occurrence of lizards having both sorts of dewlaps in certain areas.

In the following discussion I have deliberately left unassigned lizards from Banes, since fresh and annotated material from there is not available. Specimens from Banes will be discussed below.

Ahl (1924, 1925) named five species of *Anolis* from "Cuba," based on material collected by Gundlach. The names proposed are: *muelleri, abatus, calliurus, mertensi,* and *cubanus*. Through the courtesy of Dr. Günther Peters and the cooperation of Dr. Ernest Williams, I have been able to examine the type material of four of these five species; the Ahl names deserve special consideration in the present context, since Ruibal and Williams (1961:228) assigned *calliurus, muelleri* and *cubanus* to the synonymy of *A. homolechis,* and *abatus* to *A. allogus.* (The holotype of *A. mertensi*—BM 27811—is a specimen of *A. lucius* Duméril and Bibron and need not concern us further.) Data on the holotypes of the three Ahl species are: *cubanus* (BM 27810), male, snout-vent length 55 mm, 6 scales between first canthals, one scale between semicircles, 3/3 scales between semicircles and interparietal, 4 postmentals, loreals 25, 17 fourth toe lamellae, 1/1 prenasals, ventrals smooth, brachials keeled, supracarpals weakly keeled; *calliurus* (BM 9074), male, snout-vent length 53 mm, 6 scales between first canthals, one scale between semicircles, 3/3 scales between semicircles and interparietal, 4 postmentals, 28 loreals, 18 fourth toe lamellae, 1/1 prenasals, ventrals smooth, brachials keeled, supracarpals weakly keeled; *muelleri* (BM 4179), female, snout-vent length 44 mm, 6 scales between first canthals, 1 scale between semicircles, 3/3 scales between semicircles and interparietal, 2 postmentals, 23 loreals, 15 fourth toe lamellae, 1/1 prenasals, ventrals smooth, brachials keeled, supracarpals smooth.

I agree that *cubanus, calliurus,* and *muelleri* are all junior synonyms of *A. homolechis,* and as far as I can ascertain (there are of course no data on these specimens in life so that dewlap colors remain unknown) none of the three names is applicable to any of the yellow dewlapped populations described below. The single scale between the supraorbital semicircles suggests strongly that *cubanus, calliurus,* and *muelleri* are synonyms of *A. h. homolechis* (the subspecies which regularly has 1 scale between the semicircles).

A fourth name, *patricius* Barbour, was based on material from Mina Piloto, municipio of Sagua de Tánamo, Oriente Province. Ruibal and Williams (1961:230) have disposed of this name (the precise type locality cannot now be found on any current map of Cuba[1]) as a synonym of *A.*

[1] In an effort to locate Mina Piloto, I have corresponded with Dr. Gerardo Canet. The following information is pertinent. Marie-Victorin and Léon (1956:13) presented a detailed sketch map of the topographic features of the Sierra de Nipe and adjacent regions in northern Oriente Province. They showed a Río Piloto, draining the eastern slope of the Sierra de Nipe and emptying into the Río Mayarí. The

homolechis, since specimens of the species from the towns of Sagua de Tánamo and Cananova are white dewlapped. I have examined the holotype and paratypes of *A. patricius* and agree with Ruibal and Williams that *patricius* Barbour is a synonym of *A. homolechis;* the paratypes of *patricius* include a single presumed *A. rubribarbus.*

Anolis homolechis homolechis Cope

Xiphosurus homolechis Cope, 1864, Proc. Acad. Nat. Sci. Philadelphia, p. 169 (type locality—unknown; restricted to La Habana, Habana Province, Cuba—Ruibal and Williams, 1961:228).

Anolis calliurus Ahl, 1924, Zool. Anz., 62: 249 (type locality—Cuba).

Anolis muelleri Ahl, 1924, Zool. Anz., 62: 247 (type locality—Cuba).

Anolis cubanus Ahl, 1925, Zool. Archiv. f. Naturgesch., 90:87 (type locality—Cuba).

Anolis patricius Barbour, 1929, Proc. New England Zool. Club, 11:37 (type locality —Mina Piloto, district of Sagua de Tánamo, Oriente Province, Cuba).

Definition: A subspecies of *A. homolechis* characterized by a combination of moderate size (males to 58 mm snout-vent length, females to 46 mm), dewlap white to gray (Pl. 1, upper right) or combining these two colors, supraorbital semicircles usually separated by 1 row of scales, 3/3 scales between the supraorbital semicircles and the interparietal scale, postmentals averaging few (means by populations 3.0-3.3) and modally 4 in number, and loreals moderate in number (means 22.5-26.4).

Distribution: Throughout much of Cuba and the Isla de Pinos, with the exception of the distribution of the following subspecies.

Comments: I have grouped together as *A. h. homolechis* all samples which have white, gray, or white and gray dewlaps. Considering the widespread distribution of this subspecies, there is remarkable agreement in scutellation between specimens from western Pinar del Río Province and lizards from Oriente. The only scale character which does not seem to vary is the number of scales across the snout at the level of the first canthal; consequently it has not been employed in the subspecies definitions. Differences in the carination of the head scales of Isla de Pinos females from Cuban females have been noted above; there is a possibility that the Isla de Pinos *A. homolechis* should be nomenclaturally recognized as distinct from their Cuban relatives, but aside from the peculiarity of the female head scales I can detect no other differences. Specimens of *A. homolechis* with white to gray dewlaps from areas of sympatry or near-sympatry with the yellow dewlapped subspecies will be discussed in detail in the cases where this phenomenon occurs.

Specimens examined: Cuba, Pinar del Río Province, 3 km W Bartoli sawmill village (= La Majagua), 10 km SW Cayuco, 18 (AMNH 83182—9 specimens; AMNH 83184—9 specimens); Valle de San Juan, 4 (AMNH 96528); 8.2 mi. (13.1 km) W Cayuco, 6 (AMNH 96525); 6.9 mi. (11 km) W Cayuco, 3 (AMNH 96524); 2.9 mi. (4.6 km) E Isabel Rubio, 8 (AMNH 79674-81); 7.6 mi. (12.2 km) E Isabel Rubio, 5 (AMNH 79669-73); Cueva de Santo Tomás, 10 km N Cabezas, 1 (AMNH 79661); 0.4 mi. (0.6 km) NE Cabezas, 1 (AMNH 79666); San Vicente, 62 (AMNH 76496, AMNH 79498-502, AMNH 76505, AMNH 79651, AMNH 79658-60, AMNH 79682-722, AMNH 83164, AMNH 83059—4 specimens, AMNH 83060—2 specimens, AMNH 83063—3 specimens); mountains NW San Vicente, 5 (AMNH 76497, AMNH 76506-09); mountains near San Vicente (not mapped), 2 (AMNH 76503-04); mountains N San Vicente, 1

Sierra de Nipe has long been a center for mining activities (iron and nickel; Marrero, 1951: 634); the first iron mine in this region was begun in 1909. At the time of the visit of Marie-Victorin and Léon in 1940, mining was active in this region; nickel mining ceased about 1947 (Marrero, *loc. cit.*). The concordance of the names Mina Piloto and Río Piloto seems too much to be attributed to chance, and it seems very likely that the Mina Piloto was situated on or near the Río Piloto on the eastern flank of the Sierra de Nipe. However, the Sierra de Nipe region is presently in the municipio of Mayarí, not of Sagua de Tánamo; Mina Piloto was said to be in the latter municipio. Dr. Canet advised me (*in litt.,* 19 May 1967) that the municipios of Mayarí and Sagua de Tánamo were separated from one another at about the turn of the century, and that it seemed correct to assume that there has been some error in municipio designation on Ramsden's part at the time the specimens were sent to Thomas Barbour at Harvard University. Although the evidence is not incontrovertible, it seems highly probable that Mina Piloto, municipio of Mayarí, is the proper designation of the type locality of *Anolis patricius.*

(AMNH 79655); 1 mi. (1.6 km) S San Vicente (not mapped), 1 (AMNH 79656); San Vicente, Cueva de los Indios (not mapped), 3 (AMNH 79652-54); San Vicente, cliffs at Cueva del Río (not mapped), 1 (AMNH 79657); 8.4 mi. (13.4 km) W San Vicente, 1 (AMNH 83061); 1 km NW La Coloma, 1 (AMNH 76662); 1 km N La Coloma, 2 (AMNH 96541); south base, Pan de Guajaibón, 3 km W. 13.5 km S Las Pozas, 7 (AMNH 83064); Rancho Mundito, 3 (AMNH 83062); Rangel, 6 (AMNH 83065); Soroa, 2 (AMNH 79667-68); 8.5 mi. (13.6 km) SE Cabañas, 8 (AMNH 79643-50); 10 km NE Cabañas, finca de la viuda Casanova, 2 (AMNH 79723-24); *Habana Prov.*, 2 mi. (3.2 km) E Playa de Guanabo, Cueva de Rincón de Guanabo, 6 (AMNH 79663-65, AMNH 79725-27); 9 km SW San José de las Lajas, 1 (AMNH 79642); *Matanzas Prov.*, Alacranes, 3 (INHS 2625); 5.5 mi. (8.8 km) NE Canasí, 8 (AMNH 83049); Pan de Matanzas, 2.5 mi. (4.1 km) S Corral Nuevo, 5 (AMNH 83051); 6 km NE Matanzas, 1 (AMNH 83050); 8.9 mi. (14.2 km) NE Varadero, 3 (AMNH 96542); *Las Villas Prov.*, Salto de Hanabanilla, 3 (AMNH 79585-87); 8 mi. (12.8 km) S Manicaragua, 1 (AMNH 79589); 5 mi. (8 km) S Topes de Collantes, 1 (AMNH 79894); 4 km W, 8 km N Trinidad, 1 (AMNH 79588); San José del Lago, 2 (AMNH 79590-91); Cayo Bahía de Cádiz, 1 (AMNH 83053); *Camagüey Prov.*, 0.6 mi. (0.9 km) W Majagua, Río Majagua, 7 (AMNH 79619-25); Loma de Cunagua, 12 mi. (19.2 km) E Morón, 27 (AMNH 79592-618); Loma de Cunagua, 14 mi. (22.4 km) E Morón, 5 (AMNH 79626-30); Loma de Cunagua, 2 (MCZ 50162-63); ca. 15 km SW Vertientes, 4 (MCZ 63872-75); 24 km SW Camagüey, Finca El Porvenir, Loma de la Yagua, 2 (AMNH 79631-32); Cuatro Caminos, 1 (UMMZ 70993); Martí, 2 (UMMZ 70995-96); *Oriente Prov.*, Finca Búcares, 22 km S Bueycito, 1 (AS 450); 14.6 mi. (23.4 km) SW Maffo, 4 (AMNH 96544); La Cantera, Miranda, 6 (AMNH 83728—4 specimens, AMNH 83729, AMNH 83731); Cayo del Rey, Miranda, 2 (AMNH 83730); Florida Blanca, near Alto Songo, 1 (INHS 9254); 6.5 km S Palma Soriano, 3 (AMNH 83716); Santiago de Cuba, 1 (MCZ 6923); 6 mi. (9.6 km) E La Maya, 14 (AMNH 83718); 1.9 mi. (3.0 km) SE, 3 mi. (4.8 km) NE Sevilla, 1 (AMNH 96543); Gran Piedra, La Isabelica, 3500 feet (1068 meters), 1.9 mi. (3 km) SE, 10 mi. (16 km) NE Sevilla, 8 (AMNH 83724—7 specimens, AMNH 83727); La Favorita, 3 km E Gran Piedra, 3 (AMNH 96545); Playa Juraguá, 3.7 mi. (5.9 km) E Siboney, 4 (AMNH 83720); 9.1 mi. (14.6 km) E Siboney, 5 (AMNH 83725); Laguna de Baconao, 21.8 mi. (34.9 km) E Siboney, 4 (AMNH 83733); 2 mi. (3.2 km) N Caimanera, 1 (AMNH 83741); Caimanera, 1 (MCZ 59247); Guantánamo, 32 (MCZ 63954-59, MCZ 63961-80, MCZ 63982-85, MCZ 63987-88); 8 mi. (12.8 km) NE Felicidad, 1 (AMNH 83742); west slope, El Yunque de Baracoa, 9 (AMNH 83734); 9 km W, 1 km S Baracoa, 1 (AMNH 83735); Bahía de Taco, 20 (AMNH 83743—14 specimens, AMNH 83744—6 specimens); 3 mi. (4.8 km) S Bahía de Taco, 3 (AMNH 83745); Cayo Grande de Moa, 2 (USNM 80413-14); Puerto Moa, 2 mi. (3.2 km) up Río Moa, 1 (USNM 80408); Mina Piloto, Sagua de Tánamo, 10 (MCZ 28759, MCZ 28768-75, UMMZ 71409—one of two specimens with this number; holotype and paratypes of "*A. patricius*"); Preston, 1 (UMMZ 98015); *Isla de Pinos* (*Habana Prov.*), Sierra de Casas, just W Nueva Gerona, 23 (AMNH 79561-83); east base, Sierra de Casas, just W Nueva Gerona, 8 (AMNH 83055); Bibijagua, 1 (AMNH 83057); 2 km N Santa Fé, 11

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Pl. 1. Color portraits from life of males of five species of the *homolechis* complex of *Anolis* in Cuba. Upper left, *A. quadriocellifer*, AMNH 96522, 6.9 mi. W Cayuco, Pinar del Río Province; upper right, *Anolis homolechis homolechis*, San Vicente, Pinar del Río Province; second row, left, *Anolis homolechis jubar*, Paso de la Trinchera, Camagüey Province; second row, right, *Anolis homolechis oriens*, Cabo Cruz, Oriente Province; third row, left, *Anolis homolechis* subsp., Baitiquirí, Oriente Province; third row, right, *Anolis mestrei*, AMNH 95977, San Vicente, Pinar del Río Province; fourth row, left, *Anolis allogus*, San Vicente, Pinar del Río Province; fourth row, right, *Anolis allogus*, Los Paredones, Camagüey Province; lower left, *Anolis allogus*, AMNH 96563, La Favorita, 3 km E Gran Piedra, Oriente Province; lower right, *Anolis ahli*, AMNH 96568, 1.4 mi. NE San Blas, Las Villas Province.

Plate 1

(AMNH 79543-53); Paso de Piedras, ca. 20 km SSW Santa Fé, 8 (AMNH 79554-60, AMNH 83054); Puerto Francés, 1 (AMNH 79584); Jacksonville, 5 (AMNH 83056); Punta del Este, 4 (AMNH 83058).

Anolis homolechis **jubar**, new subspecies

Holotype: AMNH 96529, an adult male, from Paso de la Trinchera, Sierra de Cubitas, Camagüey Province, Cuba, one of a series taken 16 July 1960 by Ronald F. Klinikowski and David C. Leber. Original number 9357.

Paratypes (all from Camagüey Province, Cuba): AMNH 96530 (17 specimens), same data as holotype; AMNH 83708, Los Paredones, Sierra de Cubitas, 27 June 1959, R. F. Klinikowski, A. Schwartz, B. L. Smith; AMNH 83178, 5.5 mi. (8.8 km) NE Banao, 15 August 1957, J. R. Feick, W. H. Gehrmann, Jr.; AMNH 83179, 5.5 mi. NE Banao, 14 August 1957, native collector; AMNH 83180 (2 specimens), 5.5 mi. NE Banao, 17 August 1957, native collector; AMNH 83181 (5 specimens), 2 km SE Banao, 18 August 1957, J. R. Feick; AMNH 96531 (5 specimens), 11.9 mi. (19 km) NW Banao, 4 August 1960, D. C. Leber; MCZ 21049, Sierra de Cubitas, no date, C. de la Torre; MCZ 63991, Sierra de Cubitas, nr. Banao, July 1957, R. Molina, R. Ruibal; MCZ 63994-98, Sierra de Cubitas, nr. Banao, 1 August 1957, R. Molina, R. Ruibal; MCZ 64000-01, Sierra de Cubitas, south of Jaronú, 22 August 1958, R. Molina, R. Ruibal; MCZ 64005-10, Sierra de Cubitas, south of Jaronú, no date, R. Molina, R. Ruibal; MCZ 64011-12, Paso de Lesca, Sierra de Cubitas, no date, R. Molina, R. Ruibal; MCZ 64013-16, Los Paredones, 21 August 1959, R. Ruibal; MCZ 64088, Río Jigüey, between Esmeralda and Jaronú, R. Molina, R. Ruibal, 1 August 1957; MCZ 67986-91, Sierra de Cubitas, nr. Banao, no date, R. Ruibal; MCZ 74028-32, near Cueva del Indio, Paso de Lesca, 3 November 1959, R. Molina, R. Ruibal, E. E. Williams.

Definition: A subspecies of *A. homolechis* characterized by a combination of small size (males to 54 mm snout-vent length, females to 40 mm), dewlap yellow to very pale orange with a broad white to very pale yellow margin (Pl. 1, second row, left), supraorbital semicircles usually separated by one row of scales, 3/3 scales between the supraorbital semicircles and the interparietal scale, postmental mean moderate (4.0) and modally 4, and loreal mean moderate (24.6).

Distribution: The Sierra de Cubitas and associated lowlands to the north, as well as marginal forested lowlands to the south, Camagüey Province, Cuba (Fig. 3).

Description of holotype: An adult male with snout-vent length of 51 mm; snout scales between first canthals 5, supraorbital semicircles separated by one scale, 3/4 scales between semicircles and interparietal, 16 fourth toe lamellae, 5 postmentals, 23 loreals.

Comments: Of the yellow dewlapped subspecies, *A. h. jubar* is closest in scutellation to *A. h. homolechis*. It differs from that race in the dewlap color (which varies from yellow with a broad white margin to pale orange with a broad yellow margin), colors which are not known to occur in *A. h. homolechis*. The difference in size between *homolechis* and *jubar* is not particularly striking, but male *jubar* are noticeably smaller and less bulky than male *homolechis*. The postmental mean (4.0) is higher than that of any of the populations with white dewlaps which I assign to the nominate form.

The Sierra de Cubitas is a limestone massif, about 50 km in length, near the northern coast of Camagüey Province. To the south it abuts directly on the serpentine savannas (part of the Camagüey-Tunas-Holguín Peneplane) which extend thence for a distance of about 35 km southward to the city of Camagüey. The Sierra de Cubitas is presently covered with moderately dense hardwood forest. Three major passes cross the range—the Paso de la Trinchera, Los Paredones, and Paso de Lesca. To the north of the Sierra de Cubitas lies a low plain, presumably primitively well forested but now primarily denuded and cultivated except for some excellent and extensive stands of hardwoods (such as at the locality 11.9 mi. NW of Banao). These northern non-montane forests are inhabited by *A. h. jubar*. Some suitable forested situations to the south of the sierra are peripheral to the range itself and separated from it by savanna; specimens from 2 km SE Banao are from such a marginal situation—a local shaded stand of coffee and shade trees along a stream margin. The serpentine sa-

vannas themselves offer little haven for a shade-requiring anole as *A. homolechis*. The serpentine savannas are generally bare or support low herbaceous and shrubby growth; on the low gravelly hills occur open stands of small palms and moderately sized shrubs which supply little shade.

Although one tends to think of some widely distributed anoles (such as *A. sagrei* and *A. homolechis*) as occurring from one end of Cuba to the other (and in a gross sense this is true), it seems probable that there are areas whence these species are absent. *A. sagrei*, for instance, has not been collected on much of the Península de Guanahacabibes nor did I observe or collect this species along the northern coast of Oriente Province between the Río Yumurí and Bahía de Taco. It seems probable that *A. h. jubar* is effectively cut off from *A. h. homolechis* to the south by the open serpentine savannas. Possibly the same situation exists to the west of the Sierra de Cubitas, but I am not familiar with the details of geography in that region. To the east, *A. h. jubar* presumably approaches the mainland yellow dewlapped subspecies about the Bahía de Nuevitas, as Ruibal and Williams (1961:232) suggested.

The subspecific name *jubar* is derived from the Latin for "light of the sun," a reference to the dewlap color of the Sierra de Cubitas subspecies.

Anolis homolechis **cuneus**, new subspecies

Holotype: AMNH 96536, an adult male, from 1 mi. (1.6 km) E Playa Santa Lucía, Camagüey Province, Cuba, one of a series taken 26 July 1960 by David C. Leber and Albert Schwartz. Original number 9503.

Paratypes (all from Camagüey Province, Cuba): AMNH 96535 (11 specimens), same data as holotype; AMNH 96538 (23 specimens), 2 mi. (3.2 km) W Playa Santa Lucía, 27 July 1960, R. F. Klinikowski, J. D. Smallwood, Jr.; AMNH 96533 (9 specimens), 3 mi. (4.8 km) W Playa Santa Lucía, 27 July 1960, R. F. Klinikowski, J. D. Smallwood, Jr.; AMNH 96534 (4 specimens), 0.5 mi. (0.8 km) S Punta Prácticos, 29 July 1960, D. C. Leber, A. Schwartz; AMNH 83709 (2 specimens), Playa Santa Lucía, 29 June 1959, R. F. Klinikowski; AMNH 83710 (6 specimens), Playa Santa Lucía, 30 June 1959, R. F. Klinikowski, B. L. Smith; MCZ 64017-20, Playa Santa Lucía, 21 August 1957, R. Molina, E. E. Williams, R. Ruibal; MCZ 64021-26, Playa Santa Lucía, 24 August 1957, R. Molina, E. E. Williams, R. Ruibal.

Definition: A subspecies of *A. homolechis* characterized by a combination of moderate size (males to 58 mm snout-vent length, females to 41 mm), dewlap yellow with three whitish transverse bars, supraorbital semicircles usually in contact, 2/2 scales (3/3 modal on Cayo Sabinal) between the supraorbital semicircles and the interparietal scale, postmental mean high (4.9) and modally 5 scales, and loreals numerous (means 27.9 on the mainland, 27.1 on Cayo Sabinal).

Distribution: Known only from the vicinity of Playa Santa Lucía on the north coast of Camagüey Province and adjacent Cayo Sabinal, near the Camagüey-Oriente border, Cuba (Fig. 3).

Description of holotype: An adult male with snout-vent length of 56 mm; snout scales between first canthals 5, supraorbital semicircles in contact, 3/3 scales between semicircles and interparietal, 19 fourth toe lamellae, 6 postmentals, 23 loreals.

Comments: A. h. cuneus differs from *A. h. homolechis* in having a basically yellow rather than basically white dewlap. The mean number of postmental scales is 4.9 (mode 5) in *cuneus*, 3.0 to 3.8 in various samples of *homolechis* (mode 4), and *cuneus* has a slightly higher mean number of loreals (27.9) than any population of *homolechis* (22.5-26.4), the highest mean number of loreals in *homolechis* (26.4) being from the Habana-Matanzas-Las Villas sample. *A. h. homolechis* and *A. h. cuneus* are comparable in size of males.

A. h. cuneus differs from *A. h. jubar* to the west in having the dewlap yellow with three white bars rather than a wholly yellow dewlap with an extensive white edge. The major scale difference between the two subspecies is the modal presence of semicircle contact in *cuneus* and its absence in *jubar*. *A. h. cuneus* males reach a larger size than male *A. h. jubar*, and the former subspecies has both a high mean and mode of number of postmental scales and a higher number of loreals.

The Cayo Sabinal series (AMNH 96532—9 specimens; Playa Bonita, west end,

Cayo Sabinal) agrees extremely well with specimens of *A. h. cuneus*. Cayo Sabinal is separated from Punta Prácticos (where *cuneus* occurs) by a narrow channel, 15 fathoms deep, which forms the channel into the pocket harbor of the Bahía de Nuevitas. Although narrow, this channel effectively isolates two subspecies of *Leiocephalus stictigaster* (Schwartz, 1964) but apparently the mainland and cay populations of *A. homolechis* do not differ greatly from one another. The only striking difference is the modality of 2/2 scales between the semicircles and the interparietal on the mainland (28 lizards, but 23 have 3/3 scales); the modality is 3/3 (six of eight lizards) on Cayo Sabinal. If *A. h. cuneus* has but recently invaded Cayo Sabinal, the preponderance of 3/3 scales on the latter island may well be due to the condition of these scales in the founders of the insular population. Since Cayo Sabinal is the easternmost of an 190 km line of large cays off the northern coast of Camagüey Province, it would be most interesting to learn what subspecies (*homolechis, jubar,* or *cuneus*) occur on the other cays. Considering that the largest of these cays (Cayo Romano) is more or less attached to the mainland by a narrow isthmus in the region which on the mainland probably supports *A. h. jubar,* one would expect that that subspecies occurs at least on Cayo Romano.

South of Playa Santa Lucía *A. h. cuneus* and *A. h. homolechis* occur together without intergradation, at least in dewlap pigmentation (see previous discussion for details). It is instructive to construct a north-south series in this region, and compare the scutellation of *A. h. cuneus, A. homolechis* from the vicinity of overlap between *A. h. cuneus* and white to gray dewlapped specimens, and *A. h. homolechis* from the balance of Camagüey Province. There are 48 specimens of *A. homolechis* with white dewlaps from the Playa Santa Lucía region (localities between 13 and 21 km south of Playa Santa Lucía; see following list of specimens examined), and 47 specimens from elsewhere in Camagüey Province (see list of localities for *A. h. homolechis*).

Two scale characters of the white dewlapped *A. homolechis* from the region of overlap between these lizards and *A. h. cuneus* are extremely interesting. The number of scales between the semicircles and the interparietal is modally 2/2 in *cuneus* and strongly 3/3 in Camagüeyan *A. h. homolechis* (as is typical for that subspecies). The white dewlapped specimens from the area of overlap resemble *A. h. cuneus* in having 2/2 scales in this position; the mode is very strong (27 lizards have 2/2, only nine have 3/3). In number of postmentals, *A. h. cuneus* varies between 2 and 7, with a mean of 4.9 and a mode of 5; Camagüeyan *A. h. homolechis* have between 2 and 5 postmental scales, with a mean of 3.0 and a mode of 3. The white dewlapped *A. homolechis* from the region of overlap have from 2 to 5 postmentals, with a mean of 3.4 and a mode of 4. The mean of 3.4 postmentals in the overlapping white dewlapped specimens is the highest for any white dewlapped *A. homolechis* with the exception of specimens from the southern Oriente coast (mean 3.6).

As far as semicircle contact is concerned, no white dewlapped specimens from the region of overlap with *cuneus* have these scales in contact; the six Camagüeyan lizards with semicircle contact are from areas removed from the region of overlap (Loma de Cunagua; near Majagua; southwest of Camagüey city). Other scale counts taken show no significant differences between the three samples involved.

In summary, in the Playa Santa Lucía region there are two populations of *A. homolechis*: *A. h. cuneus* with a yellow dewlap with three whitish transverse bars, semicircles in contact, 2/2 scales between the semicircles and the interparietal, and a high mean and mode of postmental scales; and *A. homolechis* with a white dewlap, semicircles separated by one scale, 2/2 scales between the semicircles and the interparietal, and a moderate mean and mode of postmental scales. Of these characters, dewlap color and semicircle contact do not appear to be intermediate between *A. h. cuneus* and *A. h. homolechis* in the balance of Camagüey Province, whereas scales between the semicircles and the interparietal and number of postmentals are variously intermediate between (show characteristics of both) *A. h. cuneus* and *A. h. homolechis* from the rest of Camagüey.

Such a situation suggests that *A. h. cuneus* and *A. h. homolechis* are actually intergradi-

ent in the region of overlap (between 13 km and 17 km S Playa Santa Lucía) despite the apparent dichotomy of dewlap color and semicircle contact. Perhaps there is even intergradation in these two latter characters. Material collected in the area of overlap was assigned to "yellow dewlap" or "white dewlap"; it seems conceivable that within the "yellow dewlap" category were grouped various shades of yellow, some of which may well have been intermediate between the yellow to very pale orange of typical *A. h. cuneus* and the white to gray of *A. h. homolechis.* Consequently, once this basic separation was made, some intergradient specimens may have been grouped with the "yellow dewlapped" population (*cuneus*) since original segregation placed emphasis upon a character which varied almost imperceptibly. A second source of possible error involves the categorizations "semicircles in contact" and "semicircles separated by 1 row of scales." Although these two categories are perfectly valid and easily determinable, it should be noted that "semicircles in contact" embraces a variable *amount* of contact—from specimens which may have the semicircles barely in contact to those wherein there may be broad contact between the semicircle scales. I have not been able to quantify this feature satisfactorily, but such variability does exist. Consequently, it is possible that some yellow dewlapped specimens from the area of overlap have the semicircles less broadly in contact than material from the immediate environs of Playa Santa Lucía and are thus intermediate in this character between *A. h. cuneus* and *A. h. homolechis.* This much can be stated: of 74 yellow dewlapped specimens from the Playa Santa Lucía region, 36 lizards with semicircle contact are from the beach area itself and 12 are from areas 4.8 to 17 km south of the beach. Of this same lot of 74 lizards, 22 specimens with the semicircles separated by one row of scales are from the beach proper, and four are from the localities south of the beach. These data do not indicate intergradation in this character; of the total beach sample (58 lizards), 36 specimens (66 percent) have the semicircles in contact, whereas of 16 specimens from the area of overlap, 12 (75 percent) have the semicircles in contact. Such higher incidence in the area of overlap may mean that the semicircle contact is firmly linked with *any* shade of yellow dewlap; it should be recalled that *no* white dewlapped lizard from the area of overlap has the semicircles in contact. The situation, at least on the basis of characters I have used, remains anomalous; I have no doubt whatsoever that two forms are involved here, and the evidence indicates that these forms are to be regarded as subspecies. More adequate yellow dewlapped material from the area of intergradation may well clarify the status of the lizards in that zone.

The boundary between *cuneus* and *jubar* to the west remains to be determined. Ruibal and Williams (1961:232) suggested that the two forms might be separated by the savanna extending north to the coast near the Río Máximo. I do not know this region in detail, but the presence of an extensive savanna might well be an effective barrier between *cuneus* and *jubar* just as the plains south of the Sierra de Cubitas isolate *jubar* from *homolechis.*

The subspecific name *cuneus* is Latin for "wedge," an allusion to the interposed position of *A. h. cuneus* between *A. h. jubar* to the west and *A. h. homolechis* to the east.

Specimens examined (other than paratypes of *A. h. cuneus*): *A. h. cuneus* × *A. h. homolechis* (yellow dewlaps): *Camagüey Province,* 3 mi. (4.8 km) S Playa Santa Lucía, 1 (AMNH 83713); 5 km S Playa Santa Lucía, 1 (MCZ 64027); 7 km S Playa Santa Lucía, 4 (MCZ 64028-31); 6 mi. (9.6 km) S Playa Santa Lucía, 2 (AMNH 96537); 10 km S Playa Santa Lucía, 2 (MCZ 64032-33); 11 km S Playa Santa Lucía, 2 (MCZ 64034-35); 12 km S Playa Santa Lucía, 3 (MCZ 64036-38); 15.2 km S Playa Santa Lucía, 1 (MCZ 64039); 17 km S Playa Santa Lucía, 2 (MCZ 64040-41). *A. h. homolechis* × *A. h. cuneus* (white dewlaps): *Camagüey Province,* 13 km S Playa Santa Lucía, 2 (MCZ 64042-43); 9 mi. (14.4 km) S Playa Santa Lucía, 1 (AMNH 83711); 15 km S Playa Santa Lucía, 14 (MCZ 64044-57, MCZ 64067); 15.2 km S Playa Santa Lucía, 2 (MCZ 64068-69); 14-20 km S Playa Santa Lucía, 9 (MCZ 64070-78); 17 km S Playa Santa Lucía, 9 (MCZ 64058-66); 20 km S Playa Santa Lucía, 4 (MCZ 64079-82); 13.4 mi. (20.6 km) S Playa

Santa Lucía, 1 (AMNH 83712); 21 km S Playa Santa Lucía, 5 (MCZ 64083-87).

Anolis homolechis **balaenarum**, new subspecies

Holotype: AMNH 95975, an adult male, from smallest cay of Los Ballenatos in the Bahía de Nuevitas, Camagüey Province, Cuba, one of a series taken 26 August 1957 by Albert Schwartz and Richard Thomas. Original number 4271.

Paratypes: AMNH 83176 (9 specimens), AMNH 83177, same data as holotype; AMNH 83175 (4 specimens), Ballenato del Medio, Bahía de Nuevitas, Camagüey Province, Cuba, 26 August 1957, R. Thomas.

Definition: A subspecies of *A. homolechis* characterized by a combination of large size (males to 62 mm snout-vent length, females unknown), dewlap yellow to orange without an extensive white border or white transverse bars, supraorbital semicircles usually in contact, 2/2 scales between the supraorbital semicircles and the interparietal scale, postmental mean high (5.2) and modally 6 scales, and loreals few in number (mean 20.9).

Distribution: Known only from two of the three cays known as Los Ballenatos in the Bahía de Nuevitas, Camagüey Province, Cuba (Fig. 3).

Description of holotype: An adult male with snout-vent length of 61 mm; snout scales between first canthals 5, supraorbital semicircles in contact, 2/2 scales between semicircles and interparietal, 19 fourth toe lamellae, 5 postmentals, 16 loreals.

Comments: The three islets known as Los Ballenatos lie in the Bahía de Nuevitas, closest to (2.3 km) Punta Pastelillo. The islands are aligned in a northeast to southwest direction, with the largest (Ballenato Grande) in the northeast, intermediately sized Ballenato del Medio in the center of the line, and a smaller (apparently unnamed) island in the southwest. The two larger islands have elevations of somewhat less than 200 feet (61 meters), whereas the smallest is generally much lower. Richard Thomas and I visited only Ballenato del Medio and the smaller island. The two visited islands were well wooded but *A. homolechis* was not especially abundant. When the first yellow dewlapped male was collected, an effort was made to secure as many specimens (males) as possible; the resulting series of 15 lizards attests to the scarcity of the form at the time of our visit. Whether *A. h. balaenarum* occurs also on Ballenato Grande remains to be determined.

A. h. balaenarum is the largest subspecies of *A. homolechis*. The bulk and length of the males, and especially their very high tail fins, are strikingly in contrast to the condition in the other subspecies. The dewlap color, varying from bright yellow to orange, without an extensive white border or transverse white bars, likewise differentiates *balaenarum* from the other races. *A. h. balaenarum* resembles *A. h. cuneus* in high mean number of postmentals (5.2 and 4.9), but the former has a higher mode (6) than the latter (5). Of the described subspecies, *balaenarum* has the lowest mean (20.9) of loreal scales (*homolechis* 22.5-26.4; *jubar* 24.6; *cuneus* 27.9). Only *A. h. cuneus* has the semicircles modally in contact as does *A. h. balaenarum*. The two Ballenatos subsamples (11 topotypes; four from Ballenato del Medio) apparently differ in the presence or absence of semicircle contact; this feature is determinable on only three of the Ballenato del Medio lizards (all of which have the semicircles separated by a single row of scales), whereas of the topotypes, only two of 11 lizards have the semicircles separated. The number of scales between the semicircles and the interparietal is determinable on only two of the Ballenato del Medio specimens, one of which has a typical 2/2 count and the other 2/3. Since one of the topotypes also has a count of 2/3, this variant occurs in both populations. Note that no *A. h. balaenarum* has a count of 3/3, the mode in *A. h. jubar* and of fairly high incidence in *A. h. cuneus*, the two adjacent subspecies.

Presumably *A. h. balaenarum* (the name is derived from the Latin *balaena* for "whale") is a derivative of *A. h. cuneus*. The two resemble each other in basic dewlap color (but not in details of dewlap pattern), in high mean number of postmentals, and in having the semicircles usually in contact. They differ in the larger size and higher tail fin of *balaenarum* and in *cuneus* having a higher mean number of loreals. Judging from the small sample available from Ballenato del Medio some differentiation has taken place within these islets but, on the basis of avail-

able material, this differentiation has not progressed to a level which should be recognized nomenclaturally.

Anolis homolechis **oriens**, new subspecies

Holotype: AMNH 95976, an adult male, from Cabo Cruz, Oriente Province, Cuba, one of a series taken 5 July 1959 by Ronald F. Klinikowski and Albert Schwartz. Original number 7366.

Paratypes (all from Oriente Province, Cuba): AMNH 83715 (4 specimens), same data as holotype; AMNH 83714 (4 specimens), 5 km SW Belie, 5 July 1959, R. F. Klinikowski, B. L. Smith; AMNH 83723 (3 specimens), 20.4 mi. (32.8 km) W Santiago de Cuba, 17 July 1959, R. F. Klinikowski; AMNH 83722, 18.6 mi. (26.4 km) E Santiago de Cuba, 17 July 1959, B. L. Smith; AMNH 83726, 5 km W Aserradero, 24 July 1959, R. F. Klinikowski; AMNH 83717 (3 specimens), Aguadores, 11 July 1959, R. F. Klinikowski, A. Schwartz; AMNH 83719 (3 specimens), Aguadores, 15 July 1959, R. F. Klinikowski, B. L. Smith; AMNH 83732, Aguadores, 1 August 1959, R. F. Klinikowski; AMNH 83721 (2 specimens), Playa Juraguá (Arroyo de la Costa), 3.7 mi. (5.9 km) E Siboney, 16 July 1959, R. F. Klinikowski; AMNH 96539 (2 specimens), Playa Juraguá (Arroyo de la Costa), 22 August 1960, R. F. Klinikowski; AMNH 96540 (3 specimens), Playa Juraguá (Arroyo de la Costa), 24 August 1960, D. C. Leber; USNM 138112-13, Cabo Cruz, 6 September 1956, J. D. Hardy; USNM 81675-77, Río Puercos, 29 August 1930, P. Bartsch, USNM 81685, Punta Hicacos, 30 August 1930, P. Bartsch; USNM 81686, Cabo Cruz, 31 August 1930, P. Bartsch; USNM 138084, Ocujal, 28 August 1956, J. D. Hardy; USNM 138100-109, USNM 138111, Ocujal, 28-31 August 1956, J. D. Hardy; MCZ 42476-79, UMMZ 80771 (4 specimens), coast south of Pico Turquino, June 1936, P. J. Darlington; ASFS V12068-71, IB 1240-42, MFP—3 specimens, between Verreón and Cabo Cruz (not mapped), 14 March 1967, O. H. Garrido, M. L. Jaume.

Definition: A subspecies of *A. homolechis* characterized by a combination of moderate size (males to 56 mm snout-vent length, females to 42 mm), dewlap varying from yellow-orange to deep orange without an extensive white margin or white transverse bars (Pl. 1, second row, right), supraorbital semicircles usually in contact, 2/2 scales between the supraorbital semicircles and the interparietal scale, postmental mean (3.5) and modally 4 scales, and loreals few in number (mean 22.7).

Distribution: The southern coast of Oriente Province, from the vicinity of Belie and Cabo Cruz east to the Bahía de Santiago (but unknown by specimens from the city of Santiago de Cuba itself) and to the east of the Bahía as far as Arroyo de la Costa (west of Playa Juraguá) (Fig. 3).

Description of holotype: An adult male with snout-vent length of 53 mm; snout scales between first canthals 7, supraorbital semicircles in contact, 2/2 scales between semicircles and interparietal, 16 fourth toe lamellae, 5 postmentals, 21 loreals.

Comments: A. h. oriens occupies the southern Oriente coast, primarily in the rain shadow of the high Sierra Maestra, from Cabo Cruz east to the vicinity of the Bahía de Santiago. The subspecies is known also from two localities further east on the coast to the south of the Sierra de la Gran Piedra. These coastal areas are arid; wooded areas are common and forests are open and dry in aspect.

A. h. oriens differs from *A. h. homolechis* in having a yellow-orange to orange dewlap rather than a white or gray dewlap. Likewise, the southern Oriente subspecies differs from the northern Camagüey forms *jubar* and *cuneus* in details of dewlap pattern. Most close to *oriens* in dewlap color is *balaenarum,* which, like *oriens,* has a dewlap variably colored (yellow to orange), but the dewlap colors of *oriens* are brighter (tending more toward shades of orange) than those of *balaenarum.* Of these two subspecies, *balaenarum* is larger (snout-vent length of males to 62 mm) than *oriens* (to 56 mm), and *balaenarum* has a much higher mean (5.2) and mode (6) of postmentals than does *oriens* (mean 3.5, mode 4).

Aside from differences in dewlap color and pattern between *oriens* and *jubar* and *cuneus, oriens* differs from these two subspecies in having a lower loreal mean (22.7 versus 24.6 and 27.9), lower mean number of postmentals (3.5 versus 4.0 and 4.9), and from *jubar* in having the supraorbital semicircles in contact, and 2/2 (rather than

3/3) scales between the semicircles and the interparietal.

Since *A. h. oriens* occurs very close (within 1.5 kilometers) to Playa Juraguá, it is pertinent to compare *oriens* specifically with specimens of *A. h. homolechis* from Playa Juraguá east to the Bahía de Guantánamo. In this region, male *homolechis* are slightly larger (snout-vent lengths to 57 mm) than *oriens,* modally have the semicircles separated by one scale, modally have 2/2 scales between the semicircles and the interparietal (although there is a greater incidence of 3/3 scales in the south Oriente *homolechis* sample—25 percent—than in the *oriens* sample—14 percent), the postmental mean is 3.6 and the loreal mean is 26.4. The contact of the semicircles in *oriens* is the opposite of the condition in *homolechis* (separated by one scale) in this region, and the loreals are more numerous in local *homolechis* than in *oriens.* Although the scales between the semicircles and the interparietal are modally 2/2 in these *homolechis* (six individuals), the more usual count of 3/3 occurs in five individuals, a much higher incidence of 3/3 than in *oriens,* where 27 specimens have 2/2 and only seven have 3/3. The postmental mean of 3.6 in the southern *A. h. homolechis* is the highest mean of any sample of that subspecies; it is slightly higher than that of *oriens* (3.5).

These data, which include specimens from the locality of close approximation between *homolechis* and *oriens,* may indicate a degree of intergradation between the two forms along this coast, at least in scale counts. The situation is further complicated by the lizards from between the Bahía de Guantánamo to the Río Yumurí which are discussed below. However, despite certain trends in the *homolechis* populations in this region, there is still a distinct dichotomy in some counts which indicates that *oriens* and *homolechis* maintain their distinctness both at the locality of their approximation and along the coast between Playa Juraguá and the Bahía de Guantánamo.

Although I have included AMNH 83715 (5 km SW Belie) as paratypes of *A. h. oriens,* there is a possibility that this series of three males and one female actually represents a western terminal to an intergradient population between *homolechis* and *oriens.* The dewlaps were recorded in life as being pale yellow (Pl. 10 F 1), a lighter shade than that recorded for *oriens* elsewhere in its range. For instance, at the type locality (just 13 km from the Belie series) the dewlaps were recorded as orange (Pl. 9 D 12 for the holotype of *oriens*). Specimens from between Verreón and Cabo Cruz, taken in March 1967 and received by me in April, still had the dewlaps distinctly orange; Srs. Garrido and Jaume, who collected these lizards, were impressed by the orange dewlap color in life. I have not collected *A. homolechis* along this western coast of Oriente north of Belie, nor did Ruibal and Williams have color noted specimens from between Belie and Birama, some 130 kilometers airline to the northeast. The Birama material had white dewlaps and is *A. h. homolechis.* Considering the linear coastal range of *A. h. oriens,* the Belie area seems appropriate as a point of more orthodox intergradation (in contrast to the situation at the eastern extreme of the *oriens* range at Arroyo de la Costa—Playa Juraguá) of *oriens* with *homolechis.*

Ruibal and Williams (1961:245) noted the occurrence of yellow dewlapped specimens (within the range presently ascribed to *A. h. oriens*) from the coast south of Pico Turquino, and white dewlapped *A. h. homolechis* from the mountains to the north of the range of *A. h. oriens* at Pico Turquino, "near Santiago," Los Negros, and the Sierra del Cobre. A few additional *A. h. homolechis* localities from this same region and from the area to the north of the Sierra de la Gran Piedra are included in my list of specimens examined of *A. h. homolechis.* Accurately documented material from the lower southern slopes of the Sierra Maestra is lacking. I suspect that some of the specimens labeled as "Ocujal" were native-collected and are from lower elevations on this southern Sierra Maestran slope; dewlap color data were not taken by the collector. Reason for this suspicion is that, of 12 specimens from "Ocujal," eight have the semicircles separated by 1 scale, a much higher incidence of this character than in all other specimens of *A. h. oriens* combined. I have included these Ocujal lizards as paratypes, although I cannot be certain that all of them had yellow dewlaps in life or that all of them are from the coastal lowlands in this region. Were these specimens not included

in the calculations of *A. h. oriens*, differences between that subspecies and *A. h. homolechis* would be even more striking than the present data show. The precise altitudinal relationships of *A. h. oriens* and *A. h. homolechis* along these southern slopes will be most interesting to determine.

The name *oriens* is from the Latin for "the rising sun," an allusion to the bright dewlap color of this subspecies.

A. homolechis at Banes

As pointed out in the introduction, the population of *A. homolechis* at Banes on the north-central Oriente coast consists of lizards which have both yellow and white dewlaps (Fig. 3). There are eight specimens (MCZ 55975-81, USNM 137649) from Banes, all collected by Chapman Grant. One of these (MCZ 55977) was recorded as having a yellow dewlap and the balance were noted as having the dewlaps white. The largest males have snout-vent lengths of 52 mm (one of these is the yellow dewlapped specimen). Snout scales vary from 5 to 9 (mode strongly 5; mean 6.0). Three specimens have 0 scales between the semicircles and five have the semicircles separated by one scale; the yellow dewlapped specimen has the semicircles in contact. Scales between the semicircles and the interparietal vary between 2/2 (two specimens), 2/3 (3) and 3/3 (3, one of which is the yellow dewlapped male). Fourth toe lamellae vary between 15 and 21. Postmentals range from 2 to 6 (mean 3.1, mode 2) and loreals vary between 17 and 34 (mean 23.8).

Were it not for the fact that one of these lizards was recorded as having a yellow dewlap, I would have no hesitation in regarding the lot as *A. h. homolechis*. In scale counts, the series agrees very well with Oriente *A. h. homolechis* except that there is an unusually high incidence of semicircle contact (four of eight lizards at Banes, eight of 116 in all white dewlapped Oriente specimens with the exception of those from the southern coast between Playa Juraguá and the Bahía de Santiago). There is no material available from localities close to Banes either to the east or west, and thus there is no further evidence that *A. homolechis* from this immediate region have yellow dewlaps. The status of the Banes populations is insoluble at present; there is a possibility that these lizards represent extreme intergrades between *A. h. cuneus* and *A. h. homolechis*. Material from the entire northern coast between Banes and Playa Santa Lucía is lacking, and it is possible that *A. h. cuneus* extends as far east as the Banes region. Further collecting in this northern Oriente region should clarify the situation.

A. homolechis between the Bahía de Guantánamo and the Río Yumurí

There remain for discussion the *A. homolechis* populations between the east side of the Bahía de Guantánamo on the south Oriente coast and the Río Yumurí on the north coast of the same province (Fig. 3). Adequate assessment of these lizards is hampered by lack of extensive material with color data from living individuals, but the rather limited material which Richard Thomas and I have collected is of interest for several reasons, and discussion of it has bearing on the balance of the *A. homolechis* problem. Ruibal and Williams (1961: 245) listed, in addition to my material which they examined, yellow dewlapped specimens from Cabo Maisí and the lower Río Ovando within the area of present discussion, but material from Guantánamo, Imías, and north of Imías was recorded as having white dewlaps (and thus presumably assignable to *A. h. homolechis*).

The eastern tip of Cuba is a region of extreme ecological contrasts. The southern coast is arid, in the rain shadow of the interior montane massifs from the Bahía de Guantánamo east to Cabo Maisí. On the other hand, the northern coast is heavily forested and extremely mesic; at the mouth of the Río Yumurí there are luxuriant hardwood forests descending to the coast. These two coasts, both apparently inhabited by yellow dewlapped *A. homolechis*, present two very distinct ecologies.

Specimens which Richard Thomas and I have collected (and on which there are some color data in life) are limited; the material includes nine specimens from the United States Naval Base, six from 14.5 miles west of Baitiquirí, one from 4 miles west of Baitiquirí, and two from the mouth of the Río Yumurí. On the other hand there are large but undocumented series available from the United States Naval Base and scattered specimens from elsewhere in this

section, so that I have studied a total of 121 *A. homolechis* from this region.

At least my recently collected material can be divided into specimens having white, and others having pale yellow, dewlaps. The active word in the latter dewlap color is *pale.* In no case have I seen *A. homolechis* from this area with dewlaps approaching bright yellow, yellow-orange, or orange (see Pl. 1, third row, left; the dewlap of this particular lizard is almost pale tan rather than pale yellow). Despite this dichotomy, full data for individual lizards are lacking in several instances; however, AMNH 83739 is white dewlapped and AMNH 83738 is yellow dewlapped, and both are from the same precise locality. Thomas' recent series from the Naval Base includes individuals which were either white or yellow dewlapped, but these colors were not associated in the field notes with particular individuals.

Inspection of Table 1 (wherein all material from this area, regardless of dewlap color, has been grouped) and comparison of the data for this sample with those of other *A. homolechis* samples, as well as with *A. h. oriens* to the west of the Bahía de Guantánamo, are instructive. Like *oriens* (and also like southern coastal *A. h. homolechis*) this eastern lot modally has 2/2 scales between the semicircles and the interparietal. The semicircles are modally separated by 1 scale, but the mode is rather weak (73 of 119 specimens have 1 scale, 43 have 0 scales). This condition is different from both south coastal *homolechis* and *oriens,* each of which has a strong mode (1 scale in the former, in contact in the latter). In number of postmentals, the mean of 3.6 is moderate and comparable to that in most samples of *homolechis* (3.0 to 3.8) and equal to that of *oriens* (3.6). The mean number of loreals (22.2) is close to that of *oriens* (22.7) but lower than that of south coastal white dewlapped *homolechis* (26.0). The most striking difference between these extreme eastern lizards and other *A. homolechis* is the high mode of 5 scales between the first canthal scales (83 of 121 specimens) and a consequent very low snout scale mean (5.3), lower than that of any other sample of *A. homolechis* (most closely approached by the Isla de Pinos with a mean of 5.9).

Separating the material from this region by dewlap color (specimen by specimen) is not practical, since such data are not available for many individual lizards. At those localities whence both colors have been associated with precise specimens, there seem to be no differences in such crucial scale associations as scales between the semicircles or scales between the semicircles and the interparietal, although a positive correlation between these counts and dewlap color may well exist. At least the only two males available from the north coast at the mouth of the Río Yumurí had pale yellow dewlaps; specimens from the vicinity of Baracoa, 20 kilometers to the west, are regularly white dewlapped and show no tendencies, either in scutellation or dewlap color, to the Yumurí and southern coastal lizards.

The lizards from this region are open to three interpretations: 1) as at Playa Santa Lucía and Playa Juraguá, there are two forms which in some places occur sympatrically, one of which is *A. h. homolechis* and the other an undescribed subspecies with a pale yellow dewlap, modally 5 scales between the first canthals, semicircles in contact, and 2/2 scales between the semicircles and interparietal; 2) the lizards comprise one rather variable population of *A. h. homolechis* wherein the dewlap varies from white to pale yellow; or 3) these lizards, at least along the southern coast, are somehow "intergradient" between *A. h. homolechis* and *A. h. oriens,* despite the fact that, as far as known, the populations from east of the Bahía de Guantánamo are completely separated by an intervening population of white dewlapped *A. h. homolechis* from *A. h. oriens.*

Dewlap color data taken by Richard Thomas on the series from the Naval Base suggest, by the fact that the dewlap may be white with yellow suffusions or blotches, that at least in the area immediately to the east of the Bahía de Guantánamo *A. homolechis* is intermediate in dewlap color. Irregularly pigmented or blotched dewlaps in some anoles (as for instance, intergrades between *A. s. sagrei* and *A. s. bremeri*) occur in areas which are intermediate geographically between the ranges of subspecies whose dewlaps are solidly pigmented. In contrast to the apparent intermediacy of the dewlap coloration at the Naval Base are the two series (one white dewlapped, the other with the dewlap pale yellow) from west of

TABLE 1. Measurements and meristic data for 13 populations of *Anolis homolechis*, as discussed in detail in text. Snout-vent length in millimeters. Ranges of counts are given for snout scales at level of first canthal, fourth toe lamellae, postmentals, and loreals; in these categories, M = mean, M_o = mode. In counts of scales between supraorbital semicircles and scales between semicircles and interparietal, incidence for each category is given in parentheses and modal condition is in italics. Suprascript numbers for scales between semicircles and interparietal and postmentals for Camagüey (white dewlap specimens) indicate: (1) data for Camagüey *A. h. homolechis* outside the region of overlap between white and yellow dewlapped specimens at Playa Santa Lucía, and (2) data only for white dewlapped *A. homolechis* from the region of overlap with yellow dewlapped anoles at Playa Santa Lucía. All other data shown for Camagüey (white dewlap) specimens includes specimens both from within and outside of the area of overlap with yellow dewlapped specimens.

Locality	N	Largest ♂ ♀	Snout Scales	Scales bet. semicircles	Scales bet. semicircles and interparietal		Fourth toe lamellae	Postmentals	Loreals	Supracarpal keeling
Península de Guanahacabibes	31	♂–58 ♀–41	5–9 M = 7.1 M_o = 7	*1* (27) 2 (2)	2/3 (2) *3/3* (*14*) 3/4 (6) 4/4 (4) 4/5 (1) 5/5 (1)		16–21 M = 18.0 M_o = 17	2–5 M = 3.2 M_o = 4	18–28 M = 22.5	+ = 4 + (weak) = 10 — = 18
Pinar del Río	122	♂–57 ♀–46	5–8 M = 6.0 M_o = 6	0 (2) *1* (*103*) 2 (11)	1/2 (1) 2/2 (19) 2/3 (29) *3/3* (*47*) 3/4 (13) 4/4 (4)		16–22 M = 18.7 M_o = 18	2–5 M = 3.1 M_o = 4	15–34 M = 23.3	+ = 2 + (weak) = 21 — = 99
Isla de Pinos	61	♂–57 ♀–43	5–8 M = 5.9 M_o = 6	*1* (53) 2 (5)	2/2 (5) 2/3 (7) *3/3* (*33*) 3/4 (6) 4/4 (8) 4/5 (1)		15–22 M = 18.5 M_o = 19	2–6 M = 3.3 M_o = 3	16–31 M = 24.9	+ = 0 + (weak) = 1 — = 40
Habana-Matanzas-Las Villas	31	♂–58 ♀–43	5–8 M = 6.5 M_o = 6	0 (2) *1* (*24*) 2 (4)	2/2 (6) 2/3 (4) *3/3* (*13*) 3/4 (2) 4/4 (2) 4/5 (1)		16–22 M = 19.4 M_o = 18	2–6 M = 3.3 M_o = *3*	18–34 M = 26.4	+ = 0 + (weak) = 4 — = 27
Camagüey (white dewlap)	95	♂–53 ♀–43	5–9 M = 6.2 M_o = 5, 6	0 (6) *1* (76) 2 (6)	1/1 (1)[1] 2/2 (9) 2/3 (5) *3/3* (*16*) 3/4 (4) 4/4 (3)	2/2 (27)[2] 2/3 (12) 3/3 (9) 4/4 (1)	15–21 M = 18.5 M_o = 19	2–5[1] M = 3.0 M_o = 3 2–5[2] M = 3.4 M_o = 4	16–35 M = 25.4	+ = 2 + (weak) = 7 — = 86
Oriente (white dewlap except	119	♂–57 ♀–46	5–8 M = 6.2	0 (8) *1* (*100*)	1/2 (1) 2/2 (17)		16–21 M = 18.5	1–6 M = 3.2	15–38 M = 26.0	+ = 5 + (weak) = 39

TABLE 1 (Continued)

Locality	N	Largest ♂ ♀	Snout Scales	Scales bet. semicircles	Scales bet. semicircles and interparietal	Fourth toe lamellae	Postmentals	Loreals	Supracarpal keeling
south coast bet. Juraguá and Caimanera)			$M_o = 6$	2 (8)	2/3 (32) 3/3 (*46*) 3/4 (10) 4/4 (7) 4/5 (1) 6/6 (1)	$M_o = 18$	$M_o = 4$		— = 75
Oriente (white dewlap between Juraguá and Caimanera)	16	♂ –57 ♀ – ?	5–8 M = 6.3 $M_o = 6$	0 (4) *1* (*12*)	1/2 (1) *2/2* (*6*) 2/3 (3) 3/3 (5) 3/4 (2)	16–20 M = 17.2 $M_o = 17$	2–6 M = 3.6 $M_o = 4$	17–35 M = 26.4	+ = 0 + (weak) = 2 — = 14
Sierra de Cubitas (*A. h. jubar*)	68	♂ –54 ♀ –40	5–9 M = 6.3 $M_o = 6$	0 (15) *1* (*50*) 2 (1)	2/2 (11) 2/3 (10) *3/3* (*30*) 4/4 (2)	15–21 M = 18.1 $M_o = 17, 18$	2–7 M = 4.0 $M_o = 4$	12–37 M = 24.6	+ = 0 + (weak) = 5 — = 63
Playa Santa Lucía (*A. h. cuneus*)	84	♂ –58 ♀ –41	5–8 M = 6.0 $M_o = 6$	*0* (*48*) 1 (26)	1/2 (5) *2/2* (*28*) 2/3 (15) 3/3 (23) 3/4 (2)	15–21 M = 18.2 $M_o = 18$	2–7 M = 4.9 $M_o = 5$	17–41 M = 27.9	+ = 0 + (weak) = 9 — = 75
Los Ballenatos (*A. h. balaenarum*)	15	♂ –62 ♀ – ?	4–8 M = 6.1 $M_o = 5, 6, 7$	*0* (*9*) 1 (4)	*2/2* (*6*) 2/3 (3)	17–21 M = 19.1 $M_o = 19$	3–7 M = 5.2 $M_o = 6$	16–32 M = 20.9	+ = 0 + (weak) = 15 — = 15
Cayo Sabinal (*A. h. cuneus*)	9	♂ –52 ♀ – ?	5–7 M = 6.2 $M_o = 7$	*0* (*4*) 1 (3)	2/2 (1) 2/3 (1) *3/3* (*6*)	18–21 M = 19.1 $M_o = 18$	3–6 M = 5.0 $M_o = 5, 6$	19–31 M = 27.1	+ = 0 + (weak) = 0 — = 9
Oriente (yellow dewlap, Cabo Cruz to Juraguá; *A. h. oriens*)	65	♂ –56 ♀ –42	5–9 M = 6.2 $M_o = 6$	*0* (*38*) 1 (21) 2 (1)	1/1 (1) 1/2 (2) *2/2* (*32*) 2/3 (6) 3/3 (10) 4/4 (4) 4/5 (1)	15–21 M = 17.8 $M_o = 16$	2–6 M = 3.5 $M_o = 4$	13–37 M = 22.1	+ = 2 + (weak) = 6 — = 59
Oriente (white to pale yellow dewlap; Bahía de Guantánamo to Yumurí)	121	♂ –60 ♀ –43	4–8 M = 5.3 $M_o = 5$	0 (43) *1* (*73*) 2 (3)	1/1 (1) 1/2 (3) *2/2* (*44*) 2/3 (30) 3/3 (27) 3/4 (11) 4/4 (2) 5/5 (1)	14–21 M = 16.9 $M_o = 17$	2–6 M = 3.6 $M_o = 4$	13–34 M = 22.2	+ = 1 + (weak) = 24 — = 96

Baitiquirí (the precise locality, 14.5 mi. W Baitiquirí, is in actuality quite close to the Naval Base near the Río Yateras); at this locality there is a clear dichotomy between white and yellow dewlapped lizards. The differences were so distinctive in the field that my notes state "dewlaps pale yellow; in dry woods with white dewlapped *homolechis.*"

The situation seems unresolvable at the present time. I suspect that the lizards from between the Bahía de Guantánamo along the southern coast and around Cabo Maisí to the Río Yumurí represent an unnamed, white to pale yellow dewlapped subspecies of *A. homolechis,* but further material is needed before definitive action can be taken.

Specimens examined: Cuba, Oriente Province, Bahía de Guantánamo, north side, 1 (USNM 81655); Boquerón, 4 (USNM 81817-20); United States Naval Base (not mapped), 88 (UMMZ 110189, UMMZ 110190—4 specimens, UMMZ 110191—2 specimens, UMMZ 110188—2 specimens, UMMZ 115711—2 specimens, UMMZ 115712—8 specimens, UMMZ 115713—6 specimens, UMMZ 115714, UMMZ 115715—4 specimens, UMMZ 115716, UMMZ 115717—3 specimens, UMMZ 115729—5 specimens, UMMZ 115720-28, UMMZ 110207—30 specimens, MCZ 67383-85, MCZ 85144, MCZ 69423-28); east side, Bahía de Guantánamo, United States Naval Base, 3 (ASFS V6229-31); east of the Bahía de Guantánamo west of Kittery Beach, United States Naval Base, 6 (ASFS V6236, ASFS V6249, ASFS V6267-70); United States Naval Base, Cusco Valley (not mapped), 5 (USNM 81660-64); 14.5 mi. (23.2 km) W Baitiquirí, 6 (AMNH 83739—2 specimens, yellow dewlaps, AMNH 83738—4 specimens, white dewlaps); 4 mi. (6.4 km) W Baitiquirí, 1 (AMNH 83740); Imías, 2 (UMMZ 80770); lower Río Ovando, 2 (MCZ 42565-66); Cabo Maisí, 1 (MCZ 42549); mouth of Río Yumurí, east side, 2 (AMNH 83736-37).

Aside from the equivocal material from east of the Bahía de Guantánamo to the Río Yumurí just discussed, evidence for intergradation between white and yellow dewlapped populations of *A. homolechis* is limited. There is no evidence of intergradation between *homolechis* and *jubar* in the Sierra de Cubitas, possibly because there is at least presently no material from localities which might be presumed to harbor intergradient populations, and possibly because the savannas surrounding this isolated massif are virtually devoid of suitable habitat for the species itself. Thus *jubar* seems to be isolated from the balance of the species. Details of presumed intergradation between *homolechis* and *cuneus* have been given in the discussion of the latter form, and, although I am convinced that these two taxa behave in the area of overlap as two good subspecies, the evidence itself is inferential. Intergradation between *homolechis* and *oriens* devolves upon the small lot of specimens from the Belie area and from the peculiarities of the (presumably) non-homogeneous series from Ocujal. The easternmost coastal contact between *homolechis* and *oriens* in the Playa Juraguá area demonstrates a sharp dichotomy between white and yellow dewlapped populations, at least insofar as dewlap color itself is concerned and in most scale features as well (exception: scales between semicircles and interparietal). The lizards from the extreme eastern tip of the island, with their white to pale yellow dewlaps, may represent a somehow intermediate or intergradient population also, but I cannot resolve their status without further detailed information on specimens from this region.

Along with non-white dewlap, there are fairly regularly associated two scale characters—semicircles in contact and 2/2 scales between the semicircles and the interparietal. These three characters are associated in the subspecies *cuneus, balaenarum* and *oriens,* but not in *jubar* where the modal condition is 3/3 scales between the semicircles and the interparietal. White dewlap is usually associated with 1 scale between the semicircles and 3/3 scales between the semicircles and the interparietal. A case could thus be made for the presence of two species, one with a white dewlap, 1 scale between the semicircles and 3/3 scales between the semicircles and the interparietal, and the other with a non-white dewlap, semicircles in contact, and 2/2 scales between the semicircles and the interparietal. The major problem in such an arrangement is *jubar* which has the semicircles separated by one scale and 3/3 scales between the semicircles (both

white dewlap characters) but has a yellow dewlap (although the dewlap has relatively extensive white areas). Further comparison of other scale features is unnecessary; such a system of two species would result in combining, for instance, yellow dewlapped forms which have both the highest and lowest numbers of loreals (20.9 in *balaenarum*, 27.9 in *cuneus*) in contrast to white dewlapped specimens having means between 22.5 and 26.4. Finally, the status of the extreme eastern specimens would be unresolvable, since this population (apparently) has a variably colored dewlap, semicircles separated by 1 scale (although the mode is not strong) and 2/2 scales between the semicircles and the interparietal. As noted above, this population is perhaps actually composed of two taxa, and with carefully taken data it can be shown that the presumed excessive variability in both dewlap color and scalation is due to the pooling of data from two kinds of lizards.

Rather than multiply the number of species unnecessarily, I have adhered to a systematic arrangement in *A. homolechis* which does not violate the data presented by the specimens and which is cogent geographically. Further collecting conceivably will show that we are indeed dealing here with two species, but it seems incautious to state definitely that this is the case. The amount of variation and overlap between the various populations, whether white or yellow dewlapped, would make it most difficult to segregate two specific entities at present, at least based upon the characteristics which I have used.

It would be satisfying to propose a history of *A. homolechis* at this point in order to explain the differentiation of the subspecies involved. A tentative history of *jubar* has been presented previously, but none of the other subspecies lends itself to any sort of equally definite treatment. The association of two yellow dewlapped races with the Bahía de Nuevitas area (*balaenarum, cuneus*) and the occurrence of *cuneus* on Cayo Sabinal, suggests that the lizards from this region have been somehow isolated from the balance of *A. h. homolechis*. Possibly *A. h. cuneus* should be regarded as a form which evolved on the Camagüeyan *cayeria* and thence invaded the mainland where it it came into contact with the more inland *A. h. homolechis*. My interpretation, based on the differences between the Sabinal and Playa Santa Lucía *cuneus*, is the reverse of this, however: i.e., that the peculiarities of the Cayo Sabinal *cuneus* are the result of limited invasion from the adjacent mainland.

The southern Oriente coast, from Cabo Cruz to Cabo Maisí, is becoming noteworthy for the distinct forms which it supports. Not only does the coastal fauna include endemic subspecies which differ from those of transmontane Oriente (for example, Schwartz, 1965, *Arrhyton*), but this coast also has several species, limited more or less to the coast itself, which have distinctive subspecies along it (for example, Schwartz and Garrido, 1967, *Leiocephalus macropus;* Thomas and Schwartz, 1966, *Sphaerodactylus torrei;* Schwartz, 1960, *Leiocephalus raviceps*). It is not then surprising to discover that a widely ranging species, both geographically and altitudinally, like *A. homolechis* has likewise differentiated on this southern arid coast. The presence of high and mesic mountains descending abruptly to a xeric coastal strip in this region appears to favor the development of endemic subspecies of widely ranging forms in the latter situation. The longitudinally narrow but latitudinally long xeric coastal area, coupled with other physiographic features such as rivers whose headwaters are in the uplands and which descend torrentially to the coast, and deep embayments such as the Bahía de Santiago and the Bahía de Guantánamo, favor serially arranged subspecies along this coast. *A. homolechis* appears to be no exception; the situation with this species may prove to be even more complex than herein proposed, once the status of the populations at the extreme eastern end of Cuba is known as well as those elsewhere along this coast.

One other fact regarding these southern Oriente *A. homolechis* is pertinent. Despite the fact that the Bahía de Santiago acts as a barrier for several southern coastal reptilian species and subspecies, it does not separate *A. h. oriens* from A. *h. homolechis;* the break between these two populations—and it will be recalled that the break is sharp—is to the east of the Bahía de Santiago near Playa Juraguá. A somewhat comparable situation has been reported (Thomas and Schwartz, 1966:19) for the subspecies *Sphaerodactylus torrei ocujal* and *S. t. torrei;* in this species, a specimen of *S. t. ocujal*

TABLE 2. Measurements and meristic data for two populations of *Anolis quadriocellifer*, *A. mestrei* and *A. imias*. Categories and symbols as in Table 1. The small size of the Ensenada de Corrientes female *quadriocellifer* is an artifact of the presence of only a single small female in the series from that region.

Species and Locality	N	Largest ♂ ♀	Snout Scales	Scales bet. semicircles	Scales bet. semicircles and interparietal	Fourth toe lamellae	Postmentals	Loreals	Supracarpal keeling
quadriocellifer (topotypes + Valle de San Juan-Cayuco)	40	♂–55 ♀–40	5–7 M = 6.0 M_o = 6	*1* (32) 2 (5)	1/2 (1) 2/2 (9) *3/3* (*12*) 3/4 (5)	16–21 M = 18.2 M_o = 18	2–6 M = 4.6 M_o = 4	19–42 M = 27.2	+ = 30 + (weak) = 5 — = 4
quadriocellifer (Ensenada de Corrientes)	25	♂–51 ♀–(25)	5–8 M = 6.3 M_o = 6	*1* (*15*) 2 (7)	2/2 (4) 2/3 (5) *3/3* (9) 4/4 (3)	14–21 M = 17.6 M_o = 18	2–7 M = 4.0 M_o = 4	16–35 M = 24.5	+ = 16 + (weak) = 6 — = 2
mestrei	62	♂–56 ♀–46	5–10 M = 6.8 M_o = 6	0 (27) *1* (*31*) 2 (1)	2/2 (3) 2/3 (8) 3/3 (13) *3/4* (*16*) 4/4 (11) 4/5 (3) 5/5 (1) 6/6 (1) 5/3 (1)	13–20 M = 17.2 M_o = 17	2–7 M = 4.0 M_o = 4	19–36 M = 28.1	— = 62
imias	2	♂–65 ♀–46	6–7	1 (2)	3/3 (1) 4/4 (1)	15	2–4	25–27	— = 2

(the subspecies to the *west* of the Bahía de Santiago) was reported from a locality to the *east* of the mouth of that bay, suggesting that, with changing topography along this stretch of coast, isolated populations of western subspecies have been trapped on the eastern side of the bay. The same may well have been the case with the eastern populations of *A. h. oriens.*

Anolis mestrei Barbour and Ramsden

Anolis mestrei is restricted to the western Cuban province of Pinar del Río and adjacent Habana Province in the Sierra de Anafe (Buide, 1967:33). Although most Pinar del Río locality records for this species involve the Sierra de los Organos and the Sierra del Rosario (Fig. 1), *A. mestrei* occurs in at least one area removed from these massifs. One adult male (AMNH 83109) was collected near Isabel Rubio on a low isolated rocky outcropping in a small patch of woods, otherwise surrounded by flat fields and pastureland. This same outcropping was also occupied by *Anolis bartschi* Cochran, another confirmedly montane Pinar del Río species. Such isolated anoline outliers may well occur where suitable situations occur in Pinar del Río, even remotely peripheral to the main limestone masses of the ranges themselves.

Ruibal (1964:497) stated that the scalation of *A. mestrei* is very similar to that of *A. homolechis,* except that the posterior supraciliaries of *mestrei* are small and granular whereas those of *homolechis* are larger, elongate, and keeled. This difference is a tenuous one at best, and I am unable to confirm it on a great many specimens of *mestrei.* There is, of course, no question whatsoever that the two are very distinct species, since they differ in ear size (round in *mestrei,* higher than wide in *homolechis,* as pointed out by Ruibal), dewlap color and pattern, and habitat; the two species are generally sympatric in Pinar del Río, but less commonly syntopic, since *mestrei* usually occupies the shaded portions of woods and forests and often perches on rocky outcroppings, whereas *homolechis* prefers semi-shaded situations and seldom utilizes rocks as perching stations.

I have examined 62 specimens of *A. mestrei.* The largest male has a snout-vent length of 56 mm, the largest female 46 mm. Scale counts on this series are: snout scales between first canthals 5-10 (mean 6.8, mode 6), scales between supraorbital semicircles modally 1 (31 specimens) but 27 lizards have the semicircles in contact and one has two rows of scales between the semicircles, scales between supraorbital semicircles and interparietal modally 3/4 (16 specimens) with 13 specimens having 3/3 and 11 specimens having 4/4, fourth toe lamellae 13-20 (mean 17.2, mode 17), postmentals 2-7 (mean 4.0, mode 4), loreals 19-36 (mean 28.1). All specimens have the supracarpal scales smooth (see Table 2). None of these scale characteristics will separate *mestrei* from *homolechis;* however, *mestrei* has generally higher numbers of scales between the semicircles and the interparietal (32 of 57 lizards have counts ranging between 3/3 and 6/6 scales, whereas *homolechis* has counts above 3/3 only rarely as variants in all populations), lower mean number of fourth toe lamellae (17.2, in contrast to 17.2 to 19.4 in all *homolechis* samples with the exception of 16.9 in extreme southeastern Oriente coastal material), and higher mean number of loreals (28.1 in *mestrei,* 20.9 to 27.9 in all *homolechis* samples with the highest mean in *A. h. cuneus*). The virtually bimodal contact or lack of contact of the semicircles in *mestrei* does not occur in any population of *homolechis.*

In dewlap color, *A. mestrei* is quite distinct from *A. homolechis* and resembles in a general way the color and pattern of dewlaps of topotypical *A. quadriocellifer.* In its simplest pattern, the dewlap (which is quite large) is white-edged with a central or basal extensive reddish (brick) blotch crossed by one or two yellow bars or semicircles. The basal blotch shade is variable in intensity; Maerz and Paul designations for individual males are Pls. 4 F 11, 5 K 12, 5 H 11, 6 I 11, and verbal designations include orange, reddish-brown, maroon, brick-red, and brownish. The transverse included bars or semicircles were considered yellow to pale orange. The expression of these bars or semicircles varies from two well defined bars to no included pattern, with the dewlap having only an unpatterned dark basal blotch or spot (Pl. 1, third row, right). These variants in dewlap color and pattern are not correlated with geography

(since all have been recorded from specimens at San Vicente) but may be somewhat correlated with age, the larger males having two included yellow bars and smaller males lacking them. Such correlation is not absolute however, since dewlap data on particular specimens of comparable snout-vent lengths show that even fully adult males (snout-vent lengths in excess of 50 mm) have the dewlap variously colored and patterned. The dewlap color and pattern of *A. mestrei* resemble that in a very general fashion of *A. quadriocellifer* topotypes in that the former combines two pigments (brick and yellow) just as the latter combines two (yellow and orange) in a pattern of transverse lines, bars or stripes. Details of dewlap pattern in *quadriocellifer* and *mestrei* are not close, however, and the resemblance is rather superficial.

The body color of *A. mestrei* varies from pale (grayish to grayish tan) to darker colors (dark gray to brownish) and a greenish cast or wash is often apparent. There may be some yellowish to orange spots scattered over the body. Sleeping *A. mestrei* are at once distinguishable from any other anoles which occur with them. At night, specimens of both sexes and all ages of *mestrei* have the head a vivid pea-green, in striking contrast to the gray body color; the pea-green head is more prominent in females and juveniles than it is in adult males, but even the latter show the color quite distinctly (but less brightly than do females). Where *A. mestrei* occurs syntopically with its relatives *A. homolechis* and *A. allogus* (such as the forests at Soroa in the Sierra del Rosario), nocturnally collected specimens of *A. mestrei* are quite simply separable from the other species by their very distinctive head color.

Ruibal (1964:497) considered *A. mestrei* to be "more terrestrial than either *homolechis* or *allogus*," and "usually found on the the limestone rocks rather than on tree trunks" in shady portions of the forest. My observations agree very well with this concise statement, although *A. mestrei* does not shun tree trunks as perches. In the rich moist woods at the bases of the *mogotes* in Pinar del Río, *A. mestrei* occurs on trees and saplings, as well as upon limestone rocks and boulders, and even occasionally on the limestone walls and faces of the *mogotes* themselves which are typically the habitat of *A. bartschi*. Moderate to heavy shade is a requirement for *A. mestrei*, and in this the species is intermediate in tolerance between *A. homolechis* and *A. allogus* which occur with it.

Specimens examined: Cuba, Pinar del Río Province, 2.9 mi. (4.6 km) E Isabel Rubio, 1 (AMNH 83109); Cueva de Santo Tomás, 10 km N Cabezas, 4 (AMNH 83105-06, AMNH 83126—2 specimens); San Vicente, 21 (AMNH 83110-13, AMNH 83118—3 specimens, AMNH 83120-21, AMNH 83122—3 specimens, AMNH 83123—3 specimens, AMNH 83124—5 specimens, AMNH 83125, AMNH 95977); Cueva del Cable, San Vicente, 21 (AMNH 83108); cliffs at Cueva del Río, San Vicente, 2 (AMNH 83107, AMNH 83117); north base, Pan de Azúcar, 8 km E Matahambre, 1 (AMNH 83119); Rangel, 1 (AMNH 83127); Soroa, 11 (AMNH 83113—2 specimens, AMNH 83114—5 specimens, AMNH 83115, AMNH 83116—3 specimens).

Anolis imias Ruibal and Williams

Anolis imias was described (Ruibal and Williams, 1961:237) from two lizards collected by P. J. Darlington in 1936. The type locality was given as the village of Imías, Oriente Province; Imías lies on the southern xeric Oriente coast in the rain shadow of the Sierra de Purial. Despite many weeks of collecting along this coast, including visits to Imías, I was never able to collect this species. Orlando H. Garrido and Miguel L. Jaume had the same lack of success in 1967; their search for *A. imias* at and about the type locality failed. Mr. George C. Gorman, upon his return from Cuba, determined by conversation with Dr. Darlington that the two specimens of *A. imias* had not been taken in the environs of the village of Imías, but rather in the mountains (Sierra de Purial) north of that town (Fig. 3). Accordingly, the type locality of *A. imias* should be amended to "mountains north of Imías, Oriente Province, Cuba." I have little doubt that the species, which is large and presumably conspicuous, does not occur at Imías itself. Within the village there is the usual assortment of fruit trees, but elsewhere the region is arid with low shrubs and scattered xerophytic trees on a substrate of sand and limestone rock. The entire aspect of the

Imías region is bleak and is relieved principally by the cultured greenery in the town.

My data on the holotype and paratype (listed in that sequence in each case) are: snout-vent lengths, 64, 46; snout scales between first canthals 6, 7; scales between semicircles 1, 1; scales between semicircles and interparietal 3/3, 4/4; fourth toe lamellae 15, 15; postmentals 4, 2; loreals 25, 27; ventral, brachial and supracarpal scales smooth (see Table 2). Ruibal and Williams (1961:239) described the color of the dewlap as brown and the male pattern as now consisting primarily of 12 broad dark vertical bands on the high-crested tail, six dark bands on the hindlimbs and four dark bands on the forelimbs. The dorsum has five indistinct dark crossbands and the chin is weakly reticulate. The chin of the female paratype is strongly reticulate, and there is a pair of dark lineate scallops on the nape of the otherwise unpatterned dorsum.

I have no doubt that *A. imias* is a very distinctive species. Although it is apparently most closely related to *A. homolechis,* the two species can be easily distinguished on the basis of the smooth brachial scales, chin pattern in both sexes, and smooth head scales of *imias.* It should be pointed out, however, that there is a tendency for *A. homolechis* on this southern Oriente coast (and even elsewhere) to have the brachial scales very weakly keeled or smooth. I had at first assumed that weak or absent brachial keeling in *A. homolechis* was due to the vicissitudes of long preservation and epidermal softening with subsequent loss of scutellar detail, but even freshly collected and well preserved *A. homolechis* show reduction or absence of brachial keeling in some specimens, and I infer that this character is not so constant in *A. homolechis* as has been presupposed. Nevertheless, the absence of brachial keeling on *A. imias* almost surely is natural and not a preservation or age artifact.

In all meristic data, *A. imias* resembles *A. homolechis* from the same general region (much as *A. mestrei* resembles Pinar del Río *A. homolechis*), and no counts on the two *A. imias* will separate them from local *A. homolechis.* The male *A. imias,* however, is larger than any male *A. homolechis* from this area (maximum snout-vent length 60 mm) and the female *A. imias* likewise exceeds local female *A. homolechis* (43 mm), although female *A. homolechis* from other areas (Pinar del Río; Oriente white dewlap) equal the female *A. imias* in size. The male *A. imias* is unusual in having the prenasal transversely divided unilaterally, a feature which does not occur in any *A. homolechis* I have examined but does occur in some populations of *A. allogus* (see below). The reticulate chin markings of *A. imias* also are reminiscent of those of *A. allogus;* the latter species is however characterized by having the brachials and supracarpals heavily keeled in contrast to the smooth scales in *A. imias.*

The relationships of *A. imias* would seem to be partially with *A. homolechis* and partially with *A. allogus. A. imias* resembles the former species in having smooth supracarpals and in having the semicircles separated by 1 scale (usually, but by no means always, 2 scales in *A. allogus*). Resemblances to *A. allogus* include the reticulated throat pattern and the postmentals meeting the mental along a straight suture (although this arrangement occurs in those *A. homolechis* which have few postmentals also). In gross aspect, *A. imias* seems much more like *A. allogus* in general build and proportion, but comparison of the characters of these two species (not the least of which is the very different vertically barred tail of the male *A. imias*) shows that they are quite distinct. Judging only from the locality records, *A. imias* is sympatric with *A. allogus* but not with *A. homolechis;* the latter species is known from Imías but not from the mountains to the north. I am at a loss to explain either the origin or the apparent distribution of *A. imias;* surely more material will be most revealing both as to its affinities and range.

Specimens examined: Cuba, Oriente Province, mountains north of Imías, 2 (MCZ 42555-56, holotype and paratype).

Anolis allogus Barbour and Ramsden

Anolis ahli Barbour

Anolis rubribarbus Barbour and Ramsden

As Ruibal and Williams (1961:241) very correctly pointed out, three species of Cuban anoles of the *homolechis* group are quite closely related and are not readily distinguishable except by color. These three species are

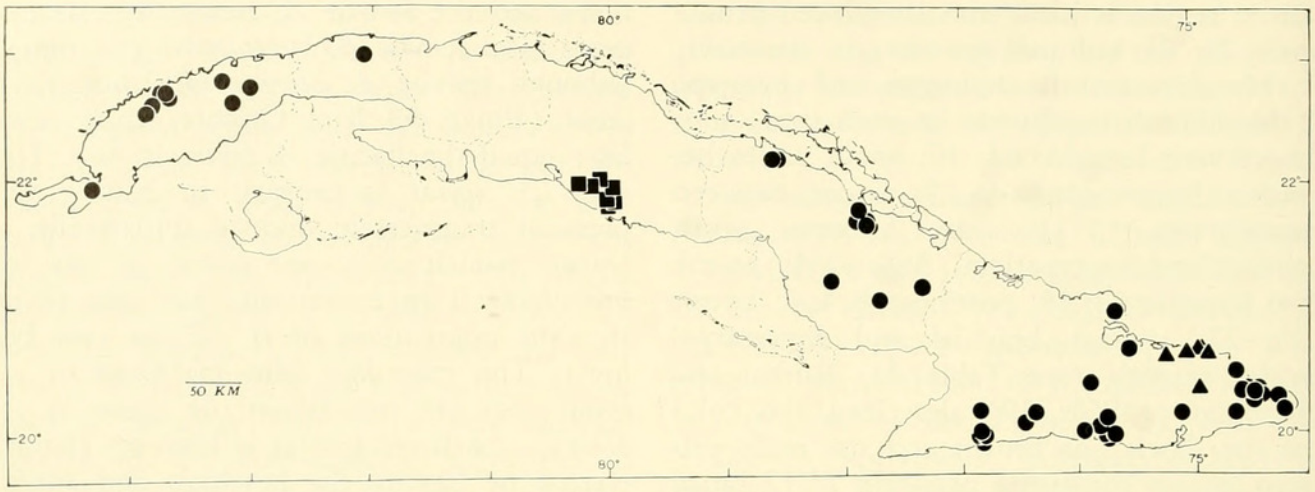

Figure 4. Map of Cuba, showing localities whence specimens of three species of anoles have been examined: solid circles—*A. allogus*; solid squares—*A. ahli*; solid triangles—*A. rubribarbus*.

A. allogus Barbour and Ramsden 1919, *A. rubribarbus* Barbour and Ramsden 1919, and *A. ahli* Barbour 1925. Of them, *A. allogus* is islandwide in distribution (Fig. 4), *A. ahli* is limited to the Sierra de Trinidad in Las Villas Province (Fig. 4), and *A. rubribarbus* to portions of the northern coast and interior (Cuchillas del Toa) of Oriente Province (Fig. 4). Although *allogus* is islandwide in a broad sense, it has been collected only in the provinces of Pinar del Río, Habana (one locality), Camagüey, and Oriente; the species is most widespread in the latter province and is known from all the major montane massifs, as well as from lowland areas along the mesic northern Oriente coast. As far as is presently known, *allogus, rubribarbus* and *ahli* are allopatric to one another. All three species resemble one another structurally in having multicarinate supracarpal scales (in contrast to the sympatric *A. homolechis,* but like the narrowly sympatric *A. quadriocellifer*), blue to blue-gray irides (*fide* Ruibal and Williams, 1961:243), and mean body/femoral ratio (*ibid.*). Dewlaps of the three species are similar but not identical and involve the same general pigments: in *allogus* the dewlap varies from unicolor peach without any transverse bars to a tan to yellow ground with three or four transverse orange to red bars, in *ahli* the dewlap is basally red with an anterior yellow edge. I have not collected *A. rubribarbus,* and so my comments on that form are necessarily limited; Ruibal and Williams (1961:223) described the *rubribarbus* dewlap as having 4 or 5 thin red transverse bars on a deep yellow ground. Of the three taxa, *rubribarbus* has a very distinctive body pattern, consisting of about six vertical dark (blackish) bands or bars separated by light (yellowish or gray) vertical bands; the tail is likewise vertically barred and the limbs are banded. Neither *allogus* nor *ahli* has so striking and contrasting a body pattern.

Since these three species are allopatric and since they are also obviously closely related *intra se,* it seemed possible that they compose a single species with several distinctive subspecies. According to Ruibal and Williams (1961:221) *allogus* and *ahli* cannot be distinguished on the basis of scalation nor body/femoral ratio. Barbour (1937:221) used the combination *A. allogus ahli* (thereby suggesting the proximity of these two taxa); he also (p. 127) used the combination *A. homolechis rubribarbus,* but there is no justification for this suggested relationship. Of the two Barbour and Ramsden names published in 1919 (*allogus* and *rubribarbus*), *A. rubribarbus* has page priority over *A. allogus,* and both these names antedate *A. ahli* Barbour; thus, if the three species are combined, *A. rubribarbus* is the name for the entire assemblage.

Anolis abatus Ahl, 1924, has been placed in the synonymy of *A. allogus* (Ruibal and Williams, 1961:215). I have not examined the syntypes of this Ahl species; one character of the type material given by Ahl (1924: 248)—that the supraorbital semicircles are separated by three rows of scales—occurs in some samples of *Anolis allogus* (in

contrast to, for instance, *A. homolechis*). Although Ahl did not mention the supracarpal keeling, despite the carefully detailed description of the head and body scalation, it is possible that the two *abatus* were drawn from a population of *allogus* in which the supracarpal keeling is weak (see discussion beyond). Since Ruibal and Williams examined the syntypes of *abatus*, I agree with their assessment of the status of this name. It should be pointed out that, if in the future *A. allogus* is separated into subspecies, *abatus* Ahl is a name which will have to be considered before any nomenclatorial changes are proposed within the species. It is even possible (although I consider it unlikely) that *abatus* Ahl will be found to be the prior name for *ahli* Barbour. Barbour's (1925:167) comments on the two syntypes effectively select the male *abatus* as the lectotype: Barbour's further statement, that the female syntype of *abatus* belongs to his new species (*ahli*), suggests that perhaps both syntypes might in actuality represent *ahli*. However, no *ahli* examined by me has three scales between the semicircles. The color description of the male syntype (Ahl, 1924:249) in some ways suggests *A. rubribarbus* ("grünlichgrau oben und an den Seiten, mit unbestimmten dunkleren Rückenstreifen und 3-4 undeutlich dunkleren Querbinden an den Seiten") by emphasizing the vertical crossbands which are such a distinctive *rubribarbus* feature. In any event, as the nomenclature now stands, no changes would be necessary if *abatus* is found to be either an *allogus* or *rubribarbus*, since *abatus* postdates these two names but antedates *ahli*.

Table 3 shows the mensural and meristic data on nine samples of *A. allogus*, one of *A. ahli*, and one of *A. rubribarbus*, arranged in more or less geographical sequence from west to east. The samples and their sizes are: 1) *allogus*—Pinar del Río Province (79); 2) *ahli* (21); 3) Loma de Cunagua, Camagüey Province (22); 4) Sierra de Cubitas, Camagüey Province (65); 5) Central Miranda at the foothills of the Sierra de Nipe, Oriente Province (25); 6) Mayarí, Oriente Province (21); 7) Sierra Maestra and Sierra del Cobre, Oriente Province (33); 8) Sierra de la Gran Piedra and immediately adjacent northern lowlands, Oriente Province (33); 9) Sierra del Guaso and Sierra de Purial, Oriente Province (20); 10) northern Oriente from the Río Yumurí to the Bahía de Taco (111); 11) *rubribarbus* (29). Comments on the variation shown in the table follow.

1) *Size.* The smallest maximally sized male *allogus* are from Central Miranda (snout-vent length 50 mm) with the largest males from the Sierra de Cubitas only slightly longer (snout-vent length 53 mm). The largest males are from Mayarí and the Sierra Maestra (62 mm) with Gran Piedra and northern Oriente coast *allogus* only slightly smaller (61 mm). Smallest females are from the Sierra de Cubitas and Central Miranda series (41 mm) with largest females among the specimens from the Gran Piedra lot (49 mm). Compared with *allogus*, *ahli* males are small (Ruibal and Williams, 1961:221, gave a maximum snout-vent length for *ahli* of 58 mm, but the largest male I have examined measures 55 mm) but are within the known variation in size for all male *allogus*. Male *rubribarbus* are moderately large (Ruibal and Williams, 1961:222, gave a maximum snout-vent length for *rubribarbus* of 62 mm, but the largest male I have examined measures 58 mm) but are also comparable in size with male *allogus*.

2) *Snout scales between first canthals.* In *allogus*, snout scales range from 5 to 13, in *ahli* from 6 to 10, and in *rubribarbus* from 7 to 11. Means vary between 7.9 in *ahli* to 9.3 in northern Oriente *allogus*. The Pinar del Río *allogus* have a snout scale mean of 8.1, slightly higher than the "adjacent" *ahli* (7.9), whereas the snout scale mean of Loma de Cunagua *allogus* (the next "adjacent" population to the east represented by long series) has a mean of 8.2; thus the mean of *ahli* is comparable to, and only slightly lower than, those of the closest *allogus* populations. The extreme eastern populations (Guaso-Purial, northern Oriente coast, *rubribarbus*) have the highest means (8.5 to 9.3), in contrast to *allogus* from elsewhere and *ahli* (7.9 to 8.4). There seems to be a general tendency for the lowest means to be in the west and the highest in the east, but the trend is neither regular nor smooth.

3) *Scales between supraorbital semicircles.* Ruibal and Williams (1961:242) stated that all three species had the semicircles separated by 2 scales. This is far from a

TABLE 3. Measurements and meristic data for nine populations of *Anolis allogus*, as well as *A. ahli* and *A. rubribarbus*, arranged from west to east. Categories and symbols as in Table 1. Prenasals are indicated as a fraction: 1/1 = prenasal undivided on both sides, 1/2 = prenasal undivided on one side and divided on the other, 2/2 = prenasal divided on both sides.

Locality	N	Largest ♂ ♀	Snout Scales	Scales bet. semicircles	Scales bet. semicircles and interparietal	Fourth toe lamellae	Postmentals	Loreals	Prenasals	Supracarpal keeling
Pinar del Río	79	♂–58 ♀–45	6–9 M = 8.1 M_o = 8	1 (5) *2* (*71*) 3 (2)	2/2 (1) 2/3 (1) 3/3 (5) 3/4 (9) *4/4* (*23*) 4/5 (17) 5/5 (14) 5/6 (3) 6/6 (1)	13–18 M = 16.0 M_o = 16	0–3 M = 1.8 M_o = 2	20–43 M = 29.3	1/1 (1) 2/2 (78)	+ = 77 + (weak) = 1
ahli	21	♂–55 ♀–48	6–10 M = 7.9 M_o = 8	1 (4) *2* (*17*)	2/2 (1) 2/3 (2) 3/3 (1) 3/4 (3) *4/4* (7) 4/5 (1) 5/5 (5) 6/6 (1)	14–20 M = 16.1 M_o = 16	1–4 M = 2.0 M_o = 2	16–34 M = 25.1	1/1 (2) 1/2 (3) 2/2 (*15*)	+ = 21
Loma de Cunagua	22	♂–55 ♀–43	7–9 M = 8.2 M_o = 8	1 (8) *2* (*14*)	2/2 (3) 2/3 (4) 3/3 (6) 3/4 (4) 4/4 (4)	14–19 M = 15.5 M_o = 16	0–6 M = 1.4 M_o = 2	23–38 M = 31.5	*2/2* (*22*)	+ = 20 + (weak) = 2
Sierra de Cubitas	65	♂–53 ♀–41	6–10 M = 8.1 M_o = 8	1 (15) *2* (*46*) 3 (3)	3/3 (9) 3/4 (8) *4/4* (*24*) 4/5 (10) 5/5 (11) 5/6 (1) 6/6 (1) 5/3 (1)	15–20 M = 16.8 M_o = 17	0–4 M = 2.0 M_o = 2	21–41 M = 29.2	1/1 (1) 1/2 (2) 2/2 (*61*)	+ = 63 + (weak) = 2
Central Miranda	25	♂–50 ♀–41	7–11 M = 8.2 M_o = 8	1 (3) *2* (*21*) 3 (1)	3/3 (1) 3/4 (1) *4/4* (*11*) 4/5 (5) 5/5 (4) 5/6 (1) 6/6 (1)	14–19 M = 16.8 M_o = 17	0–4 M = 2.1 M_o = 2	24–42 M = 31.4	2/2 (*25*)	+ = 8 + (weak) = 17
Mayarí	21	♂–62 ♀–42	7–10 M = 8.4 M_o = 8	1 (3) *2* (*17*) 3 (1)	3/3 (2) 3/4 (5) *4/4* (6) 5/5 (2) 6/6 (3)	14–19 M = 15.9 M_o = 17	2–4 M = 2.4 M_o = 2	24–39 M = 30.2	1/1 (1) 2/2 (*20*)	+ = 13 + (weak) = 8

TABLE 3 (Continued)

Locality	N	Largest ♂ ♀	Snout Scales	Scales bet. semicircles	Scales bet. semicircles and interparietal	Fourth toe lamellae	Postmentals	Loreals	Prenasals	Supracarpal keeling
					5/3 (1)					
					8/7 (1)					
Sierra Maestra + Sierra del Cobre	33	♂–62 ♀–46	5–10 M = 8.1 M_o = 8	1 (15) *2 (18)*	2/2 (1) 2/3 (4) 3/3 (9) 3/4 (2) *4/4 (10)* 4/5 (2) 5/5 (4) 5/6 (1)	14–20 M = 17.1 M_o = 17	1–3 M = 1.9 M_o = 2	19–52 M = 30.6	1/1 (1) 1/2 (2) 2/2 (28)	+ = 14 + (weak) = 19
Sierra de la Gran Piedra	33	♂–61 ♀–49	6–10 M = 8.0 M_o = 8	*1 (19)* 2 (12) 3 (1)	1/2 (1) 2/2 (4) 2/3 (3) 3/3 (5) 3/4 (2) 4/4 (5) 4/5 (1) 5/5 (9) 6/6 (1)	14–20 M = 16.6 M_o = 17	1–2 M = 1.9 M_o = 2	17–39 M = 28.1	1/2 (2) 2/2 (29)	+ = 31 + (weak) = 2
Sierra del Guaso + Sierra de Purial	20	♂–57 ♀–42	7–11 M = 8.7 M_o = 9	1 (7) *2 (13)*	2/3 (1) 3/3 (5) 3/4 (1) *4/4 (5)* 4/5 (4) 5/5 (1) 5/6 (1) 8/3 (1)	14–18 M = 16.5 M_o = 16, 17, 18	2–4 M = 2.5 M_o = 2	19–38 M = 29.6	*2/2 (20)*	+ = 14 + (weak) = 6
Río Yumurí to Bahía de Taco	111	♂–61 ♀–43	5–13 M = 9.3 M_o = 9	0 (4) 1 (29) *2 (60)* 3 (13) 4 (2)	1/2 (6) 2/2 (11) 2/3 (9) *3/3 (26)* 3/4 (11) 4/4 (24) 4/5 (8) 5/5 (13) 5/6 (1) 5/3 (1)	14–22 M =17.2 M_o = 17	0–6 M = 2.5 M_o = 2	18–43 M = 31.3	1/1 (6) 1/2 (1) 2/2 *(101)*	+ = 102 + (weak) = 9
rubribarbus	28	♂–58 ♀–42	7–11 M = 8.5 M_o = 8	0 (1) *1 (19)* 2 (8)	1/2 (1) 2/2 (1) 2/3 (3) *3/3 (13)* 3/4 (4) 4/4 (6)	15–20 M = 17.5 M_o = 17	2–4 M = 2.6 M_o = 2	20–41 M = 29.7	*1/1 (16)* 1/2 (3) 2/2 (8)	+ = 11 + (weak) = 17

regular condition in these species, and the semicircles may be separated by 0 (= semicircles in contact) to 4 scales. Separation by two scales is certainly modal (with 296 of 452 specimens of the three combined species having this condition), but over one-third (34.5 percent) of the three combined species have counts other than 2 in this position, and, if *allogus* is treated singly, 32.7 percent of the specimens of that form have counts other than 2 between the semicircles.

Other than a count of 2 scales between the semicircles, the next most frequent category is 1 (occurring in all samples), followed by 3 scales (in samples from Pinar del Río, Sierra de Cubitas, Central Miranda, Mayarí, Guaso-Purial, northern Oriente coast). Only two samples (northern Oriente coast *allogus, rubribarbus*) have specimens with the semicircles in contact, and only one sample (northern Oriente coast) has two specimens with the semicircles separated by 4 scales.

The modal condition, as pointed out above, is usually 2 scales between the semicircles; the mode is usually very strong. There are two exceptions to this statement: *allogus* from the Sierra de la Gran Piedra and *rubribarbus* have the semicircles modally separated by 1 scale. The mode of 2 is very weak in *allogus* from the Sierra Maestra (the region of the type locality of *A. allogus*), where 18 specimens have 2 scales between the semicircles and 15 have 1 scale in this position.

Of the series of *ahli,* 17 of 21 specimens have 2 scales between the semicircles and the balance have 1; of the series of 27 *rubribarbus,* 19 have 1 scale between the semicircles, seven have 2 and one has 0. Note that in this character *ahli* resembles *allogus,* and that *rubribarbus,* with a strong mode of 1 differs from most *allogus* populations except that from the Sierra de la Gran Piedra.

4) *Scales between supraorbital semicircles and interparietal.* The mode for most samples of *allogus* is 4/4 but there are several exceptions. A mode of 3/3 occurs in *allogus* from Loma de Cunagua, northeastern Oriente coast, and *rubribarbus,* and 3/3 and 4/4 are bimodes (each with 5 specimens) in the Guaso-Purial sample. The Gran Piedra material has a mode of 5/5. The greatest number of combinations (10) occurs in northeastern Oriente, with Pinar del Río having nine combinations; the least variability in this character occurs in the Loma de Cunagua sample.

Note that in number of scales between the semicircles and the interparietal, *ahli* agrees with *allogus,* whereas *rubribarbus* agrees with adjacent *allogus* from the northern Oriente coast (and with the material from Loma de Cunagua).

5) *Fourth toe lamellae.* Fourth toe lamellae show a total variation in *allogus* between 13 and 22, in *ahli* between 14 and 20 and in *rubribarbus* between 15 and 20. Mean fourth toe lamellae range from 15.5 at Loma de Cunagua to 17.5 in *rubribarbus;* modal number of lamellae is either 16 (including *ahli*) or 17 (including *rubribarbus*); only the Guaso-Purial sample has these categories (16, 17, 18) with the same incidence (4 specimens) and no mode.

6) *Postmental scales.* The modal condition in all populations (including *ahli* and *rubribarbus*) is 2 postmentals; the number of postmentals varies between 0 (most frequent at Loma de Cunagua, but occurring also in Pinar del Río, Cubitas, Miranda, northern Oriente coast) to 6 (one specimen, Loma de Cunagua). All samples but one (Guaso-Purial) have at least three categories of number of postmentals. From a mode of 2 postmentals, five samples (Pinar del Río, Loma de Cunagua, Cubitas, Sierra Maestra, Gran Piedra) show a tendency toward a lesser number of postmentals (0 or 1), whereas five samples (Miranda, Mayarí, Guaso-Purial, northern Oriente coast, *rubribarbus*) show a tendency to higher numbers of postmentals (3 or 4). Means range from 1.4 (Loma de Cunagua) to 2.6 (*rubribarbus*), with Guaso-Purial and northern Oriente coast having means of 2.5, in contrast to means elsewhere of 1.4 to 2.4 (the latter at Mayarí in Oriente).

7) *Loreals.* The total variation in *allogus* loreals is 17 to 52, in *ahli* from 16 to 34, and in *rubribarbus* from 20 to 41. Means range from 25.1 (*ahli*) to 31.5 (Loma de Cunagua *allogus*), with Central Miranda and northern Oriente coast *allogus* having only slightly lower means (31.4 and 31.3). The *rubribarbus* mean (29.7) is near to that of the northern Oriente coast (31.3) and almost identical to that of Guaso-Purial (29.6).

8) *Supracarpal keeling.* No specimen of this complex of three taxa has the supracarpal scales smooth. In general, the supracarpals are sharply multicarinate, but in several samples there is a high preponderance of specimens with weak keels. Weak keels are strongly modal at Central Miranda and modal but less strongly so in the Sierra Maestra and *rubribarbus.* Only the *ahli* sample includes specimens all of whose supracarpals are strongly keeled; all others include at least a very few individuals whose supracarpals scales are weakly keeled.

9) *Prenasal scale.* Ruibal and Williams (1961:222) stated that most specimens of *rubribarbus* had the prenasal scale single, whereas in *ahli* and *allogus* this scale is divided by a transverse suture to give two scales before the naris; in fact, they (p. 243) suggested that this was a good scale difference between *rubribarbus* on one hand and *allogus* and *ahli* on the other. Of the 27 *rubribarbus* before me, 16 have the prenasal undivided on both sides, three have this scale single on one side and divided on the other, and eight have the scale divided on both sides. Thus, eight of 27 specimens cannot be separated on the basis of this character from specimens of *allogus.*

The occurrence of divided prenasals in *rubribarbus* achieves more than academic interest. Before proceeding, however, comments on the specimens of *rubribarbus* must be made. The taxon was described by Barbour and Ramsden on the basis of a holotype from El Puerto de Cananova, near Sagua de Tánamo, Oriente Province; no paratypes were designated, although these authors stated (1919:158) that there was "a small series" from Cananova. There are at present three specimens (MCZ 11910-12) which are from Cananova and presumably are the short series referred to by Barbour and Ramsden. These specimens may, in the very loosest of interpretations, be considered paratypes (as they were by Barbour and Loveridge, 1929:222, although they list the "paratypes" as being three specimens, "MCZ 11908-12," a presumed *lapsus calami*) but I adhere to paratypic status by declaration of the describer and do not so consider them. In any event, these three specimens and the holotype plus a series of eight lizards (MCZ 28760-67) from Mina Piloto, Sagua de Tánamo, form a group of specimens which may be termed the old series, since they were collected some time ago; these lizards have a community of localities in that they all are from the western portion of the known range of *rubribarbus.* There is a second or new series of specimens (MCZ 50187, MCZ 63660-61, MCZ 63665-74, MCZ 63662-63, MCZ 93651), more recently collected, from the vicinity of Moa, in the eastern portion of the range of *rubribarbus.*

These two series of *rubribarbus* differ from one another in some interesting ways. As far as prenasals are concerned, the new series has the higher incidence of undivided prenasals (12 specimens undivided on both sides; two specimens undivided on one side, divided on the other; and two specimens with divided prenasals on both sides) whereas the old series has the higher frequency of divided prenasals (six specimens with divided prenasals on both sides; one specimen with the prenasal single on one side, divided on the other; and four specimens with the prenasal single on both sides). (The series differ in other scale characters as well: for instance, the old series has the semicircle separation by 0 scales in one lizard, 1 scale in five lizards, and 2 scales in six lizards, whereas the new series has 14 of 16 specimens with 1 scale between the semicircles and the exceptions have 2 scales in this position.)

Although a transversely divided prenasal is overwhelmingly the modal condition in *A. allogus,* the incidence of undivided prenasals is variable by population. No lizards from Loma de Cunagua, Central Miranda, or Guaso-Purial have undivided prenasals. Other than these, the lowest incidence of undivided prenasals occurs in the Pinar del Río material (1 of 79 specimens; 1.3 percent) and the highest in the Sierra Maestra material (3 of 31 specimens; 9.7 percent). Five of 25 *ahli* (25.0 percent) and 20 of 28 *rubribarbus* (71.4 percent) have undivided prenasals. The northern Oriente coast *allogus* rank second (8.2 percent) of all *allogus* populations in this character. Despite the high incidence of undivided prenasals in the northern Oriente *allogus,* in this character these specimens do not begin to approach the very high incidence in *rubribarbus.* It is suggestive, however, that of the nine specimens of *allogus* with undivided

prenasals, three are from an interior montane locality 9 km west and 3 km south of Baracoa and thus toward the geographic western extreme of *allogus* material from this region, and the remaining six are from Cabacú, to the southeast of Baracoa. At least the first series might indicate a tendency at this locality toward the predominantly undivided prenasal condition in *rubribarbus*. There is no material between this locality and the easternmost *rubribarbus* locality except for two lizards from the Bahía de Taco; these have divided prenasals on both sides.

There are no specimens assignable to this complex of forms between the Bahía de Taco (*allogus*) and Punta Gorda (*rubribarbus*), a distance of 25 kilometers airline (Fig. 4). Ruibal and Williams (1961:240) were faced with a similar lack of specimens from intermediate localities (although the gap has been somewhat closed since then by the Bahía de Taco specimens) but suggested that if intermediates between *allogus* and *rubribarbus* were found along this northern Oriente coast, it would be necessary to regard *allogus* and *rubribarbus* as conspecific. Although I suspect that such will eventually prove to be the case (despite the striking pattern of *rubribarbus*), I am likewise unwilling now to consider these two taxa as being conspecific. At a locality 8 km northwest of Bahía de Taco, I observed three boldly vertically barred anoles on deciduous growth along the margins of a small stream coursing through pinewoods; none was secured but I am convinced that they were *rubribarbus*. No *allogus* I have observed had such bold dorsal markings; the habitat is precisely that cited for this species by Ruibal and Williams (1961:228). If *allogus* and *rubribarbus* are subspecies, the transition from one to the other must be extremely abrupt, much as in the case of *A. h. homolechis* and *A. h. oriens* at Playa Juraguá.[2]

Less information is available for the zone of contact between *allogus* and *rubribarbus* on the west. In this region, there is an excellent series of *allogus* from 16 km E Mayarí (only one of which has the prenasals undivided). A single specimen from Mina Piloto (UMMZ 71409, one of the paratypes of *Anolis patricius* Barbour) has divided prenasals; this lizard is from a known *rubribarbus* locality but presently it is undistinguishable from *A. allogus*. I have considered it *A. rubribarbus* purely on the basis of its provenance. From the meager evidence shown by the Mayarí series, it seems that *allogus* and *rubribarbus* approach one another by about 30 km airline on the west. It should be pointed out once more that the old series of *rubribarbus* from the western portion of the range of that form (Mina Piloto; Cananova) are precisely those specimens which have the high incidence of divided prenasals, an *allogus* character. Such high incidence may reflect tendencies toward (intergradation with) *A. allogus* in this region, whereas specimens from farther east (Moa, south of Moa, east of Moa) with high incidence of undivided prenasals may be more "pure" *rubribarbus* (at least in this character).

The nomenclatural status of *A. ahli* is problematical. As Ruibal and Williams (1961:240) pointed out, *allogus* is unknown from Las Villas and Matanzas provinces; *ahli* is the only representative of this group of lizards in Las Villas Province and it occurs only in the Sierra de Trinidad. *A. ahli* is like *A. allogus* in scalation and size, but as Ruibal (1964:498) noted, male *ahli* appear to lack a tail crest, a variably developed feature in male *allogus*. Although *allogus* remains unknown from Las Villas and Matanzas provinces, there is much suitable habitat for it remaining there; such areas as Pan de Matanzas and the mountains in the vicinity of Mayajigua, to mention but two areas, seem suitable for such a shade-dwelling species. Absence of *ahli* from the heavily wooded *seboruco* areas in the Soledad region at the foot of the Sierra de Trinidad is strange, but the species is known only from

[2] Garrido (1967, Trabajos de divulgación, Museo "Felipe Poey," 55:1-7) has recently summarized both ecological and observational data on *Anolis rubribarbus* at a locality 20 km SE Moa; he has shown conclusively that *A. rubribarbus* and *A. allogus* are not allotopic at this locality (called Potosí), that *A. rubribarbus* no longer occurs at the type locality due to destruction of forested habitats, and that *A. rubribarbus* does not occur so far east as Cayo Güin (about 11 km NW Baracoa) where he encountered only *A. allogus*. Ethological and ecological data presented by Garrido suggest that *A. allogus* and *A. rubribarbus* inhabit different situations but he admitted (p. 6) that much yet remains to be determined about the distribution and relationships of *A. rubribarbus*.

higher elevations in this range. Ruibal (1964:499) suggested that *ahli* is limited to the deeply shaded portions of the Trinidad forests. My experience differs from his, since *ahli* was encountered regularly in more open situations (but usually associated with wooded or at least shrubby situations) along roadsides and on the open trail leading to the bottom of the river valley at the Salto de Hanabanilla. In any event, *ahli* appears to be a geographical isolate of a basic *allogus* stock, restricted to the Sierra de Trinidad. It differs from *allogus* in absence of a tail fin in males, low mean number of scales between the first canthals, low mean number of loreals, and high incidence of undivided prenasals; dewlap coloration is discussed below.

Dewlap color and pattern of *A. allogus* vary between localities in a rational manner. Pinar del Río specimens regularly have the dewlap yellow to pale yellow with three transverse red bars (Pl. 1, fourth row, left). Males from Loma de Cunagua have the dewlap yellow with three orange bars or an extensive orange central spot. The aspect of the dewlap in Sierra de Cubitas males is faded with a very pale yellow ground and about three transverse orangish bars or an orange spot (Pl. 1, fourth row, right). At Central Miranda, the dewlap is regularly very pale peach (Pl. 11 E 9), slightly deeper centrally, but without definite bars; at most there are indications of two very faintly darker transverse bars. Sierra de la Gran Piedra males either have faintly yellow dewlaps (Pl. 10 F 3) with three reddish (Pl. 5 E 11) bars or they lack bars and have an orange or reddish (Pl. 4 F 11) center or basal blotch (Pl. 1, lower left). Northern Oriente coast specimens have the dewlap yellow to peach with three or four red to brick bars. In general Pinar del Río and northern Oriente males have the most vividly colored dewlaps, whereas those of other samples which I have seen in life are paler and often lack expression of the bars completely; the latter is the rule in males from Central Miranda.

The dewlap in *ahli* is yellow to very pale yellow (Pls. 10 I 1 and 10 I 4) anteriorly, with a large basal red spot (Pls. 3 H 12 and 11 F 11); there is often an extensive black area on the neck, extending to the posterior portion of the expanded dewlap (Pl. 1, lower right). Although the *ahli* style dewlap is not known to occur in any *allogus* populations, at least the general two color schema (absence of barring and a darker central area) is shown in some samples of male *allogus*.

Ruibal (1961) has discussed the ecology of *A. allogus*. This species is non-heliothermic and is confined to heavily shaded broadleaf forests, from sea level to elevations of 6000 feet (1830 meters) in the Sierra Maestra. *A. allogus* is absent from the arid southern Oriente coast; there are three specimens recorded from the same region (Ocujal; coast south of Pico Turquino, both coastal localities), but I doubt the precision of the locality data for these lizards. The forests (when present) on this southern coast are open and dry, and far more suitable for *A. homolechis* than *A. allogus*. On the northern Oriente coast, however, where dense broadleaf forests descend to the coast, *A. allogus* accompanies them (such as at the mouth of the Río Yumurí and the Bahía de Miel). One of the Bahía de Taco *allogus* was collected in mangroves; this seemingly unlikely situation for this species may be easily explained since in this region dense forests occur immediately adjacent to the coast in many places, and dense mangrove growth offers an equally shaded situation to a non-heliothermic lizard, provided the mangroves are readily accessible by proximity to broadleaf forest.

The occurrence of *A. allogus* on the extreme western Península de Guanahacabibes has been reported by Garrido and Schwartz (MS). The presence of this lizard on the peninsula, far removed from its more usual haunts in the Sierra de los Organos and Sierra del Rosario, is not surprising, since the central portion of the peninsula is densely forested, providing optimal habitat for the species. The lone record of *A. allogus* from Habana Province likewise is from dense broadleaf forest in the Escaleras de Jaruco; the presence of *A. allogus* at this locality strongly suggests that it occurs in the same range to the east (such as at Pan de Matanzas, where it remains uncollected). In Camagüey Province, *A. allogus* is known from the forested Loma de Cunagua (an isolated steep-sided mountain in the Llanura de la Trocha), the Sierra de Cubitas and

associated forested lowlands between that range and the northern coast, the Sierra de Najasa (a less well-forested massif to the southeast of Camagüey city), Loma de la Yagua (an isolated and wooded hill to the southwest of Camagüey city), and Martí (a locality which presently seems unsuitable; the specimen may have come from some locality near Martí rather than from the environs of the city itself).

A. allogus is widespread in Oriente, occurring in the Banes area, in the Sierra Maestra, Sierra del Cobre, Sierra de la Gran Piedra (including the mesic foothills to the immediate north of that range as at Dos Bocas), Sierra del Guaso, and Sierra de Purial. Along the northern Oriente versant, *A. allogus* occurs from sea level (mouth of Río Yumurí; Bahía de Miel; Bahía de Taco) to higher elevations (El Yunque de Baracoa). The series from 9 km W and 3 km S Baracoa was secured in an unusual situation; here, at a locality known as La Minita, *A. allogus* was inhabiting abandoned houses and shacks which had been in use when the mine was active. The area lacked arborescent vegetation, and the flora consisted of stunted trees and shrubs on red lateritic soils. The elevation is unknown, but to reach La Minita we passed through broadleaf forest. This is the only occasion where I encountered *A. allogus* associated with human habitation, albeit in this case a deserted settlement. Occurrence of *A. allogus* in mangroves at Bahía de Taco has been mentioned. At the mouth of the Río Yumurí, *A. allogus* inhabits coastal *Coccoloba* forests; these seagrape woods are immediately adjacent to dense broadleaf forest, and the lizards have doubtless invaded the somewhat less suitable situation from the latter more suitable one.

Anolis allogus is regularly encountered at night, sleeping on the leaves of shrubs; I have not found it sleeping on stems, twigs, or branches. During the day, males were observed on the trunks of trees in or at the edges of forests or at least well shaded woods. Females are more terrestrial and were at times collected on the ground. Although the occurrence of *A. allogus* about dwellings and in proximity to humans happens rarely, at Gran Piedra this species was common on the walls of the ruins of the French plantation house, La Isabelica, and at the mouth of the Río Yumurí *A. allogus* was exceptionally abundant, occurring not only on trees but rocks and fence posts along the open but well shaded road. During overcast days, which are frequent in the Sierra de la Gran Piedra, *A. allogus* was encountered under rocks lying on the ground, where presumably they had sought temporary refuge from the cool breezes and blowing mist.

Anolis ahli, as noted above, also was found in *monte* and in less well shaded situations along open trails and adjacent to roads. Sleeping perches are primarily leaves of low shrubs, 2 to 4 feet above the ground, but occasional individuals were encountered sleeping on slender twigs. The tail, while the lizard sleeps, may be either tightly curled or may be prehensily twisted about the leaf petiole or some minor surface irregularity. At night the heads of *A. ahli* are greenish but not so bright as the pea-green of dormant *A. mestrei*. Female *ahli* at night show a prominent broken and irregular middorsal band.

Although I have made no taxonomic changes in the three species of this group (*allogus, rubribarbus, ahli*), primarily for lack of intergradient or intermediate material from crucial areas, I have little doubt that they are subspecifically related. Inspection of Table 2 shows that there are few scale differences between them, and all are allopatric to one another insofar as known. The body pattern of *rubribarbus* and the dewlap pattern of *ahli* are certainly distinctive characters, but at least some populations of *allogus* approach the dewlap pattern (although not the intensity of color) of *ahli*. Whether *allogus* and *ahli* are considered conspecific appears to be primarily a matter of philosophy; the specific status of *allogus* and *rubribarbus*, because of the geographic approximation of these two species, is perhaps more certain and clear evidence of intergradation should be at hand before considering them subspecifically related. So much of the interior of Oriente Province remains still unknown that the relationships of these two species in that area are still not at all clear.

Considering the disjunct nature of the distribution of *A. allogus* outside of Oriente (in which province it has a fairly broad and more or less continuous distribution), it would not be surprising if some popula-

tions (especially Pinar del Río, and possibly also those of the Sierra de Cubitas and Loma de Cunagua) might not appropriately be regarded as nomenclaturally distinct from other samples. Not only is there evidence that such is the case in these outlying populations, but within Oriente itself there is material (most especially that from Central Miranda, which I assume to be drawn from a basically Sierra de Nipe population) which differs quite markedly in dewlap color and pattern and other features of scalation. However, without resolution of the status of *ahli* and *rubribarbus*, it seems profitless to name additional forms of *A. allogus*.

Specimens examined: Anolis allogus: Cuba, Pinar del Río Province, Vallecito de San Juan, 11 km W Cayuco, 1 (AMNH 83161); Cueva de Santo Tomás, 10 km N Cabezas, 18 (AMNH 83131—3 specimens, AMNH 83132—6 specimens; AMNH 96557—9 specimens); north base, Pan de Azúcar, 8 km E Matahambre, 1 (AMNH 83158); San Vicente, 27 (AMNH 83134, AMNH 83153-55, AMNH 83156—6 specimens, AMNH 83157, AMNH 83159, AMNH 83162—6 specimens, AMNH 83163—5 specimens, AMNH 83168—3 specimens, AMNH 83169); Cueva de los Indios, 2 (AMNH 83128); 0.5 mi. (0.8 km) S San Vicente (not mapped), 2 (AMNH 83129-30); Valle de Ancón, 1 (AMNH 83133); south base, Pan de Guajaibón, 3 km W, 13.5 km S Las Pozas, 3 (AMNH 83165—2 specimens AMNH 83166); Soroa, 22 (AMNH 79633-41, AMNH 83146-47, AMNH 83148—5 specimens, AMNH 83149, AMNH 83150—3 specimens, AMNH 83152—2 specimens); Rangel, 2 (AMNH 83171); *Habana Province,* 6.8 mi. (8.9 km) W Jaruco, 2 (AMNH 83151); *Camagüey Province,* Loma de Cunagua, 12 mi. (19.2 km) E Morón, 1 (AMNH 83135); Loma de Cunagua, 14 mi. (22.4 km) E Morón, 21 (AMNH 83136—18 specimens, AMNH 83137—2 specimens, AMNH 83138); 24 km SW Camagüey, Finca El Porvenir, Loma de la Yagua, 3 (AMNH 83144—2 specimens, AMNH 83145); Sierra de Najasa, 3.8 mi. (6.1 km) S, 5.1 mi. (3.2 km) W Ecuador, 2 (AMNH 96562); Martí, 1 (UMMZ 70994); Paso de la Trinchera, 6.5 mi. (10.4 km) NW Banao, 14 (AMNH 83143—7 specimens, AMNH 96558—7 specimens); Los Paredones, 38 (AMNH 83142—5 specimens, AMNH 96559—20 specimens, AMNH 83688—13 specimens); Olla de Bonnet, 6 (AMNH 83141); 5.5 mi. (8.8 km) NE Banao, 4 (AMNH 83139—3 specimens, AMNH 83140); 11.9 mi. (19.0 km) NW Banao, 3 (AMNH 96560, AMNH 96561—2 specimens); *Oriente Province,* La Cantera, Miranda, 25 (AMNH 83692—4 specimens, AMNH 83693, AMNH 83694—20 specimens); Banes, 2 (MCZ 55982-83); 16 km E Mayarí, 21 (MCZ 63764-79, MCZ 63781-85); nr. Buey Arriba, SW of Bayamo, 8 (MCZ 63756-63); 14.6 mi. (23.4 km) WSW Maffo, 2 (AMNH 96566); Los Negros, Jiguaní, 5 (MCZ 8568, MCZ 8571, MCZ 8597-99); Pico Turquino, 2 (UMMZ 80775); Cueva del Aura, Pico Turquino (not mapped), 3 (MCZ 42451-53); Loma Cardero, Pico Turquino, 1 (MCZ 39663); Joachimal, Pico Turquino (not mapped), 1 (MCZ 50172); Pico Palma Mocha, 1 (MCZ 50171); Sierra del Cobre, 5 (UMMZ 80774—2 specimens, MCZ 42535-36, MCZ 42538); Florida Blanca, nr. Alto Songo, 2 (INHS 9259-60); Jutinicú, Alto Songo, 1 (MCZ 8595); "coast south of Pico Turquino," 2 (MCZ 42470-71); "Ocujal," 1 (USNM 138110); 1.9 mi. (3.0 km) SE, 5 mi. (8.0 km) NE Sevilla, 4 (AMNH 96564); Gran Piedra, La Isabelica, 3500 feet (1068 meters), 1.9 mi. (3.0 km) SE, 10 mi. (16.0 km) NE Sevilla, 13 (AMNH 83689—7 specimens, AMNH 83690, AMNH 83691—5 specimens); La Favorita, 3 km E Gran Piedra, 3500 feet (1068 meters), 12 (AMNH 96563—11 specimens, AMNH 96567); Dos Bocas, 4 (AMNH 96565); Mal Paso, Guantánamo (not mapped), 2 (MCZ 8688, MCZ 9358); Mt. Líbano, Guantánamo, 4 (MCZ 8433, MCZ 8539-41); "Guantanameto Mt., Pinarea Range," 1 (UMMZ 98016); mountains N Imías, 7 (MCZ 41490-92, UMMZ 80772—4 specimens); upper Río Ovando, 6 (MCZ 42521-23, UMMZ 80773—3 specimens); mouth of Río Yumurí, east side, 32 (AMNH 83704—20 specimens, AMNH 83705—12 specimens); 7 km W Río Yumurí, 3 (AMNH 83703); Baracoa, 2 (AMNH 83702, MCZ 11210); Baracoa, east side, Bahía de Miel, 16 (AMNH 83698); 4.5 km W Baracoa, 3 (AMNH 83695); La Pasana, Baracoa, 1 (MCZ 11212); Cabacú,

Baracoa, 23 (UMMZ 94044—5 specimens, MCZ 47108-09 + 11 specimens, UMMZ 94045 — 5 specimens); Joa, Baracoa, 2 (MCZ 47110-11); Yatiecito, Baracoa (not mapped), 6 (UMMZ 94046 —4 specimens, MCZ 47120-21); Jair, Baracoa (not mapped), 3 (UMMZ 94047); 9 km W, 3 km S Baracoa, 7 (AMNH 83700); El Yunque de Baracoa, 3 (MCZ 42508-10); west slope, El Yunque de Baracoa, 7 (AMNH 83696—4 specimens, AMNH 83697—3 specimens); 3 mi. (4.8 km) S Bahía de Taco, 1 (AMNH 83707); Bahía de Taco, 2 (AMNH 83701, AMNH 83706).

Anolis rubribarbus: Cuba, Oriente Province, El Puerto de Cananova, nr. Sagua de Tánamo, 4 (MCZ 11868—holotype; MCZ 11910-11); Mina Piloto, Sagua de Tánamo, 9 (MCZ 28760-67, UMMZ 71409—one of two paratypes of *A. patricius*); Moa, 1 (MCZ 50187); Moa, Río Cabañas, 2 (MCZ 63660-61); *ca.* 7 km E Moa, 12 (MCZ 63665-74, MCZ 63662-63); 35 km S Moa, 1 (MCZ 93651).

Anolis ahli: Cuba, Las Villas Province, Salto de Hanabanilla, 2 (AMNH 83173); 8 mi. (12.8 km) S Manicaragua, 1 (AMNH 96569); 1.4 mi. (2.2 km) NE San Blas, 1 (AMNH 96568); Mina Carlota, 1 (UMMZ 63086); Topes de Collantes, 1 (INHS 9264); 1.8 mi. (2.9 km) S Topes de Collantes, 8 (AMNH 96570); 4 km W, 12 km N Trinidad, 7 (AMNH 83172—6 specimens, AMNH 95968).

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June 27, 1968