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MAMMALS OF NORTHERN COLOMBIA, PRELIMINARY
REPORT NO. 8: ARBOREAL RICE RATS, A SYSTEMATIC
REVISION OF THE SUBGENUS *Oecomys*, GENUS
*ORYZOMYS*¹

By PHILIP HERSHKOVITZ²

Arboreal rice rats are small to medium-sized cricetines of the genus *Oryzomys* (family Muridae). They are found only in tropical and subtropical zone forests of Central and South America. Of the two recognized species, the larger, *Oryzomys (Oecomys) concolor*, occurs in northern Colombia.

The author collected 27 specimens from six localities during his 1941-43 tenure of the Walter Rathbone Bacon Traveling Scholarship and 38 specimens, including six of the smaller species, *Oryzomys (Oecomys) bicolor*, in other parts of Colombia while conducting the Chicago Natural History Museum-Colombian Zoological Expedition (1949-52). This material and pertinent field observations are the basis of the present report.

¹ Previous reports in this series have been published in the Proceedings of the U.S. National Museum as follows:

1. Squirrels, vol. 97, August 25, 1947.
2. Spiny rats, vol. 97, January 6, 1948.
3. Water rats, vol. 98, June 30, 1948.
4. Monkeys, vol. 98, May 10, 1949.
5. Bats, vol. 99, May 10, 1949.
6. Rabbits, vol. 100, May 26, 1950.
7. Tapirs, vol. 103, May 18, 1954.

Curator of Mammals, Chicago Natural History Museum.

MATERIAL

A total of 390 specimens was studied. This number includes virtually all arboreal rice rats preserved in American museums, and the types only in the British Museum (Natural History).

The following abbreviations for museums are used in the lists of specimens examined.

- AMNH = American Museum of Natural History
BM = British Museum (Natural History)
CM = Carnegie Museum
CNHM = Chicago Natural History Museum
MACN = Museo Argentino de Ciencias Naturales
MCZ = Museum of Comparative Zoology
UMMZ = University of Michigan Museum of Zoology
USNM = United States National Museum

The writer expresses thanks to the authorities of the above institutions for permitting him to study the material in their charge.

THE ORYZOMYINE RODENTS

The general characters of subgenus *Oecomys* are common to *Oryzomys* and a number of other genera which together compose the oryzomyine group of the subfamily Cricetinae (family Muridae). In addition to the aforementioned, the group includes the currently recognized genera or subgenera *Melanomys* Thomas, *Oligoryzomys* Bangs, *Microryzomys* Thomas, *Nesoryzomys* Heller, *Neacomys* Thomas, *Scolomys* Anthony, *Nectomys* Peters, *Sigmodontomys* J. A. Allen, and *Megalomys* Trouessart. The group has been defined elsewhere (Hershkovitz, 1944, Univ. Michigan Mus. Zool. Misc. Publ. No. 58, pp. 12-17). Its more salient characters may be summarized as follows.

Size and form *Mus*-like to *Rattus*-like; eyes and ears normal; hind feet of the generalized scansorial-terrestrial type, or moderately specialized for running, swimming or climbing; three middle digits of hind foot partly, but not always conspicuously, webbed; claws short, more or less recurved, never specialized for digging; tail always more than one-half as long as head and body combined, generally thinly haired, the scales always visible; mammae eight (two pairs pectoral, two pairs inguinal). Distance between first molars always more than length of M^1 ; median longitudinal palatal ridge not present; bony palate produced posteriorly beyond plane of last molars; posterolateral palatal fossa present and marked by a distinct pit or reticulation of pits; parapterygoid fossa shallow, its anterior corner never undercut. Incisors ungrooved, generally opisthodont, never proodont; molars generally brachyodont, never distinctly hypsodont; crowns crested or terraced, never plane (cf., Hershkovitz, 1955, Fieldiana, Zool., vol. 37, p. 649); mesoloph (id) present in all molars and fused

with mesostyle (id) as a functional unit; procingulum of upper molars and postcingulum of lower molars present and usually well developed.

REMARKS: With few exceptions, all real species of oryzomyine rodents are well defined. Unfortunately, the multiplication of names has made the identification of any one of them an extremely arduous, sometimes nearly impossible, task. A total of 54 names, mostly of specific grade, have been given to representatives of *Oecomys* alone. These are shown to be applicable to only two species with a combined total of nine subspecies.

Subgenus *Oryzomys* (*Oecomys*) Thomas

Oecomys, Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 18, p. 444, 1906 (subgenus of *Oryzomys* Baird); ser. 8, vol. 3, pp. 378-379, 1909 (genus).

Oecomys, Gyldenstolpe, Kungl. Svenska Vet.-Akad. Handl., ser. 3, vol. 11, p. 38, 1932 (characters; list of species).—Tate, Amer. Mus. Nov., No. 581, p. 10, 1932 (taxonomic history).—Ellerman, The families and genera of living rodents, vol. 2, pp. 340, 342, 357, 408, 1941 (subgenus of *Oryzomys*).

Oryzomys, Goldman, North American Fauna, No. 43, pp. 15, 82, 1918 (part, *Oryzomys tectus* group).

TYPE SPECIES: *Rhipidomys benevolens* Thomas [= *Oryzomys* (*Oecomys*) *bicolor phaeotis* Thomas], by original designation.

INCLUDED SPECIES: *Oryzomys concolor* Wagner, *O. bicolor* Tomes.

DISTRIBUTION (figs. 1, 2): Forested parts of the tropical and subtropical zones of Central and South America, from Costa Rica through Panama into Colombia, Ecuador, Peru, Bolivia, Venezuela, Trinidad, the Guianas and Brazil; altitudinal range from near sea level to approximately 2,000 meters above.

The ranges of the two species are coextensive in Panama, the Río Orinoco basin of Colombia and Venezuela, and the Amazonian region. So far as known, only the larger species, *Oryzomys concolor*, occurs in Costa Rica, northern Colombia, northwestern Venezuela, and Trinidad. The smaller *O. bicolor* occurs alone in western Ecuador.

TAXONOMIC HISTORY

The first name proposed for an arboreal rice rat is *Mus cinnamomeus* Pictet and Pictet, 1844. It is based on an eastern Brazilian representative of the larger species of subgenus *Oecomys*. Unfortunately, it is invalid because the name *Mus cinnamomeus* had already been used by Lichtenstein in 1830 for a species of spiny rats of the modern genus *Proechimys*. The next name for an *Oecomys* is *Hesperomys concolor* Wagner, 1845. It was given to the large form discovered by Johann Natterer in the forests of the upper Rio Negro, northwestern Brazil. While the name *concolor* was virtually ignored by recent authors, the animal it represents has since been redescribed under 27 different names.

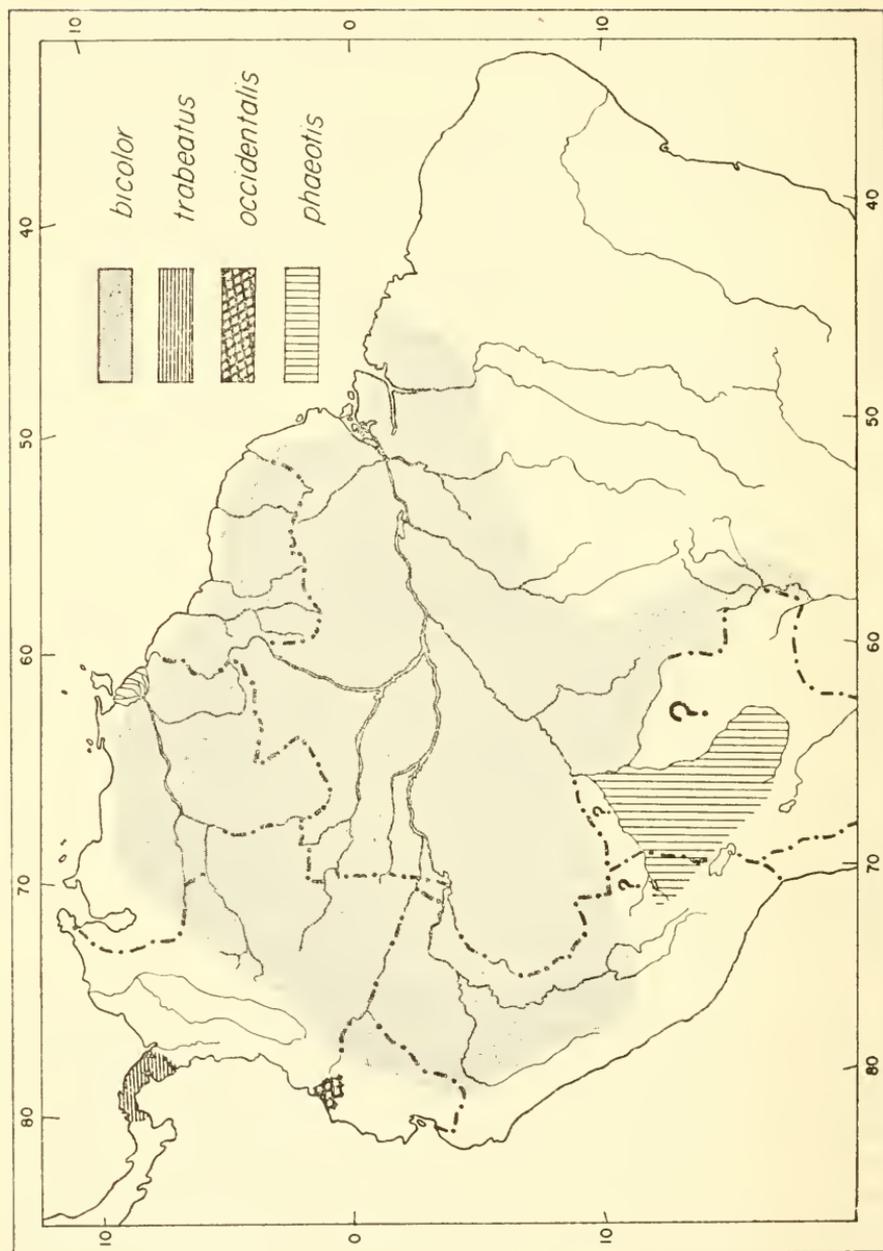


FIGURE 1.—Distribution of the subspecies of *Oryzomys bicolor* in Central and South America. For location of individual collecting stations see text and gazetteer (p. 562).

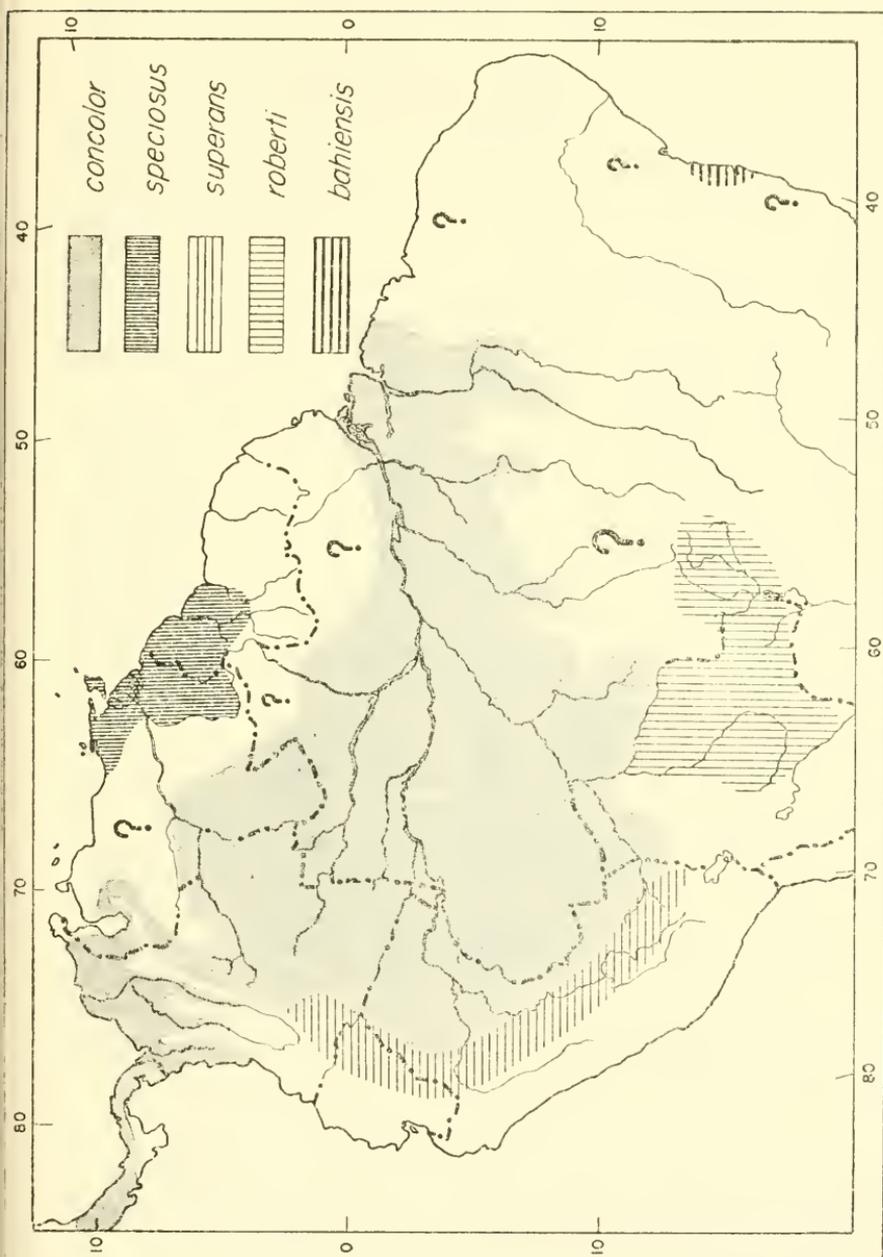


FIGURE 2.—Distribution of the subspecies of *Oryzomys concolor*. For location of individual collecting stations see text and gazetteer (p. 562).

The first binomial for the smaller species of subgenus *Oecomys* is *Hesperomys bicolor* Tomes, given in 1860 to a specimen from eastern Ecuador. As in the case of *O. concolor*, the true nature of *bicolor* was not immediately appreciated by subsequent workers. The next member of the species, collected in western Ecuador, was described by Thomas in 1900 as *Rhipidomys dryas*. This was followed by *Rhipidomys phæotis*, *R. benevolens*, *R. rosilla* and *R. paricola*, all described by Thomas on the basis of comparisons with his *R. dryas*.

In 1906, Thomas discovered the essential oryzomyine characters of the small arboreal rice rats assigned by him to *Rhipidomys*. The close relationship between them and *Hesperomys bicolor* Tomes was also noted. Accordingly, Thomas combined them in *Oecomys*, a new subgenus of *Oryzomys*. Thomas also included in subgenus *Oecomys* his previously described *marmosurus*, *mamorae*, and *roberti*, each based on a local form of the large species of arboreal rice rats. All other named forms of arboreal rice rats, including *Hesperomys concolor* Wagner, were ignored or tacitly regarded as species of true *Oryzomys*.

The name *Oecomys* was elevated to full generic rank by Thomas in 1909. This classification was followed by authors until Ellerman (*The families and genera of rodents*, vol. 2, p. 342, 1941) questioned the validity of *Oecomys* even as a subgenus. It appears that Ellerman was misled by the current uncritical listing of some named forms of *Oryzomys concolor* as species of typical *Oryzomys*, and other named forms of *O. concolor* as species of *Oecomys*. Thus, his specimens of "*Oryzomys*" *tectus* and "*Oecomys*" *osgoodi*, exhibited as proof of the absence of important differences between the two "genera" concerned, are actually conspecific and identical with *Oryzomys concolor*. The issue is further confused by Ellerman's observation that "*Oecomys*" *catherinae* Thomas shares critical cranial characters with *Oryzomys subflavus* Wagner. The type of *Oryzomys catherinae*, however, is not an *Oecomys* (see p. 543) but merely another specimen of *Oryzomys subflavus* Wagner. The proper basis for evaluating the taxonomic status of *Oecomys* is a comparison of its type species, *O. bicolor* Tomes, with *O. palustris* Harlan, the type species of *Oryzomys*. Neither of these species was taken into account by Ellerman.

RECOGNIZED FORMS OF THE SUBGENUS

- Oryzomys bicolor trabeatus* G. M. Allen and Barbour (p. 533).
Oryzomys bicolor occidentalis, new name for *Rhipidomys dryas* Thomas
 (= *Oryzomys dryas* Thomas), preoccupied (p. 533).
Oryzomys bicolor bicolor Tomes (p. 534).
Oryzomys bicolor phaeotis Thomas (p. 540).
Oryzomys concolor concolor Wagner (p. 545).
Oryzomys concolor speciosus J. A. Allen and Chapman (p. 553).

Oryzomys concolor superans Thomas (p. 556).

Oryzomys concolor roberti Thomas (p. 559).

Oryzomys concolor bahiensis, new subspecies (replaces *Mus cinnamomeus* Pictet and Pictet, preoccupied) (p. 561).

STATUS OF CERTAIN SPECIES INCORRECTLY ASSIGNED TO *Oecomys*

Oecomys catherinae Thomas, 1909 = *Oryzomys subflavus* Wagner, 1842.
(See infra p. 543.)

Oecomys rex Thomas, 1910 = *Oryzomys subflavus* Wagner, 1842. (See infra p. 543.)

Oecomys emiliae J. A. Allen, 1916 = *Rhipidomys emiliae* J. A. Allen.

Oecomys phelpsi Tate, 1939 = *Akodon aerosus* Thomas, 1913. The name *phelpsi* is based on a skin of what may be either an *Oecomys* or a *Rhipidomys* (cf. Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, p. 194, 1939) and a mismatched skull of *Akodon* (*Chalcomys*) *aerosus*. The name *phelpsi* was restricted to the skull by Tate (Journ. Mammal., vol. 26, p. 316, 1945). *Oecomys phelpsi* Tate, therefore, is a synonym of *Akodon aerosus*. Goodwin (Bull. Amer. Mus. Nat. Hist., vol. 102, p. 300, 1953) lists the skin as type. Tate's decision, however, has priority and is irrevocable.

Mus pyrrhorhinos Wied Neuwied, 1821 = *Wiedomys pyrrhorhinos* Wied Neuwied. This small arboreal mouse from eastern Brazil was provisionally referred to *Oecomys* by Osgood (Journ. Mammal., vol. 14, p. 370, 1933) and is so classified by Goodwin (Bull. Amer. Mus. Nat. Hist., vol. 102, p. 300, 1953). Ellerman (Families and genera of living rodents, vol. 2, p. 349, 1941) lists it as the sole member of a species group of *Oryzomys*. It has since been shown (Hershkovitz, Proc. Biol. Soc. Washington, vol. 72, p. 5, 1959) that the mouse is type of a distinct genus most nearly related to phyllotine rodents.

Mus maculipes Pictet and Pictet, 1844 = *Rhipidomys maculipes* Pictet and Pictet. Incorrectly listed as an *Oecomys* by Tate, Amer. Mus. Nov., No. 581, pp. 10, 21 [footnote 1], 1932.

Hesperomys simplex Winge, 1888 = ? Winge (E Museo Lundii, vol. 1, No. 3, p. 11, pl. 2, fig. 1, 1888) based the name on the anterior portion of a skull found in owl pellets in Recent-Pleistocene deposits in the caves of Lagôa Santa, Minas Gerais, Brazil. Moojen (Os roedores do Brasil, p. 55, 1952) treats this species as an *Oecomys*. However, it is obvious from the original description and figured skull, and from Winge's own definition of *Hesperomys*, that *simplex* is neither an *Oecomys* nor an oryzomyine. The broad forward-projecting zygomatic plate of *simplex*, its narrow, unridged, and rather concave-sided interorbital region, long palate, and simplified molars, i.e. without mesoloph, point to

phyllotine or sigmodont affinities. A more precise determination of the systematic position of *Hesperomys simplex* cannot be made on the basis of available data.

CHARACTERS

EXTERNAL CHARACTERS: Body heavy, limbs short and adapted for arboreal life; size from approximately that of a house mouse (*Mus musculus*) to that of a medium-sized house rat (*Rattus rattus*); pelage long and thick; dorsal surface from buffy to tawny or rufous, with a fine to coarse mixture of dark brown; a poorly defined dark middorsal band sometimes present; underparts from sharply defined white to dark gray, buff, or ochraceous little or not at all defined from sides; an ochraceous lateral line present or absent; ears comparatively small, length (from notch) approximately one-half to four-fifths length of hind foot (dry, with claw); tail never sharply bicolor, sparsely haired except at thickly furred base, tip with or without a conspicuous tuft; length of tail from 40 to 60 percent of total length; hind foot comparatively short and broad, sole at heel bare but half hidden by overlapping hairs of side of tarsus; six plantar tubercles present and well developed; first hind toe with claw extending to base of middle phalanx of second toe, fifth hind toe well developed for grasping, its claw nearly or quite on a level with base of terminal phalanx of fourth toe; claws short and recurved, the fifth exposed, the others partially concealed by the digital tufts.

CRANIAL CHARACTERS (pls. 1-3): Skull moderately heavy; sides of supraorbital region ridged or beaded and markedly divergent posteriorward; midtransverse width of paired frontals more than greatest width of rostrum; nasals comparatively short; upper anterior corner of vertical zygomatic plate rounded and slightly or not at all visible when skull is viewed from above; zygomatic plate comparatively slender, its anteroposterior width at midpoint not more than alveolar length of M^{1-2} ; interparietal well developed, its median length varying from approximately three-tenths to slightly more than one-half its transverse width; sphenopalatine vacuities small, slit-like, or obsolete; incisive foramina moderately long and well opened, length more than one-half but less than nine-tenths that of diastema, the posterior borders terminating from slightly before to slightly behind anterior plane of first molars; auditory bullae small, their anteroposterior length, exclusive of tube, less than that of molar row.

DENTAL CHARACTERS (fig. 3; pl. 4a,b): Upper incisors recurved; upper molar rows parallel-sided; inner and outer halves of unworn to moderately worn upper molar crowns distinctly crested, of lower molars bilevel, i.e., with outer cusps lower than inner cusps; major fold well open, a low enterostyle present at its base in M^{1-2} , and fre-

quently in M^3 ; first minor fold reduced or obsolete in unworn M^2 , obsolete or absent in M^3 ; anterior border of procingulum of unworn first upper molar sometimes notched; mesostyle always fused with mesoloph and connected with either paracone or metacone, or both; a well-developed paralophule usually present and often extending across first secondary fold to connect with mesoloph; primary folds often irregular in outline, the second primary usually isolated from the margin; first and second internal folds of M^{1-2} discrete or confluent with corresponding primary folds, of M^3 discrete or confluent with primary or secondary folds; first secondary fold present in all upper molars, usually as an enamel island or as two, sometimes three, islands separated by the paralophule; second secondary fold present in M^{1-2} as an enamel island, in M^3 as a discrete island, or may be coalesced with either second primary or second internal fold, or absent. Procingulum of M_1 subovate in outline, never distinctly bilobate, the internal, labial and lingual folds isolated from the margin, discrete or coalesced with each other; apex of major fold of M_{1-2} hardly or not at all extending beyond midline of tooth; first minor fold well developed in all lower molars; ectostylid well developed in all molars; ectolophid always present, frequently well developed and fused with ectostylid; a well-defined fold between hypoconid and ectolophid often present and isolated from the margin; first and second internal folds coalesced with corresponding primary folds; first secondary fold of M_{2-3} obsolete or absent; second secondary fold of M_{1-2} well developed, usually isolated but clearly defining mesolophid, of M_3 obsolete or absent; a small entolophulid sometimes present in one or more molars.

COMPARISONS

Subgenus *Oecomys* is the oryzomyine most specialized for arboreal life. Its adaptive characters contrast sharply with those of true *Oryzomys* as represented by its typical species, the palustrine, riparian *O. palustris* Harlan. In *palustris*, pelage of upperparts is dark and glossy, middle digits of hind feet (fig. 4f) long, the outer ones short; interdigital webbing nearly as well developed as in the aquatic oryzomyine *Nectomys*; fifth postdigital plantar tubercle reduced or lost as in many aquatic Muridae; tail coarsely scutulated and often provided with keel hairs. The skull of *O. palustris* (pls. 1-4) differs from subgenus *Oecomys* chiefly by the prominence of the forward-projecting zygomatic plate when viewed from above and by the extremely large sphenopalatine vacuities. The molars of *palustris* and subgenus *Oecomys* (pl. 4) are similar but the lower internal folds are usually discrete in those of *palustris*. Except for the presence of intermediate forms, typical *Oryzomys* and subgenus *Oecomys* might well be treated as generically distinct.

Some species of the arboreal genus *Rhipidomys* resemble subgenus *Oecomys* in superficial characters. Both groups have evolved as arboreal forms along parallel lines but *Rhipidomys* is more specialized. Its tail (fig. 5*b*) is more hairy and, in certain species, considerably longer; the fifth hind toe is longer and a brown metatarsal patch is generally present. The very closely related *Nyctomys* (fig. 5*a*) is another arboreal cricetine that resembles subgenus *Oecomys* in external characters. *Rhipidomys* and *Nyctomys* are members of the peromyscine group of cricetines which differs from oryzomyines chiefly by its short palate (pl. 2*d*) without pitted posterolateral palatal depressions, some minor dental characters (pl. 4), and by the mammary formula, 1-2=6.

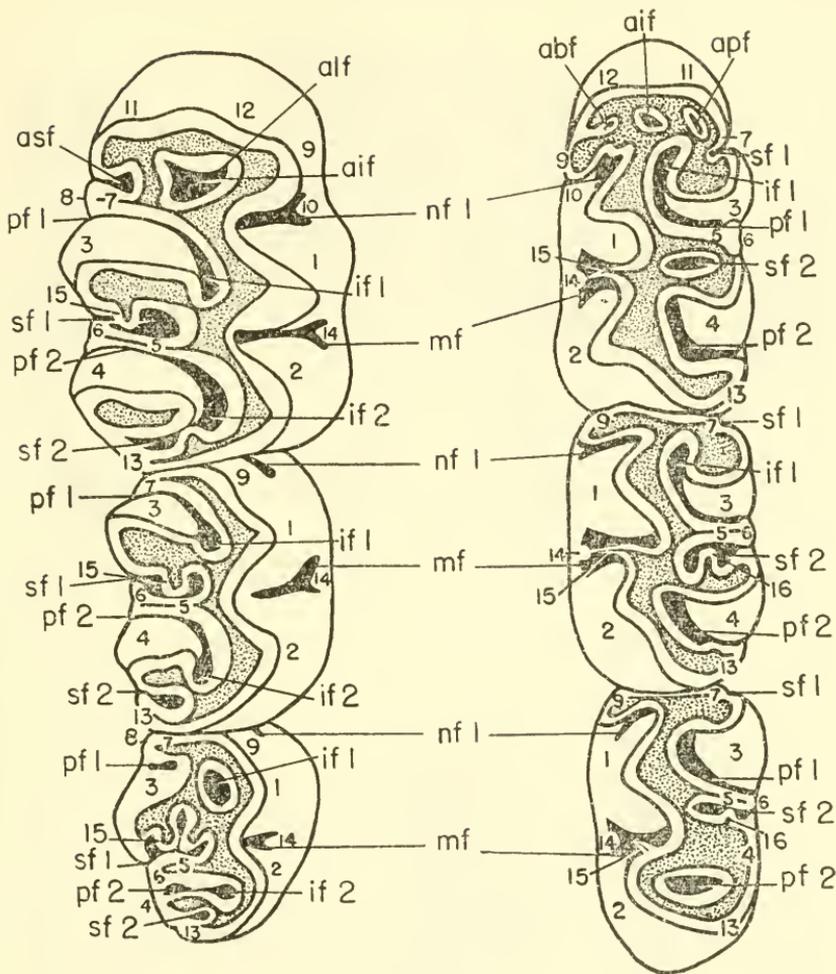
Additional comparisons of subgenus *Oecomys* are given under the individual species headings.

SOME ARBOREAL ADAPTATIONS

HIND FOOT (fig. 4): The *pes* of subgenus *Oecomys* is actually and relatively shorter and broader than that of closely related terrestrial species of comparable body size. Measurements of the length of the hind foot of a series of the small species *Oryzomys (Oecomys) bicolor* are shown in table 1. They may be compared with measurements in

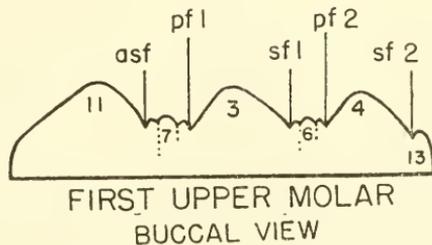
EXPLANATION OF SYMBOLS IN FIGURE 3

Names of Cusps	3, Metaconid	sf 1, first secondary fold
<i>Upper Molars</i>	4, Entoconid	sf 2, second secondary fold
1, Protocone	5, Mesolophid	
2, Hypocone	6, Mesostylid	if 1, first internal fold
3, Paracone	7-12, Procingulum	(shown coalesced with pf 1)
4, Metacone	7, Anterolophid	
5, Mesoloph	8, Anterolingual stylid	if 2, second internal fold
6, Mesostyl	(not shown)	(shown coalesced with pf 2)
7-12, Procingulum	9, Anteroconulid	
7, Anteroloph	10, Anterolabial stylid	aif, anterior internal fold
8, Anterolabial style	11, Anterolingual conulid	asf, anterior secondary fold (upper first molar only)
9, Anteroconule	12, Anterolabial conulid	alf, anterior lingual fold (upper first molar only)
10, Anterolingual style	13, Posterolophid (postcingulum)	
11, Anterolabial conule	14, Ectostylid	abf, anterior labial fold (lower first molar only)
12, Anterolingual conule	15, Ectolophid	
13, Posteroloph (postcingulum)	16, Entolophulid	apf, anterior primary fold (lower first molar only)
14, Enterostyle	Names of Folds	
15, Paralophule	mf, major fold	
<i>Lower Molars</i>	nf 1, first minor fold	
1, Protoconid	pf 1, first primary fold	
2, Hypoconid	pf 2, second primary fold	



RIGHT UPPER MOLARS

LEFT LOWER MOLARS



FIRST UPPER MOLAR
BUCCAL VIEW

FIGURE 3.—Molars of *Oecomys*: a diagrammatic composite of the enamel pattern. The basic elements and some of the variations present in the upper and lower molars of *Oryzomys (Oecomys) bicolor* and *O. (O.) concolor* are shown. Explanation of symbols on opposite page.

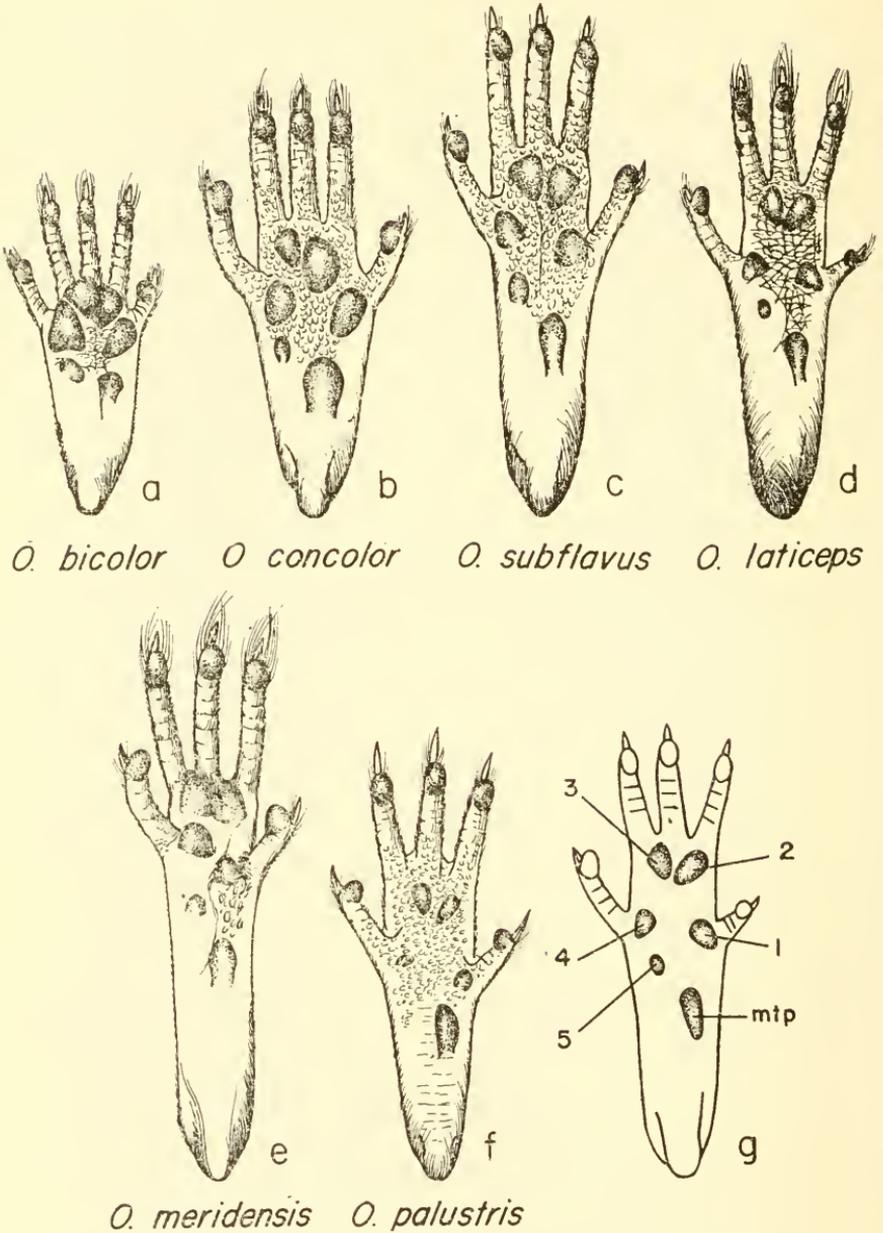


FIGURE 4.—Right hind foot of: a, arboreal *Oryzomys bicolor*; b, arboreal *O. concolor*; c, semi-arboreal *O. subflavus*; d, terrestrial *O. laticeps*; e, terrestrial *O. meridensis*; f, palustrine *O. palustris*. g, Plantar surface of murid hind foot showing position of pads (1-5 = postdigital plantar pads; mtp = metatarsal pad).

table 2 of a series of the equally small but terrestrial species *Oryzomys alfaroi*. Measurements in tables 3 and 4 are, respectively, of a series of the large arboreal *Oryzomys (Oecomys) concolor* from eastern Colombia, and those of a series of the comparably sized terrestrial *Oryzomys (Oryzomys) laticeps* from the same region. Because of distortions of the hind $\frac{1}{2}$ foot in dry specimens, no reliable measurement can be given for the width of the metatarsus relative to foot length.

The hind foot of *Oecomys* appears short in comparison with terrestrial types. Nevertheless, the proportions between metatarsalia and digits have probably diverged little from those of the scansorial type of primitive cricetines. On the other hand, the greater breadth of the metatarsus of subgenus *Oecomys* (fig. 4a,b) does appear to be a specialization for arboreal life. The broader foot provides a more powerful and expansive grasp for climbing, perching, and hanging. It also permits an effective degree of opposability between the first and fifth metatarsals and a considerable amount of adduction and abduction in the corresponding toes.

PLANTAR TUBERCLES: Six plantar tubercles, the primitive number, are present and well developed in subgenus *Oecomys* (fig. 4a,b). The first four postdigital pads are large and with little space between them. The smaller fifth postdigital pad is also well developed, and is separated from the fourth by a space less than its smallest diameter. The metatarsal pad is long and narrow, as usual in cricetines. The function of the postdigital plantar tubercle has not been observed in subgenus *Oecomys*. Homer (Contr. Lab. Vert. Gen. Univ. Michigan, No. 61, p. 13, 1954) states that in scansorial forms of *Peromyscus* the pads are used for grasping. The method was not described but undoubtedly slender branches and twigs may be clutched between apposing tubercles.

CLAWS: The claws are thick, comparatively short, recurved, their tips sharp and raised well above the ends of the toes. These claws cannot serve for digging and their position does not interfere with the action of the toes as grasping organs. In contrast, claws of closely related terrestrial cricetines such as *Oryzomys laticeps* are slender, little curved, and shield the fleshy tips of the toes when used in scratching or digging.

TAIL: Modification of this organ as a specialized tool for arboreal life is not pronounced in subgenus *Oecomys*. It is not remarkably long and in many individuals is actually shorter than head and body combined. The average length, however, is greater than that of head and body combined. The tail of subgenus *Oecomys* appears to be slightly thicker than those of comparable sylvan cricetines of predominately terrestrial habits. This character indicates greater power for balancing, prehension and support in climbing. The

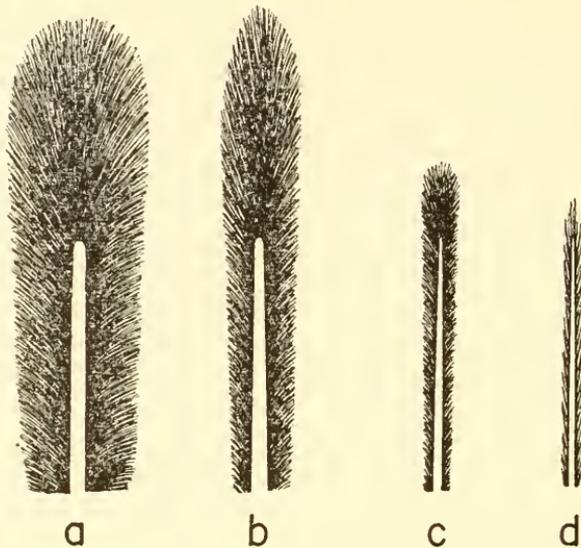


FIGURE 5.—Comparative length of hair of terminal portion of tail of: *a*, arboreal peromyscine, *Nyctomys*; *b*, arboreal peromyscine, *Rhipidomys*; *c*, arboreal oryzomyine, *Oryzomys bicolor*; *d*, terrestrial oryzomyine, *Oryzomys laticeps*.

pilosity of the tail (figs. 5, 6) varies considerably but is never as great as in such related arboreal cricetines as *Rhipidomys* and *Nyctomys*. The thin pencil and elongated hairs of the terminal one-fourth or one-third of the tail are probably sensory and used by the mouse for detecting movements in the rear.

DISCUSSION: Hind foot length of arboreal mice of the subgenus *Oecomys* averages less than 21.5 percent of combined head and body length. The hind foot of predominantly terrestrial oryzomyines averages more than 21 percent. The arboreal or terrestrial *pes* could, therefore, have evolved from an ancestral type with average length from 21 to 21.5 percent of combined head and body length. Specialization of the hind foot of the evolving arboreal cricetine is expressed first by a lateral broadening of the metatarsus. As the animal becomes increasingly dependent on its arboreal habitat, the metatarsus becomes more flexible, the first and fifth digits more powerful and opposable, and the plantar tubercles modified for grasping. In contrast, the hind foot of the highly specialized cursorial or saltatorial terrestrial cricetine becomes narrower and longer relative to head and body length, the metatarsus rigid, and the first and fifth hind digits reduced.

A tail length approximately equal to head and body combined appears to be the generalized condition in cricetines. In the evolution of ambulatory, terrestrial species, notably volelike and fossorial forms, the tail becomes shorter. In arboreal, saltatorial and some

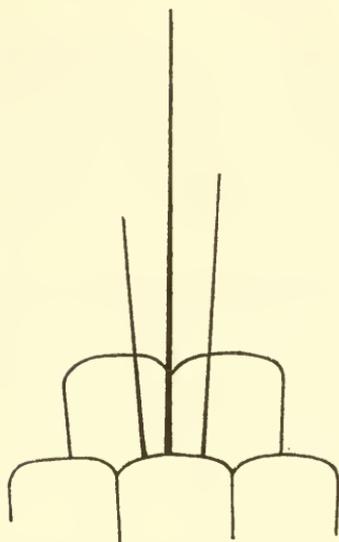


FIGURE 6.—Hair-scale relationships on basal portion of tail in *Oryzomys*. Hairs of one scale only are shown; the same number and disposition of hairs occurs on every scale. ($\times 40$.)

aquatic cricetines, the tail has become longer, at least on an average.

The degree of specialization of hind foot and tail of cricetines may be measured by the amount each organ has diverged from the critical proportions given above. Thus, in oryzomyines the longer the hind foot than 21.5 percent of combined head and body length, or shorter than 21 percent, the more specialized it is. In other cricetines, the critical proportions may be a little more or less. Likewise, the longer or shorter a tail than combined head and body length, the greater the specialization. This, in effect, implies that a specialized short-footed species could not have evolved from a specialized long-footed form, or vice versa; and that a specialized long-tailed species cannot claim a specialized short-tailed species as its ancestor, or vice versa.

On the basis of the above criteria, *Oryzomys* (*Oecomys*) *concolor* is more highly specialized for arboreal life than *O.* (*Oecomys*) *bicolor*. Its hind foot is comparatively shorter, its tail proportionately longer. The more developed temporal ridges also indicate greater specialization of the masseter muscle.

HABITS AND HABITATS

The two known species of subgenus *Oecomys* nest in tree hollows, tangled masses of epiphytes or vines, palm fronds, abandoned bird nests and in thatched roofs of houses. They normally feed above ground, but famine or drought may drive them to the ground in search

of food and water. At least the larger species, *Oryzomys concolor*, never lives far from water. I have often shined individuals at night running along the maze of tree trunks, vines, logs and even fences that connect their arboreal nests with the water's edge. The smaller species is the one most commonly found in houses where arboreal habitats are simulated by the palm-thatched roofs and natural timber frameworks. A lone mouse or one or two families of either species may be permanent residents in the thatched roof or attic of a house. On the other hand, many individuals merely visit buildings for feeding on insects or man's food stores. Marauding mice are obliged to cross the cleared ground between the forest-edge and the building.

Oryzomys concolor frequently nests near the ground. It is commonly taken in traps placed on logs, along fences and on the banks of streams sheltered by shrubs and overhanging vines. *O. concolor* has managed to survive in a number of localities (e.g. Villanueva, Colombia) where the primitive forest cover has been reduced to small isolated stands, scattered trees, shrubs and thinly wooded stream banks. It also thrives in plantations of coffee, bananas and other fruits. Where living conditions are optimum, *Oryzomys concolor* tends to form colonies and can become excessively numerous. The collector Salamón Briceño notes (MS.) that the species does considerable damage in coffee plantations in the district of Mérida, Venezuela.

The smaller species, *Oryzomys bicolor*, is strictly arboreal and prefers to nest high above ground. Although one of the most common native house mice in tropical South America, it is not found in areas where forests have lost their dominance. It lives in pairs or in single family groups and is nowhere known to be abundant.

Males of *Oryzomys concolor* exude a musky odor. The females of either species of *Oecomys* produce two to four young in a litter. The condition of the mammae in dry skins suggests that young are born the year round.

The name *Oecomys* (*oikos*=house+*mus*) was given in allusion to the mice's predilection for houses. In eastern Ecuador where arboreal rice rats are common, the local Quechua name for *O. concolor* is "polanda ucucha" (banana rat) and for *O. bicolor*, "jahua ucucha." The meaning of "jahua" is obscure.

Oryzomys bicolor Tomes

DISTRIBUTION (fig. 1): Tropical zones of Panama, Venezuela (exclusive of the Maracaibo basin), Ecuador, the Guianas, the Amazonian and upper Rio Paraguay basins of Brazil, and the Amazonian regions of Bolivia, Peru, and Colombia; altitudinal range, from near sea level to about 2,000 meters above. The apparent disributional hiatus in

northwestern Venezuela and in northern and western Colombia may not be real.

EXTERNAL CHARACTERS: Dorsal surface ochraceous to tawny finely mixed with dark brown; underparts sharply defined white or buffy to ochraceous, the basal portions of the individual hairs white throughout, or pale gray on belly and lateral borders; tail from 40-60 percent of total length.

TABLE 1.—*Oryzomys (Oecomys) bicolor bicolor* Tomes: External measurements (in millimeters) of a series of adults from the Rio Caquetá region, eastern Colombia. Specimens were collected and measured in the flesh by the author. Note proportional length of hind foot and compare with table 2.

CNHM No.	Sex	Head and body	Tail	Hind foot (dry, c. u.)	Hind foot/Head and body	Weight (in grams)
					<i>Percent</i>	
72092	♂	110	121	23	20.9	42
72093	♂	105	110	22	21.0	32
72094	♂	115	—	23	20.9	40
72095	♀	109	119	23	21.1	40
72096	♀	105	120	24	22.8	42
72097	♀	111	95	21	18.9	32
Mean		109	113	23	20.9	38

CRANIAL CHARACTERS (pls. 1-11): Sides of supraorbital region finely beaded, sometimes narrowly ledgelike; temporal ridges never strongly developed anteriorly, weakly defined or obsolete posteriorly; anterior zygomatic plate comparatively narrow, its anteroposterior width at midpoint always less than alveolar length of M^{1-2} , and frequently less than length of M^{2-3} ; upper anterior corner of zygomatic plate not produced forward and barely or not at all visible when skull is viewed from above; braincase well inflated, usually convex antero-posteriorly at frontoparietal suture, the interparietal steeply arched; position of posterior borders of incisive foramina from slightly in front of to slightly behind anterior plane of first molars; posterior halves of palatines without notable excrescences.

DENTAL CHARACTERS. Those of the subgenus.

COMPARISONS: Ordinarily the difference in size between *Oryzomys bicolor* and *O. concolor* is sufficient for distinguishing the smaller from the larger species. However, a few extremely large individuals of *O. bicolor* may equal or even exceed in size small adults of some populations of *O. concolor*. Where the similarity extends to color of underparts, length of hind foot, size of molars and width of anterior zygomatic plate, it may be difficult to distinguish an isolated specimen of the first species from that of another of the second species.

TABLE 2.—*Oryzomys (Oryzomys) alfaroi gracilis* Thomas: External measurements (in millimeters) of a series of adults from Valdivia, Antioquia, central Colombia. Specimens were collected and measured in the flesh by the author. Note proportional length of hind foot and compare with table 1.

CNHM No.	Sex	Head and body	Tail	Hind foot (dry, c. u.)	Hind foot/Head and body	Weight (in grams)
70507	♂	110	119	26	<i>Percent</i> 23.7	40
70508	♂	101	108	25	24.7	40
70511	♂	114	110	26	22.8	—
70513	♂	104	108	26	25.0	30
70515	♂	107	104	25	23.3	40
70516	♂	122	122	27	22.7	—
70517	♂	104	112	25	24.0	—
70518	♂	107	127	27	25.2	40
70509	♀	101	101	24	23.7	—
70510	♀	106	101	25	23.6	—
70512	♀	106	101	25	23.5	30
70514	♀	116	116	26	22.4	—
Mean		108	112	25	23.7	37

Members of the *Oryzomys longicaudatus* group, or subgenus *Oligoryzomys*, are the only other rice rats that resemble *Oryzomys bicolor*. They are smaller, primarily terrestrial mice, with pelage comparatively coarse, underparts sometimes pure white, as in *O. bicolor* but more commonly with the color of the basal portions of the hairs dark gray and usually showing through at the surface; tail more slender, equal to or longer than combined head and body length, coarsely scutulated, nearly naked and without a definable pencil; hind foot narrow and comparatively longer, generally more than 23 percent of combined head and body length; sole at heel not hidden by overlapping lateral tarsal hairs in the tropical zone forms; first hind toe with claw barely extending beyond base of second toe, fifth hind toe slender, its claw extending to base of middle phalanx of fourth toe, sometimes slightly distad; skull (pl. 7b) more elongate, braincase narrower, bullae more inflated; anterior zygomatic plate forward-projecting so that one-half its width is visible from above; supraorbital region narrow, the sides concave, parallel or slightly divergent posteriorward and never ridged or beaded; median longitudinal sulcus of nasals continuing as a well marked depression over anteromedian portion of frontals.

COLOR AND PELAGE: Geographic variation in color in *Oryzomys bicolor* is insignificant from a taxonomic point of view. This is remarkable in view of the extent and ecological diversity of the area occupied by the animal. The usual correlation between coat color and color of soil or ground cover apparent in most terrestrial cricetines

TABLE 3.—*Oryzomys (Oecomys) concolor superans* Thomas: External measurements (in millimeters) of a series of adults from the Río Caquetá region, eastern Colombia. Specimens were collected and measured in the flesh by the author. Note tail length and proportional length of hind foot and compare with table 4.

CNHM No.	Sex	Head and body	Tail	Hind foot (dry, c. u.)	Hind foot/Head and body	Weight (in grams)
					<i>Percent</i>	
72014	♂	141	181	32	22.7	75
72015	♂	170	—	31	18.2	110
72016	♂	162	163	30	18.5	95
72017	♂	159	171	30	18.9	110
72018	♂	152	170	30	19.7	85
72019	♂	160	—	32	20.0	105
72020	♂	159	161	30	18.9	93
72021	♂	151	163	31	20.5	82
72022	♂	151	177	29	19.2	—
72023	♀	169	173	31	18.3	115
72024	♀	141	—	23	19.9	80
72025	♀	157	160	29	18.5	80
72027	♀	162	176	31	19.6	120
72029	♀	153	175	31	20.3	88
72030	♀	141	—	28	19.9	75
72031	♀	164	183	31	18.9	105
72032	♀	149	183	29	19.4	—
72033	♀	176	174	31	17.6	—
72034	♀	161	158	30	18.6	—
Mean		157	172	30	19.3	95

is not evident in arboreal *Oryzomys bicolor*. The direct relationship between amount of rainfall and intensity of coat color, clearly expressed in many species of terrestrial and arboreal mammals, is but slightly indicated on the underparts of some individuals of *O. bicolor*. Temperature throughout the area occupied by *O. bicolor* is fairly uniform and has little or no effect on the length, thickness, texture and, indirectly, the color of the pelage.

The underparts vary from pure white to uniformly ochraceous. White underparts may be marked by buff or ochraceous spots, patches and streaks. In underparts that appear wholly white at the surface, the basal portions of the hairs are generally white except, sometimes, along the sides where they may be gray. Where the underparts are tinged, the basal portions of the hairs are, as a rule, dark gray.

In any one population, each adult may be classified as either bright or dark according to the color of its upperparts and sides. In the bright color group, the terminal portions of the cover hairs are ochraceous orange with or without a fine dark brown tipping. The terminal portions of the guard hairs are dark brown. The colors in the dark group are similar but the cover hairs are more uniformly tipped with dark brown and there is a greater concentration of guard hairs.

The difference between the color groups are slight and in any large series completely intergrading. Extreme examples of the bright color group are nearly erythristic. On the other hand, no specimen of the dark group even remotely suggests melanism.

There are some examples in present material of adults molting from one color group to another.

The color of nestling young is like that of adults. As the juvenal coat of cover hairs on upperparts and sides becomes worn, the dark gray basal portions of the hairs show through. Adult pelage begins to replace juvenal pelage on the lower parts of the sides of the body and on the shoulders. Adult pelage appears next on head, nape, and shoulders, respectively. Evidently, the short, wholly slate colored pelage characteristic of most newborn terrestrial species of *Oryzomys* is either absent or ephemeral in *O. bicolor*.

THE SUBSPECIES

Four subspecies of *Oryzomys bicolor* are recognized, two of them provisionally. The first, *bicolor* Tomes, occupies most of the range of the species east of the Andes. The second, *phaeotis* Thomas of southeastern Peru and northern Bolivia, averages larger in size than the others. *O. b. trabeatus* G. M. Allen and Barbour is the Central American representative. It appears to be completely isolated

TABLE 4.—*Oryzomys* (*Oryzomys*) *laticeps* Lund: External measurements (in millimeters) of a series of adults from the Rio Caquetá region, eastern Colombia. Specimens were collected and measured in the flesh by the author. Note tail length and proportional length of hind feet and compare with table 3.

CNIM No.	Sex	Head and body	Tail	Hind foot (dry, c. u)	Hind foot/Head and body	Weight (in grams)
					<i>Percent</i>	
72035	♂	146	—	32	21.9	83
72036	♂	135	—	29	21.4	—
72037	♂	142	—	30	21.1	78
72038	♂	159	127	33	20.7	98
72039	♂	146	127	31	21.2	75
72040	♂	148	131	31	20.9	40
72041	♂	143	130	33	23.0	65
72043	♂	153	133	32	21.5	95
72044	♂	147	137	33	22.4	95
72045	♂	137	123	30	21.8	58
72046	♂	139	130	30	21.6	88
72047	♂	148	134	32	21.6	90
72048	♀	139	133	30	21.6	—
72049	♀	158	141	32	20.2	103
72050	♀	136	121	29	21.3	—
72052	♀	141	120	32	22.7	63
72054	♀	151	119	31	20.5	80
72055	♀	154	129	31	20.1	88
72056	♀	146	129	32	21.9	75
Mean		147	123	31	21.4	80

geographically from its relatives but is not known enough to be characterized. *O. b. occidentalis* (new name) of western Ecuador is distinguished by a few trivial cranial characters.

***Oryzomys (Oecomys) bicolor trabeatus* G. M. Allen and Barbour**

Oecomys trabeatus G. M. Allen and Barbour, Bull. Mus. Comp. Zool., vol. 65, p. 262, 1923.—G. M. Allen, Bull. Mus. Comp. Zool., vol. 71, p. 266, 1931 (type history).

Oecomys endersi Goldman, Journ. Washington Acad. Sci., vol. 23, p. 525, 1933 (type locality, Barro Colorado Island, Canal Zone, Panama).—Enders, Bull. Mus. Comp. Zool., vol. 78, p. 454, 1935 (Barro Colorado, Panama; habits).

TYPE: Adult male, skin and skull (MCZ 19837); collected Apr. 10, 1922, by Thomas Barbour and W. S. Brooks.

TYPE LOCALITY: Río Jesusito, Darién region, eastern Panama.

DISTRIBUTION: Known only from the Canal Zone to the eastern boundary of Panama. The range may extend into Costa Rica on the west and into the Colombian Chocó on the south; altitudinal range from sea level to about 500 meters above.

CHARACTERS: Those of the species. See "Remarks," below.

MEASUREMENTS: Those of the type of *trabeatus* (from the original description) are followed by those of the type of *endersi*: head and body, 110, 114; tail, 120, 124; hind foot, 22 (in flesh), 24 (dry); ear, 15, 15; greatest length of skull, 26.0, 28.1; zygomatic breadth, 15, 15.1; rostrum, —, 5.4; incisive foramina, —, 4.8; diastema, 7.0, 7.4; molar row, 4.0, 4.3 (alveolar); width of zygomatic plate, —, 2.5.

REMARKS: Judged by the original description, the type of *trabeatus* is a young individual of the bright color group. It was compared with three darkly colored individuals of *Oryzomys bicolor* from eastern Ecuador and said to differ by its "somewhat larger" size, longer tail and longer, thicker pelage. None of these distinctions is valid. Retention here of *trabeatus* for Central American members of the common species is based solely on the availability of the name and the absence of any records of the occurrence of the species in the deciduous forests of northern Colombia. It is also possible that additional material from Panama may reveal subspecific differences that cannot be accurately evaluated from one specimen.

The type of *endersi* Goldman, also from Panama, is an old individual of the dark color group. Its size and color are within the range of variation of the typical form of the species.

SPECIMENS EXAMINED: One (UMMZ, type of *endersi*, from Panama).

***Oryzomys (Oecomys) bicolor occidentalis*, new name**

Rhipidomys dryas Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 5, p. 271, 1900 (preoccupied by *Oryzomys dryas* Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 2, p. 267, 1898, a member of the subgenus *Microrizomys*)

[*Oryzomys* (*Ecomys*)] *dryas*, Thomas, Ann. Mag. Nat. Hist., ser., 7, vol. 18, p. 455, 1906 ("probably=*bicolor*").

TYPE: Adult female, skin and skull (BM 99.12.5.4); collected May 11, 1899, by R. Miketta.

TYPE LOCALITY: Paramba, Río Mira, Imbabura, northwestern Ecuador; altitude, 1,100 meters above sea level.

DISTRIBUTION: Known from northwestern Ecuador only. No doubt the range extends northward into western Colombia. Its southward extension may be limited to the Río Guayas drainage system in Manabí, Bolívar, and Guayas Provinces, Ecuador. Its altitudinal range is from near sea level to about 1,500 meters above on the western slope of the Cordillera Occidental.

CHARACTERS: Size and external characters as in *trabeatus* and typical *bicolor*: zygomata less expanded; midtransverse width of paired frontals hardly more than greatest width of rostrum and comparatively less than in other races.

MEASUREMENTS: Those of the type of *dryas* Thomas (from the original description) are followed by those of two adults from Pambilar, Esmeraldas, Ecuador: head and body, 100, 104, 106; tail, 120, 115 (dry), 130 (dry); hind foot, 22 (*s.u.*), 22 (dry, *c.u.*), 23 (dry, *c.u.*); ear, 14, 12 [?], 15; greatest length of skull, 27.0, 26.4, 27.4; zygomatic breadth, 15.0, 13.5, 13.4; rostrum, —, 5.1, 5.3; incisive foramina, 4.6, 4.6, 4.5; diastema, 7.0, 6.5, 6.4; molar row, 3.8, 4.0 (alveolar), 4.1 (alveolar); width of zygomatic plate, —, 2.2, 2.5.

REMARKS: The three near topotypes at hand are brightly colored. One is a juvenal in old pelage but with an irregular patch of bright new adult pelage on nape, back, and left side.

SPECIMENS EXAMINED: Four, from the following localities in Ecuador: Paramba, Imbabura, 1 (BM, type of *dryas*); Pambilar, Esmeraldas, 3 (USNM).

Oryzomys bicolor bicolor Tomes

Hesperomys longicaudatus, Tomes (not Bennett), Proc. Zool. Soc. London (1858), p. 548, 1859 (Gualaquiza, Ecuador).

Hesperomys bicolor Tomes, Proc. Zool. Soc. London (1860), p. 217, 1860.

[*Hesperomys*] *M[yozomys] bicolor*, Tomes, Proc. Zool. Soc. London (1861), p. 284, 1862.

H[esperomys (Rhipidomys)] bicolor, Thomas, Proc. Zool. Soc. London (1884), p. 448, 1884 (doubtfully referred to *Rhipidomys*).

Oryzomys (*Ecomys*) *bicolor*, Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 18, p. 445, 1906 ("type . . . described from a discoloured specimen with a broken tail").

Oryzomys (*Ocomys*) *bicolor*, Sanborn, Journ. Mammal., vol. 30, p. 285, 1949 (Yarinacocha, Loreto, Peru).

Ecomys bicolor, J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 35, p. 210, 1916 (Colombia: Andalucia, Huila; Florencia, Caquetá).—Thomas, Ann. Mag.

Nat. Hist., ser. 9, vol. 19, p. 370, 1927 (Yurac Yacu, San Martín, Peru, "mostly caught in house"); ser. 10, vol. 2, p. 262, 1928 (San Jerónimo, Loreto, Peru).

Oecomys bicolor, Osgood, Field Mus. Nat. Hist., zool. ser., vol. 10, p. 161, 1914 (Tambo Yacu, near Rioja, San Martín, Peru).—Gyldenstolpe, Kungl. Svenska Vet.-Akad. Handl., vol. 11, p. 39, 1932 (characters; "type locality: South-western Ecuador, Guayaquil."—Tate, Zoologica, vol. 32, p. 66, 1947 (Rancho Grande, Aragua, Venezuela, 1,100 meters).

Rhipidomys rosilla Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 14, p. 35, 1904 (type locality, La Unión, lower Río Caura, Río Orinoco, Bolívar, Venezuela).

[*Oryzomys* (*Ecomys*)] *rosilla*, Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 18, p. 445, 1906 (classification).

Rhipidomys paricola Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 14, p. 194, 1904 (type locality, Igarapé Açu, on the railway line between Belém de Pará and Bragança, Pará, Brazil; altitude, 50 meters).

[*Oryzomys* (*Ecomys*)] *paricola*, Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 18, p. 445, 1906 (classification).

Ecomys nitidulus Thomas, Ann. Mag. Nat. Hist., ser. 8, vol. 6, p. 505, 1910 (type locality, lower Essequibo River, 13 miles above mouth, Demerara, British Guiana).—Anthony, Zoologica, vol. 3, No. 13, p. 275, 1921 (Kartabo, British Guiana).

Ecomys milleri J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 35, p. 523, 1916 (type locality, Barão de Malgaço, Rio Conguiaru, upper Gy-Paraná, Rio Madeira, Mato Grosso, Brazil).

Ecomys florenciae J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 35, p. 524, 1916 (type locality, Florencia, Río Orteguaza, upper Río Caquetá, Caquetá, Colombia).

[?] *Ecomys rutilus* Anthony, Amer. Mus. Nov., No. 19, p. 4, 1921 (type locality, Kartabo, at junction of Cuyuni and Mazaruni Rivers, lower Essequibo, Demerara, British Guiana).—Anthony, Zoologica, vol. 3, No. 13, p. 275, 1921.

Rhipidomys [sic] *benevolens*, Ihering (not Thomas), Rev. Mus. Paulista, São Paulo, vol. 6, p. 420, 1904 (Rio Juruá, Amazonas, Brazil; skull, 28 mm., molar row, 4.3).

TYPE: Young adult female, skin and skull (BM 7.1.1.96); collected by Mr. Fraser.

TYPE LOCALITY: Gualaquiza, Río Gualaquiza, Santiago-Zamora Province, southeastern Ecuador; altitude, 885 meters above sea level.

DISTRIBUTION: From the Amazonian region of Brazil north into the Guianas, west into the foothills of the Cordillera Oriental in Venezuela, Colombia, Ecuador, and the Ríos Ucayali and Huallaga basins of Peru, south into the upper Río Paraguay drainage basin in Mato Grosso, Brazil; altitudinal range from sea level to possibly 1,000 meters above.

CHARACTERS: Those of the species.

MEASUREMENTS: See table 5.

VARIATION: Six specimens at hand from Zamora are near topotypes. Three are juvenals in old pelage with the new adult pelage appearing along the sides of the body. The three adults are uniformly colored

TABLE 5.—*Oryzomys bicolor bicolor* *Tomes: Measurements (in millimeters)*
by italic

Locality	Head and body	Tail	Hind foot	Ear	Skull, greatest length
COLOMBIA					
Guacaramo	—	—	22(21.0-22.5) <i>5</i>	—	23.2(25.7-29.1) <i>5</i>
Mambita	—	—	22	—	—
Florencia ¹	100	100	22	—	—
Florencia	98, 100, 100	100, 100, 100	22, 22, 22	—	—
Mecaya	111, 105, 115	95, 120, —	21, 24, 23	14, 16, 13	—, 28.8, 29.2
Tres Troncos	109, 110	119, 121	23, 23	14, 14	27.3, 28.5
Ino Gaje	93	—	20	—	27.1
ECUADOR					
Rfo Suno	—	—	22, 22, 23	—, —, —	26.5, 27.4, 28.8
Llunchi	96(85-113) <i>8</i>	107(98-114) <i>7</i>	22(21-22) <i>8</i>	15(14-16) <i>8</i>	26.5, 26.8, 28.1
Canelos	110, 108, 107	105, 117, 113	21, 22, 23	—, —, —	26.9, 27.6, 27.9
Copataza	103, 108, 103	100, 121, 100	23, 22, 21	15, —, 15	26.6, 27.0, 27.5
Zamora	108, 112	111, 111	22, 23	—, —	27.6, 28.5
Gualaquiza ²	95	89	20	—	27.6
PERU					
Curaray	—	—	21.5(20-23) <i>8</i>	—	26.5(26.1-27.2) <i>6</i>
Rfo Mazán	—	—	24	—	27.3
Rfo Santiago	108	110	22	14	27.6
Rfo Ucayali ³	100, —, —	103, —, —	22, 21, 20	12, —, —	26.6, 27.5, 27.6
Satipo	105, 105	120, 115	21, 22	11, 14	28.2, 28.8
VENEZUELA					
Rancho Grande	—	—	—	—	26.7
La Unión ⁴	109	101	20.5 ⁵	—	28
BRITISH GUIANA					
Kartabo	—	—	22(21-22) <i>5</i>	—	27.4(26.7-28.1) <i>6</i>
Kartabo ⁶	77	94	20	—	24.2
Essequibo ⁷	118	125	23 ⁸	—	29.0
Holmia	110	105	22	15	25.2
BRAZIL					
Jauararé	95	115	22	—	27.1
Igarapé Bravo	98	97	22	—	25.5
Limontuba	103	92	21	—	24.9
Recreio	100	115	22	—	27.2
Igarapé-açu ⁹	118	125	23 ⁸	—	25.0
Barão Melgaço ⁹	95	90	20	—	24.0
Barão Melgaço	—	—	—	—	23.7

¹ Type of *florenciae* J. A. Allen, from original description. The type and paratypes are skins without skulls.

² Type of *bicolor* Tomes, from original description.

³ Specimens from Pucallpa, Sarayacu, and Lagarto Alto, respectively.

⁴ Type of *rosilla* Thomas, from original description, external measurements from the dry skin.

of adults. (Number of specimens, when more than three, indicated figure.)

Zygomatic breadth	Rostrum width	Inclisive foramina	Diastema	Alveolar length of molar row	Zygomatic plate width
14.9(14.5-15.1)4	5.1(4.7-5.4)6	4.8(4.5-5.0)6	7.1(6.2-7.6)6	4.2(4.0-4.4)6	2.5(2.3-2.7)6
14.9	5.3	4.9	7.1	4.3	2.4
—	—	—	—	—	—
—	—	—	—	—	—
14.4, 15.4, 15.3	4.9, 5.2, 5.1	5.0, 4.5, 5.1	6.9, 7.4, 7.4	3.8, 4.6, 4.2	2.5, 2.6, 2.3
14.1, 14.9	4.7, 5.5	4.7, 5.3	6.8, 7.4	4.3, 4.2	2.3, 2.4
13.8	4.8	4.8	7.0	4.0	2.4
—, 14.4, 15.9	4.8, 5.0, 4.7	4.7, 4.8, 4.7	6.5, 7.0, 7.2	3.9, 4.3, 4.2	2.1, 2.2, 2.5
14.1(13.1-14.6)6	5.0(4.4-5.4)8	4.8(4.3-5.2)8	6.8(5.5-7.5)8	4.1(4.0-4.3)8	2.3(1.8-2.5)8
—, 14.3, 15.0	4.9, 5.1, 4.9	—, 4.7, 4.1	—, 7.0, —	4.0, 4.0, 4.0	2.2, 2.5, 2.4
13.3, 15.5, 14.2	4.7, 5.5, 5.0	4.3, 4.8, 4.9	6.5, 6.6, 6.9	4.4, 4.1, 3.8	2.2, 2.3, 2.3
14.3, 14.9	5.2, 4.8	5.0, 4.9	7.5, 7.4	3.9, 4.1	2.3, 2.4
14.8	—	—	—	4.2	—
13.9(13.2-14.5)7	5.0(4.8-5.4)7	4.5(4.2-4.9)8	6.5(5.8-7.0)8	4.1(4.0-4.3)8	2.2(1.9-2.4)9
—	5.0	4.6	6.8	4.1	2.5
—	5.2	4.7	6.9	3.8	2.6
—, —, —	4.8, 5.1, 5.3	4.8, 5.1, 4.9	6.9, 7.3, 7.4	3.9, 4.1, 3.9	2.3, 2.2, 2.2
14.7, 14.9	5.2, 5.7	4.8, 4.7	7.2, 7.3	4.1, 4.1	2.5, 2.4
14.2	4.9	4.6	6.9	4.1	2.4
15.5	—	5.4	7.4	3.8	—
14.7(13.6-15.5)6	5.0(4.6-5.3)6	4.9(4.6-5.4)6	7.0(6.6-7.5)6	3.9(3.8-4.2)6	2.3(2.2-2.6)6
13.5	—	3.7	—	3.4	—
—	—	5.2	—	3.7	—
13.0	4.3	4.5	6.5	3.9	2.0
14.0	5.1	4.9	6.8	4.2	2.5
13.2	5.0	4.3	6.3	3.7	2.3
12.6	4.9	4.1	5.9	3.8	2.1
13.9	5.0	4.5	6.8	4.5	2.3
—	—	4.2	—	4.2	—
13.0	—	5.0	6.0	3.5	—
—	—	4.5	6.5	3.8	2.0

⁵ Without claw.

⁶ Type of *rutilus* Anthony, from original description.

⁷ Type of *nitedulus* Thomas, from original description.

⁸ Type of *paricola* Thomas, from original description.

⁹ Type of *milleri* J. A. Allen, from original description.

except for an ochraceous streak on each side of the white underparts in one.

In five individuals from Canelos taken March 8-12, 1924, the underparts are faintly tinged with buff; in three from the same locality, taken in April 1910, and in two from the Río Copataza and another from Montalvo, the underparts are pure white. The three localities mentioned are within a few miles of each other in the upper Río Pastaza region.

Specimens from Jollín, Jatun Yacu, Llunchi, Avila, Concepción, San José and Río Suno, all in the upper Río Napo region, show the same range of variation in color as the preceding. In one specimen from Llunchi, however, the belly is uniformly ochraceous and hardly defined from the sides.

The series of 11 specimens from the Río Curaray, Loreto, Peru, includes individuals in dark and bright pelage. One is nearly uniformly ochraceous orange on upperparts and sides. Underparts are white. One specimen has a pair of small ochraceous gular patches.

One of four specimens from Lagarto Alto, Río Ucayali, Peru, in old pelage, is nearly uniformly ochraceous tawny on head and back. This color is defined in the form of a molt line from the darker outer sides of shoulders and thighs. The other three specimens of the series are dark in unworn pelage. Underparts, upper lips and lower half of cheeks in one of two mice from Satipo, Junín, are yellowish. Underparts of the other specimen are sharply defined white, the lips and cheeks ochraceous.

The remaining Peruvian material consisting of one or two individuals from scattered localities reveal no peculiarities.

The type series of *Oecomys florenciae* J. A. Allen, from eastern Colombia, is practically indistinguishable from typical *bicolor* as represented by any series from eastern Ecuador. Other Colombian specimens at hand exhibit no individual or local variables of note.

Judged by the original description, the only distinguishing character of the Orinocoan "*Rhipidomys*" *rosilla* Thomas is the "buffy ochraceous" belly of the type as compared with the pure white belly of the type of *dryas* (= *occidentalis*) of western Ecuador. A colored belly, however, is a common enough character in *bicolor* of eastern Ecuador. In the absence of other distinctions, *rosilla* must be regarded as identical with typical *bicolor*.

Oecomys nitedulus Thomas of British Guiana is said to be "quite like the Orinoco *Oe. rosilla* above, but the undersurface is without the marked ochraceous wash characteristic of that animal." This characterization implies that *nitedulus* is like typical *bicolor*. Indeed, our material from British Guiana is altogether indistinguishable from eastern Ecuadorian *bicolor*. I have not examined the type of *Oecomys*

rutilus Anthony. Judged by the original description, it is a subadult of the same Kartabo series identified by Anthony as *nitedulus*.

The description of *paricola* Thomas, from the state of Pará, Brazil, like that of *rosilla*, was based on a comparison with western rather than with eastern Ecuadorian representatives of *bicolor*. It is said to be "duller" in color and smaller. Of two specimens at hand from the Rio Tapajóz, Pará, one, an adult from Limontuba, is as small cranially as the type; the other, from Igarapé Bravo, is a subadult with a much larger skull. The color of either, whether dull or bright, is like that of *bicolor* from eastern Ecuador or anywhere else.

Oecomys milleri J. A. Allen, from Barão de Malgaço, Mato Grosso, Brazil, was aptly diagnosed in the original description as "similar in general coloration and size to *Æ. bicolor* (Tomes)." A careful examination of the type, two paratopotypes, a specimen from Urupá and another from Urucum de Corumbá confirms this characterization. The Corumbá specimen is bright ochraceous on upperparts, pure white beneath. The topotypes are darker, with underparts yellowish in one, pure white in the other. The Urupá individual is darkest, tawny above, more buffy beneath.

SPECIMENS EXAMINED: One hundred and seventeen, from the following localities:

COLOMBIA: Guaicaramo, Meta, 6 (AMNH); Mambita, eastern Cundinamarca, 1 (AMNH); Andalucia, Huila, 1 (AMNH); Florencia, Río Orteguzza, Caquetá, 5 (including type of *florenciae*, AMNH); Tres Troncos, Río Caquetá, Caquetá, 3 (CNHM); Río Mecaya, mouth of Río Caquetá, Putumayo, 3 (CNHM); Ino Gaje, Río Apoporis, Vaupés, 4 (CNHM).

ECUADOR: Below San José, Río Payamino, Napo-Pastaza, 2 (AMNH); Río Suno, Río Napo, Napo-Pastaza, 3 (AMNH); Avila, Río Suno, Napo-Pastaza, 1 (USNM); Río Jollín, Napo-Pastaza, 2 (MCZ); Río Jatun Yacu, Napo-Pastaza, 1 (MCZ); Llunchi, Río Napo, Napo-Pastaza, 8 (UMMZ); Canelos, Río Bobonaza, Napo-Pastaza, 8 (AMNH, 5; MCZ, 3); Montalvo, Río Bobonaza, Napo-Pastaza, 1 (CNHM); Río Copataza, Napo-Pastaza, 3 (CNHM, 2; AMNH, 1); Zamora, Santiago-Zamora, 6 (AMNH).

PERU: Río Curaray, mouth at Río Napo, Loreto, 11 (AMNH); Monte Alegre, Loreto, 1 (AMNH); Sarayacu, Río Ucayali, Loreto, 2 (AMNH); Yarinacocha, Río Ucayali, Loreto, 2 (CNHM); Pucallpa, Río Ucayali, Loreto, 1 (CNHM); Lagarto Alto, Río Ucayali, Loreto, 4 (AMNH); Río Santiago, mouth of Río Marañón, 1 (AMNH); Puerto Indiana, Río Marañón, Loreto, 1 (AMNH); Río Mazán, Loreto, 1 (AMNH); Tambo Yacu, Rioja, San Martín, 1 (CNHM); Chanchamayo, Junín, 1 (CNHM); Satipo, Junín, 3 (MCZ); Pozuzo, Huanuco, 1 (CNHM).

BRITISH GUIANA: Kartabo, Demerara, 12 (AMNH); Holmia, Potaro Highlands, 1 (CNHM); Barakara, Canje River, 1 (AMNH); Essequibo River, 1 (BM, type of *nitedulus*).

VENEZUELA: La Unión, Bolívar, 1 (BM, type of *rosilla*); Rancho Grande, Aragua, 1 (AMNH); Caño Seco, Cerro Duida, Amazonas, 1 (AMNH).

BRAZIL: Jauararé, Río Uapés, Amazonas, 2 (AMNH); Igarapé Bravo, Río Tapajóz, Pará, 1 (AMNH); Limontuba, Río Tapajóz, Pará, 1 (AMNH); between

Belem and Braganza, Pará, 1 (BM, type of *paricola*); Recreio, Rio Majary, Amazonas, 1 (AMNH); Urucum de Corumbá, Mato Grosso, 1 (CNHM); Barão Malgaço, Mato Grosso, 3 (including type of *milleri*, AMNH); Urupá, Mato Grosso, 1 (AMNH).

Oryzomys bicolor phaeotis Thomas

Rhipidomys phæotis Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 7, p. 181, 1901. [*Oryzomys* (*Æcomys*)] *phæotis*, Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 7, p. 445, 1906 (classification).

Oryzomys (*Oecomys*) *phaeotis*, Sanborn, Publ. Mus. Hist. Nat. "Javier Prado," ser. A, zool., No. 6, p. 21, 1951 (Peru: Marcapata, Cuzco; Camante, Cuzco).

Rhipidomys benevolens Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 7, p. 369, 1901 (type locality, Chimate, upper Río Beni, La Paz, Bolivia; altitude, 700 meters above sea level).

[*Oryzomys* (*Æcomys*)] *benevolens*, Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 18, p. 445, 1906 (classification).

Oecomys benevolens, Gyldenstolpe, Kungl. Svenska Vet.-Akad. Handl., ser. 3 vol. 11, p. 40, pl. 4, fig. 1 (skull), pl. 17, fig. 11 (molars), 1932.

TYPE: Adult male, skin and skull (BM 1.1.1.23); collected July 23, 1900, by Perry O. Simons.

TYPE LOCALITY: "Segrario" [=Sagrario], upper Río Inambari, an affluent of the Río Madre de Dios, Puno, southeastern Peru.

DISTRIBUTION: Departments of Cuzco, Puno, and Madre de Dios in southeastern Peru, and Departments of La Paz, Cochabamba, and Beni in northwestern Bolivia; altitudinal range from approximately 200 to 2,000 meters above sea level.

CHARACTERS: Largest of the subspecies; molars proportionately larger.

MEASUREMENTS: See table 6.

REMARKS: The available Peruvian specimens of *phaeotis*, including the type and a paratype, are from four localities within a comparatively small area in the drainage basin of the upper Río Inambari, an affluent of the Madre de Dios. Two from Camante, Marcapata, taken August 1950, are as large as the type of *phaeotis* collected July 1900. An individual from Quincemil, collected August 1953, and another from Villa Carmen, Cosñipata, dated September 1954, agree with typical *bicolor* in size. No measurements of the paratype were given but Thomas declared it to be "about the same general size" as the type. The large Camante specimens, judged by cranial characters, are not older than the others and the molars are slightly less worn.

Rhipidomys benevolens Thomas, from the upper Río Beni, Bolivia, was characterized as larger than *dryas* (= *occidentalis*) and smaller than *phaeotis*. Representative specimens from the upper Río Mamoré include one subadult and three juvenals. They agree with *phaeotis* in their over-all larger size and proportionately larger molars as compared with typical *bicolor* of northeastern Peru and eastern Ecuador.

TABLE 6.—*Oryzomys bicolor phaeotis* Thomas: Measurements (in millimeters) of adults.

Locality	Head and body	Tail	Hind foot	Ear	Skull, greatest length	Zygomatic breadth	Rostrum width	Incisive foramina	Diastema	Alveolar length of molar row	Zygomatic plate width
PERU											
Sagrario ¹	112	—	25	18	30.2	16.3	—	5.0	8.0	4.2 ²	—
Camante	119, 113	129, 130	25, 25	17, 17	29.4, 30.6	15.5, 16.5	5.4, 5.5	5.0, 4.8	7.7, 7.5	4.8, 4.7	2.6, 2.4
Quincemil	121	107	22	17	28.5	15.2	5.3	4.5	6.9	4.5	2.3
Carmen	104	111	22	14	27.4	14.7	4.5	4.5	6.5	4.5	2.3
BOLIVIA											
Chimata ¹	110	112	21.5	16	20.0	15.5	—	5.0	7.3	4.0	—
Chaparé	95	105	24	15	23.0	14.0	5.3	4.9	6.8	4.3	2.2

¹ Type of *phaeotis* Thomas, from original description.² Crown length.³ Type of *benetosens* Thomas, from original description.

A skin without skull from Ticunhuaya, Bolivia, not far from the type locality of *benevolens*, appears to belong here.

The largest specimens of *O. bicolor phaeotis* are practically indistinguishable from small adults of *O. concolor* from other parts of tropical America. On the other hand, the size difference between *O. bicolor phaeotis* and *O. concolor* of the same general region leaves no doubt regarding the separate identity of the two species.

SPECIMENS EXAMINED: Eleven, from the following localities:

PERU: Sagrario, Río Inambari, Puno, 1 (BM, type of *phaeotis*); Hacienda Villa Carmen, Cosñipata, Cuzco, 1 (CNHM); Camante, Marcapata, Cuzco, 2 (CNHM); Quincemil, Marcapata, Cuzco, 1 (CNHM).

BOLIVIA: Chimate, La Paz, 1 (BM, type of *benevolens*); El Palmal, Chaparé, Cochabamba, 1 (MACN); Marbán, Río Mamoré, Beni, 3 (MACN); Ticunhuaya, La Paz, 1 (AMNH).

Oryzomys concolor Wagner

DISTRIBUTION (fig. 2): Tropical and subtropical forested zones of Costa Rica, Panama, Colombia, Venezuela, Trinidad, the Guianas, Brazil, and the Amazonian regions of Bolivia, Peru, and Ecuador; altitudinal range from near sea level to approximately 2,000 meters above.

EXTERNAL CHARACTERS: Dorsal surface buffy to tawny or rufous, with a fine to coarse mixture of dark brown; a poorly defined dark middorsal band sometimes present; underparts sharply or hardly defined from sides, basal portions of individual hairs white or gray; tail from 49 to 60 percent of total length.

CRANIAL CHARACTERS (pls. 1-6, 8-11): Sides of supraorbital region prominently ridged, often ledgeline; temporal ridges well developed in adults for entire length of parietals; anterior zygomatic plate moderately broad, its anteroposterior width at midpoint usually less, rarely equal to or slightly more, than alveolar length of M^{1-2} ; upper anterior corner of zygomatic plate slightly projecting; braincase moderately inflated, flat or slightly convex anterodorsally at frontoparietal suture; posterior borders of incisive foramina usually terminating anteriorly, rarely slightly behind, anterior plane of first molars; posterior half of palatines often marked by a pair of small transverse cornuate processes, one on each bone (one or both processes are frequently lost in the cleaning operation but the median burr or rugosity remains).

DENTAL CHARACTERS (pls. 4b, 12b): Essentially as in *O. bicolor* but with first and second internal folds of M^{1-2} more frequently confluent with corresponding primary folds. In extremely worn teeth, however, these folds may be secondarily discrete.

COMPARISONS: *Oryzomys concolor* is essentially an outsize *O. bicolor*. In most localities where the two species are sympatric the difference in size is obvious. On the other hand, many small northern represen-

tatives of *concolor* are hardly larger than some large southern individuals of *O. bicolor* (pl. 5). In the Guianas, size alone is not a decisive character. Generally, the heavier more "adult" skull of *concolor* with its better developed supraorbital and temporal ridges, less inflated braincase, and more gray or buff underparts are characters that help separate the larger from the smaller species where the two occur together.

Representatives of *Oryzomys subflavus* Wagner³ of Brazil and the Guianas have sometimes been confused with *O. concolor*. The two species are similar in color, size, and tail length. In *subflavus*, however, the pelage is comparatively lax and harsh; hind foot (fig. 4c) long, stout, with outer digits shorter, first hind toe with claw barely extending beyond base of second toe, fifth hind toe with claw extending only to base of middle phalanx of fourth toe; sole of heel exposed; excision of dorsal border of antorbital foramen deep, one-half or more of width of anterior zygomatic plate exposed to view when skull is viewed from above; supraorbital region of skull (*c* of pls. 8-11) broad, its sides ridged or beaded and divergent as in *concolor*; zygomata less expanded anteriorly; incisive foramina generally narrower but with their posterior borders not extending behind anterior plane of first molars; sphenopalatine vacuities more open but less so than in *O. xantheolus* (compared below); bullae more inflated; enamel pattern of molars (pl. 12c) essentially as in *Oecomys*.

Oryzomys xantheolus Thomas is a semiarbooreal species with a superficial resemblance to *O. concolor*. It occupies the dry coastal area of western Peru and southwestern Ecuador where *Oecomys* is not known to occur. Its pelage is comparatively lax, upperparts and sides of body buffy or olivaceous, lateral line absent, underparts not pure white; tail long as in *concolor* but untufted and bicolor for most or all its length; hind foot broader than in strictly terrestrial species but narrower than in *concolor*, the outer toes shorter and less robust, interdigital webbing more developed; general shape of skull (*d* of pls. 8-11) and sides of supraorbital region as in *concolor* but anterior zygomatic plate projected forward so that at least one-half its width is visible from above; incisive foramina longer, their length at least three-fourths that of diastema, and terminating posteriorly well behind anterior plane of first molars; sphenopalatine vacuities large, as in *O. palustris* (pl. 2c), posterior border of palate without excrescences; bullae well inflated; enterostyles and ectostylids (pl. 12d) rudimentary or absent.

³ "*Oecomys*" *catherinae* Thomas is a synonym of *Oryzomys subflavus*. "*Oecomys*" *rex* Thomas, 1910, of British Guiana, is also a member of the same species but probably subspecifically distinct. The name, however, clashes with "*Calomys*" [= *Oryzomys*] *rex* Winge, 1888. Because of the homonymy, the name of the form described by Thomas may be changed to *Oryzomys subflavus regalis* (new name).

*Oryzomys laticeps*⁴ is a terrestrial species ranging coextensively with *Oecomys*. Its resemblance to *Oryzomys concolor* is superficial and restricted to body size and, in some cases, to color and texture of pelage. In *laticeps*, however, the tail averages shorter, the hind foot (fig. 4d) longer, the ear larger. The outer toes of the hind foot of *O. laticeps* are shorter than in all others with which comparisons have been made. A dark juvenal color-pelage phase and a distinct subadult color-pelage phase are well marked and more consistently present in *laticeps* than in other oryzomyines. The skull (*e* of pls. 8-11) of *O. laticeps* is comparatively longer than in *concolor*, the supraorbital region narrower, the sides ridged or beaded but not as widely divergent; rostrum with a more decided downward flexion; anterior zygomatic plate projecting well forward; anteroposterior width of zygomatic plate often more than length of M^{1-2} ; incisive foramina extremely short, generally less than 60 percent of length of diastema, their posterior borders separated from anterior plane of first molars by a distance approximately equal to length of first molar; sphenopalatine vacuities absent or small as in *concolor*; bones of posteropalatal region more cancellate with the excrescences or cornuate processes noted in *concolor* generally present and, usually, more developed; internal folds of molars (pl. 12*e*) usually absent; second secondary fold absent in M^3 ; second secondary folds of lower molars greatly reduced, sometimes coalesced with major fold of opposite side.

COLOR AND PELAGE: The range of variation in color and character of pelage in *Oryzomys concolor* is wider than in *O. bicolor*. Populations of dry localities are distinctly paler than those of humid areas. The pelage of high altitude forms is invariably longer and thicker than that of their relatives of lower levels. As in *O. bicolor*, there are bright and dark color phases. The tone of the bright phase in a darkly colored population generally equals that of the dark phase of a pale colored population. In *concolor*, individual molt from one color phase to the other is obvious in a large proportion of the specimens.

Pelage of nestlings is short, fine, and colored like that of adults. This is superseded by a longer dark gray or dark brown coat distinctly darker than that of adults.

THE SUBSPECIES

Five geographic races are recognized. The nominate subspecies, *Oryzomys concolor concolor* Wagner, occupies the greatest part of the

⁴ Specific synonyms of *Oryzomys laticeps* include *bolivaris* J. A. Allen, *boliviae* Thomas, *caracolus* Thomas, *castaneus* Thomas, *goeldi* Thomas, *legatus* Thomas, *macconnelli* Thomas, *magdalenae* J. A. Allen, *medius* Robinson and Lyon, *modestus* J. A. Allen, *mollipilosus* J. A. Allen, *oniscus* Thomas, *peruvensis* J. A. Allen, *riularis* J. A. Allen, *saltator* Winge, *syatricus* Thomas, *talamancae* J. A. Allen, *velutinus* J. A. Allen, and a few others. *Mus capito* Olfers (1818), based on the "rat à grosse tête" of Azara, is undoubtedly the same species and antedates *Mus laticeps* Lund (1841). *Mus cephalotes* Desmarest (1819) is another name for Azara's "rat à grosse tête."

range of the species. It is a medium-sized, brightly colored form with an irregular pattern of geographic variation that reflects seasonal and local climatic differences. Nevertheless, individual variation in any one locality may be of the same magnitude as variation within the subspecies as a whole.

The remaining four subspecies occupy peripheral and ecologically distinct parts of the range of the species. *Oryzomys concolor superans* Thomas, of the Amazonian rain forests along the base of the Andes, is the darkest and largest race. *O. c. speciosus* J. A. Allen and Chapman of the northeastern bulge of South America resembles *superans* in color, especially of the underparts, but agrees with typical *concolor* in size. The palest subspecies, *O. concolor roberti* Thomas, lives in the subhumid southern border of the range in Bolivia and south-central Brazil. *O. concolor bakiensis* (new subspecies) is a saturate form of the rain forests of eastern Brazil.

The pattern of local and geographic variation in *Oryzomys concolor* contrasts sharply with the comparative stability of *O. bicolor*. The difference between the two species in their response to color of soil and cover, humidity and temperature may be attributed to slight but significant differences in their habitat preferences. *Oryzomys concolor* generally nests lower and descends to the ground with greater frequency. It is, accordingly, less independent of factors controlling living conditions at ground level.

Oryzomys (Oecomys) concolor concolor Wagner

Hesperomys concolor Wagner, Arch. Naturg., vol. 11, pt. 1, p. 147, 1845; Abh. Akad. Wiss., Munich, vol. 5, p. 311, 1848 (characters)—Pelzeln, K. K. Zool.-Bot. Gesellsch., Wien, Beiheft 33, p. 70, 1883 (characters; habits).—Gyldenstolpe, Kungl. Svenska Vet-Akad. Handl., ser. 3, vol. 11, p. 151, 1932 (incertae sedis).—J. A. Allen and Chapman, Bull. Amer. Mus. Nat. Hist., vol. 5, p. 213, 1893 (comparison with *Oryzomys speciosus* "with which it may prove to be identical").

[*Oryzomys*] *concolor*, Tate, Amer. Mus. Nov., No. 579, p. 3, 1932 (taxonomic history).

Oryzomys flavicans Thomas, Ann. Mag. Nat. Hist., ser. 6, vol. 14, p. 351, 1894 (type locality, Mérida, Sierra de Mérida, Venezuela).

[*Oryzomys*] *flavicans* [sic], Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 310, 1953 (lapsus for *flavicans* Thomas, in discussion of *O. palmarius* J. A. Allen).

Oryzomys flavicans illectus Bangs, Proc. Biol. Soc. Washington, vol. 12, p. 164, 1898 (type locality, Pueblo Viejo, Sierra Nevada de Santa Marta, Magdalena, Colombia, altitude, 853 meters.—Bangs, Proc. New England Zool. Club, vol. 1, p. 94, 1900 (Colombia: La Concepción; Pueblo Viejo; Palomino; San Antonio; *Oryzomys trichurus* J. A. Allen, part, a synonym).

[*Oryzomys*] *flavicans illectus*, J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 12, p. 206, 1899 (Minca, Santa Marta Region, Magdalena, Colombia).

Oryzomys illectus, J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 20, pp. 436, 439, 1904 (Don Amo, Magdalena, Colombia).

- Oryzomys flavicans subluteus* Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 2, p. 268, 1898 (type locality, "W. Cundinamarca," i.e., western slope of Cordillera Oriental, Cundinamarca, Colombia).
- O[ryzomys] subulatus* [sic], Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 302, 1953 (lapsus for *subluteus* Thomas, in discussion of *Oryzomys helvolus*).
- Oryzomys trichurus* J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 12, p. 206, 1899 (type locality, El Líbano, near Bonda, Santa Marta, Magdalena, Colombia, altitude 500 feet); vol. 20, p. 437, 1904 (Bonda, Colombia).—Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, p. 190, 1939 ("juv. and synonym of *illectus*").—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 301, 1953 (type history).
- Rhipidomys marmosurus* Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 4, p. 378, 1899 (type locality, Maipures, middle Río Orinoco, Vichada, eastern Colombia).
- [*Oryzomys* (*Æcomys*)] *marmosurus*, Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 18, p. 445, 1906.
- Oecomys marmosurus*, Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, p. 194, 1939 (listed).
- Æ[comys] marmosurus*, Thomas, Ann. Mag. Nat. Hist., ser. 8, vol. 6, p. 187, 1910 (comparisons).
- Oryzomys tectus* Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 8, p. 251, 1901 (type locality, Bugaba (misspelled "Bogava"), Chiriquí, Panama, 250 meters altitude).
- Oryzomys tectus tectus*, Goldman, North American Fauna, No. 43, p. 84, 1918 (revision; Boruca, Costa Rica).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 87, p. 394, 1946 (Costa Rica: Boruca, Puntarenas; San Gerónimo de Pirris, San José).
- Oryzomys klagesi* J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 20, p. 327, 1904 (type locality, El Llagual [Yagual], near Maripa, lower Río Caura, Bolívar, Venezuela).—Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, pp. 190, 191, 1939 (listed as member of "*trinitatis* group" of *Oryzomys* (p. 190)).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 301, 1953 (type history; "probably a subspecies of *O. flavicens* [sic] Thomas").
- Rhipidomys* (?) *klagesi*, Gyldenstolpe, Kungl. Svenska Vet.-Akad. Handl., ser. 3, vol. 11, p. 50, 1932 (type a *Rhipidomys* [!] according to Tate, ex litt).
- Æcomys tapajinus* Thomas, Ann. Mag. Nat. Hist., ser. 8, vol. 3, p. 378, 1909 (type locality, Santa Rosa, Rio Jamanchin, Rio Tapajóz, Pará, Brazil); ser. 8, vol. 9, p. 87, 1912 (Marajó, Pará, Brazil); ser. 9, vol. 6, p. 277, 1920 (Brazil: Villa Braga, Rio Tapajóz, Pará; Monte Alegre, Rio Solimões, Pará; Manacapurú, Rfo Solimões, Amazonas).
- Oryzomys frontalis* Goldman, Smithsonian Misc. Coll., vol. 56, p. 6, 1912 (type locality, Corozal, Canal Zone, Panama).
- Oryzomys tectus frontalis*, Goldman, North American Fauna, No. 43, p. 85, pl. 4, figs. 4, 4a (skull), pl. 5, fig. 10 (mandible), pl. 6, figs. 7, 7a (molars), 1918, (Panama: Cana; Corozal, Canal Zone). Smithsonian Misc. Coll., vol. 69, p. 101, 1920 (Panama: Cana; Corozal; Tacarcuna).
- Oryzomys helvolus* J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 32, p. 597, 1913 (type locality, Villavicencio, upper Río Meta, Meta, Colombia); vol. 35, p. 212, 916 (Colombia: Villavicencio; Buenavista.—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 302, 1953 ("probably a subspecies of *O. flavicens* [sic]; may equal *O. subulatus* [sic] Thomas").
- Oryzomys vicencianus* J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 32, p. 598, 1913 (type locality, Villavicencio, Meta, Colombia); J. A. Allen, vol. 35, p. 212, 1916 (Villavicencio, Colombia).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 302, 1953 (type history and measurements).

[*Oryzomys*] *vicencianus*, Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, p. 190, 1939 ("juv. and synonym of *helvolus*").

Oecomys mincae J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 32, p. 603, 1913 (type locality, Minea, Santa Marta region, Magdalena, Colombia).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 301, 1953 (type history).

Oecomys caicarae J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 32, p. 603, 1913 (type locality, Caicara, Río Orinoco, Bolívar, Venezuela).

Oecomys caicarae, Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 300, 1953 (type history and measurements).

Oecomys guianae caicarae, Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, p. 193, 1939 (Venezuela: Mt. Duida; Casiquiare).

Oryzomys trinitatis, Tate (not Allen and Chapman), Bull. Amer. Mus. Nat. Hist., vol. 76, p. 190, 1939 (part; Venezuela: Agüita; Mt. Duida).

TYPE: Presumably in the Vienna Natural History Museum; collected Aug. 4, 1831, by Johann Natterer; original number, 174.

TYPE LOCALITY: Rio Curicuriari, an affluent of the upper Rio Negro, entering from the right below São Gabriel, Amazonas, Brazil.

DISTRIBUTION: Tropical and subtropical forested zones of Costa Rica, Panama, northwestern Colombia, and eastern Colombia in the Río Orinoco drainage system, western and southern Venezuela in the Lake Maracaibo and the middle and upper Río Orinoco basins, the Amazonian rain forest of Brazil and their extensions into extreme northern Bolivia, eastern Peru, and eastern Ecuador; altitudinal range, sea level to approximately 2,000 meters above.

CHARACTERS: Generally brightly colored, upperparts ochraceous buff to tawny finely ticked with dark brown, chest and belly white to buff, throat and chin white.

MEASUREMENTS: See table 7.

VARIATION: Two specimens from the type region are at hand. One, from Jauaraté, Rio Uaupés, above the type locality, is larger than the type, its belly with a light buffy wash. The other, from Yauanari, Rio Negro, below the type locality, is smaller, with belly, chest, and sides ochraceous buff. Underparts of the type are sharply defined white. The same range of variation in color of underparts obtains in most populations of the species.

The type of *Oecomys tapajinus* Thomas and two other specimens from Tauary, in the type region on the Rio Tapajóz, Brazil, do not differ from *concolor* of the Rio Negro-Río Orinoco basin. The underparts of one of the two Tauary specimens is creamy, most notably on chest, throat, and chin; in the other, the same parts are sharply defined white. A specimen from Lago Cuiteuá, on the opposite side of the Solimões, is practically identical. A young individual from the Boca do Igarapé Piaba, also on the north bank of the Solimões, shows the old pelage being replaced by a more saturate new pelage.

The type of *marmosurus* Thomas, from the middle Río Orinoco, Colombia, is not significantly different from any other individual of

TABLE 7.—*Oryzomys concolor concolor* Wagner: Measurements (in millimeters)

Locality	Head and body	Tail	Hind foot	Ear	Skull, greatest length
COSTA RICA					
San Gerónimo	125	149	28	—	34.5
El General	146	142	27	—	32.6
PANAMA					
Boruca	118, 125	140, 123	27, 28	—	31.0, 31.1
Bugaba ¹	140, 122	142, 147	27, 29	18, —	—, 33.2
Cana ²	148	161	30	—	35.5
Cana	126(114-137) ³	148(127-162) ³	28(26-29) ³	—	31.4(28.8-34.0) ⁷
COLOMBIA					
Socorré	129, 130, 143	154, 140, 154	28, 28, 29	18, 17, 18	33.7, —, 33.9
Catival	132	146	28	17	31.4
Muzo	128	140	29	16	31.8
Pueblo Viejo ⁴	132	160	25 ⁵	17	—
Pueblo Viejo	136(122-145) ⁵	145(140-155) ⁵	26(25-27) ⁵	17(15-18) ⁵	30.4(29.8-31.1) ⁴
Palomino	140	145	26	16	32.3
Don Diego	127(111-137) ⁸	149(136-165) ⁸	26(25-28) ⁸	—	31.6(30.5-32.3) ⁵
Bonda	120	155	—	—	28.8
El Líbano ⁶	121	160	25	—	30.0
Minca ⁷	126	160	25	—	—
Pueblo Bello	122, 114	136, 147	24, 26	17, 20	30.5, 31.4
El Orinoco	129, 120	145, 135	24, 25	18, 17	29.2, 30.2
Villanueva	120(116-127) ⁴	151(133-165) ⁴	24(23-25) ⁴	16.5(15-17) ⁴	29.7, 30.2
Sierra Negra	125(116-136) ⁴	141(133-153) ⁴	25(24-27) ⁴	18(18-19) ⁴	30.1(29.4-31.2) ⁵
Marimondas	128, 140	151, 150	25, 26	17, 19	30.4, 32.8
Buena Vista	125(115-131) ⁵	135(123-167) ⁵	27(25-28) ⁵	—	31.8(31.2-32.6) ⁴
Guacaramo	—	—	28	—	35.2
Villavicencio ⁸	134	143	27	—	34
Villavicencio ¹⁰	120	130	27	—	29
VENEZUELA					
Cogollo	130	154	26	—	31.8
Azulita	136, 146	148, 169	28, 29	—	32.5, 34.4
Mérida ¹¹	116	129	24 ⁵	—	—
Mérida	—	—	—	—	30.7(28.3-31.6) ¹⁴
Calcara ¹²	122	152	25	16	30.2
Calcara	119	144	26	—	30.7
Yagual ¹⁴	127	121	25	—	32.0
Casiquiare	107	136	26	—	31.3
El Meréy	129	156	26	—	30.8
Esmeralda	122, 121	140, 145	28, 26	—	30.6, 30.9
Ihuapo	120	132	26	—	31.2
Ocama	125	155	29	—	33.0
BRAZIL					
Curicurlari ¹⁵	126	124	—	—	—
Curicurlari ¹⁶	124	137	—	—	—
Jauaraté	137	148	28	—	—
Yavanari	115	125	27	—	31.8
Cuiteuá	140	150	27	—	33.1
Santa Rosa ¹⁷	126	158	25 ⁵	17	—
Tauary	142	158	27	—	33.8
Manapíri	114	153	27	16	—

¹ Type of *tectus* Thomas, from original description, followed by a paratype (USNM).² Possibly crown length.³ Type of *frontalis* Goldman, from original description.⁴ Type of *illectus* Bangs, from original description.⁵ Without claw.⁶ Type of *trichurus* J. A. Allen, from original description.⁷ Type of *mincae* J. A. Allen, from original description.⁸ Type of *helvolus* J. A. Allen, from original description.⁹ Probably=5.2 mm.

of adults. (Number of specimens, when more than three, indicated by italic figure.)

Zygomatic breadth	Rostrum width	Inclisive foramina	Diastema	Alveolar length of molar row	Zygomatic plate width
17.0	6.0	6.1	8.6	5.4	3.9
17.0	5.9	5.4	8.6	5.0	3.9
15.8	5.6	5.4, 5.3	7.9, 7.9	4.8, 5.3	3.1, 3.2
17.0, 16.5	—, 6.1	5.0, 5.2	8.1, 7.8	4.9, ² 5.2	—, 3.8
18	—	6.0	—	5.0	—
16.5(15.4–17.4)7	5.9(5.4–6.5)7	5.6(5.2–5.9)7	7.7(6.9–8.7)6	5.3(5.0–5.4)7	3.3(2.9–3.9)7
16.6, 16.2, 17.6	5.9, 5.6, 6.2	6.3, 5.7, 5.8	8.5, 7.7, 8.5	5.1, 5.0, 5.2	3.8, 2.7, 3.5
15.4	5.6	5.5	7.8	5.1	3.3
16.8	5.5	5.4	8.1	4.9	3.3
—	—	—	—	—	—
16.3, 17.1	5.5(5.3–5.7)4	5.4(4.7–5.8)4	7.7(7.2–7.9)4	5.0(4.7–5.2)4	3.2(3.1–3.4)4
17.3	5.6	5.6	8.2	5.5	3.7
—	5.7(5.4–6.3)5	5.6(5.2–5.9)6	7.9(7.6–8.2)6	4.9(4.6–5.2)8	3.4(3.1–3.6)8
15.3	5.5	4.8	7.1	4.6	3.0
15.0	—	5.0	—	4.0 ³	—
—	—	—	—	—	—
15.7, 16.8	5.6, 5.6	5.1, 6.0	7.7, 8.0	4.8, 5.2	3.1, 3.4
16.4, 16.0	5.5, 5.6	4.9, 5.5	7.4, 7.7	4.4, 4.6	2.8, 2.8
15(14.8–15.3)3	5.4(5.1–5.6)5	5.1(4.8–5.3)5	7.3(7.0–7.5)5	4.7(4.6–4.9)5	2.8(2.6–2.9)5
16.1(15.2–17.1)4	5.5(5.2–5.8)4	5.4(5.2–5.6)4	7.4(7.0–7.7)4	4.9(4.7–5.0)4	3.3(3.0–3.6)4
15.9, 16.4	5.2, 5.5	5.3, 5.7	7.5, 8.0	4.7, 4.9	3.5, 3.2
16.6(16.1–17.2)5	5.9(5.6–6.3)5	5.8(5.6–6.0)5	8.2(7.9–8.8)5	5.1(4.9–5.5)5	3.7(3.5–3.9)5
—	6.5	5.8	9.1	5.5	4.1
17	—	6.5	—	6.2 ⁴	—
13.2	—	5.0	6.5	4.5	—
16.3	5.9	5.4	8.0	4.7	3.3
16.3, 17.4	5.9, 6.5	5.7, 5.8	8.5, 8.7	5.3, 4.9	3.3, 3.4
—	—	4.8	7.7	4.8 ⁵	3.1
16.5(15.6–16.9)4	5.7(5.3–6.2)16	4.9(4.6–5.4)20	7.5(7.0–7.9)19	5.0(4.7–5.4)21	3.1(2.8–3.5)21
? 12	—	—	—	5.0	—
16.9	5.8	5.8	7.6	4.5	3.1
17.0	—	6.0	—	5.0	—
16.4	5.9	5.1	7.9	5.3	3.3
16.3	5.9	5.7	7.9	4.9	2.9
16.6, 17.1	6.1, 6.3	5.3, 5.4	7.9, 7.7	5.0, 5.0	3.3, 3.0
—	6.1	6.0	7.7	5.0	3.3
16.7	6.0	5.5	8.5	5.1	3.3
—	—	—	—	—	—
—	—	—	—	—	—
17.1	6.1	6.1	8.3	5.3	3.7
17.5	6.2	5.5	7.7	5.3	3.3
—	6.7	5.3	8.9	4.9	3.4
16	—	5.8	9.2	4.7 ⁶	2.2
17.7	6.8	5.6	8.1	5.1	3.3
—	—	—	—	—	—

¹⁰ Type of *vicenianus* J. A. Allen, from original description.

¹¹ Type of *flavicans* Thomas, from original description.

¹² Type of *caicarae* J. A. Allen, from original description.

¹³ In the original description, "13.6 mm." is obviously wrong.

¹⁴ Type of *klagesi* J. A. Allen, from original description.

¹⁵ Type of *concolor* Wagner, from original description.

¹⁶ Type, collector's measurements according to Pelzeln, 1833 (K. K. Zool.-Bot. Gesellsch., Wien., Beih., vol. 33, p. 70).

¹⁷ Type of *tapajinus* Thomas, from original description.

the subspecies *concolor*. Its belly is tinged with buffy, the hairs of the throat, chest, and groins white. *Oryzomys klagesi* J. A. Allen, from El Llagual (or Yagual), Río Caura, farther down the Río Orinoco, is nearer true *concolor* than *speciosus*, with which it was originally compared. *Oecomys caicarae* J. A. Allen is the third name given to the middle Río Orinoco population of *concolor*. The dusker coloration of the upperparts in the type series indicates a cline leading to the darker *speciosus* in northeastern Venezuela and Trinidad.

Twelve specimens from the upper Río Meta region, Colombia (Villavicencio, Buena Vista, Mambita, Guaicaramo, Medina), representing *Oryzomys helvolus* J. A. Allen and *vicencianus* J. A. Allen agree with *concolor* of the upper Río Negro-Río Orinoco region in size, but are more saturate on underparts and as dark on upperparts and sides as *O. concolor superans*. An extremely large female from Guaicaramo, like the type of *frontalis*, is equal in size to average adult *superans*. Morphologically and geographically, however, the mice of the Colombian base of the Andes in Orinoco drainage are nearest true *concolor*.

Thirty-six topotypes of *flavicans* Thomas from Mérida, Venezuela, vary remarkably little *inter se*. Their upperparts are uniformly pale, their bellies whitish with a light to moderate, never a heavy, buffy wash.

Three mice from La Azulita in the Maracaibo basin at the foot of the Sierra de Mérida are indistinguishable from the Mérida series. A specimen from Río Cogollo on the Sierra de Perijá side of Lake Maracaibo is brighter above, more buffy beneath, and quite like individuals from the Colombian side of the same mountain range.

The relationship of the intensity of body color to rainfall is shown by specimens from diverse localities in the Sierra Nevada de Santa Marta. The darkest specimens are from the humid Don Diego region at the base of the mountains. Topotypes of *illectus* Bangs from the equally humid but cooler northern slope of the Sierra average paler. A series from the humid locality of Pueblo Bello on the southern side of the range is colored like topotypes of *illectus*. In the warmer, less humid El Salado, farther down the eastern slope, the mice average paler. Thirteen specimens from the comparatively dry Río Cesar valley (Villanueva; El Orinoco) between the Sierra Nevada and Sierra de Perijá are smaller and extremely pale, their underparts more nearly pure white. They were taken from the early part of the dry season in January to the beginning of the rainy season in April. The January specimens are darkest, their pelage in good condition. In the March specimens, the pelage is faded and molting. April specimens show the darker new pelage on the middorsal region. The contrast is quite marked between the pale, comparatively short-haired valley mice of the dry season and the saturate prime pelage of speci-

mens taken during the rainy season on the comparatively cool slopes of the Sierra Nevada and the Sierra de Perijá.

Oryzomys trichurus J. A. Allen is founded on a juvenal and *Oecomys mincae* J. A. Allen on an adult, both from localities near Bonda in the semiarid northwestern corner of the Sierra Nevada de Santa Marta. They are like the small pale mice of the ecologically similar valley at the western base of the Sierra. One specimen at hand from Bonda is virtually a dwarf.

The range of variation in color, size, and degree of development of the supraorbital ridges shown by the mice of the Sierra Nevada de Santa Marta region is greater than in those of any other single region. The tendency for each stream valley branch in each altitudinal zone to produce a distinctive population is one of the most striking biological phenomena of the Sierra.

Oryzomys flavicans subluteus Thomas from "W. Cundinamarca," Colombia, was described as similar to Venezuelan *flavicans* "but distinguished by its darker belly." Three specimens at hand from Paime, Río Minero, western Cundinamarca, with underparts lightly washed buffy are absolutely indistinguishable from topotypes of *flavicans*. Two specimens from Muzo, western Boyacá, and but a few miles downstream (north) from Paime, with underparts entirely buff except for the white throat and chin are exactly like the type of *subluteus*.

Oryzomys tectus Thomas was described as more brightly colored than *flavicans* and with "remarkably expanded supraorbital ridges." The difference in color between western Panamanian *tectus* and Venezuelan *flavicans* lies well within the limits of variations common to any large population from either region. Supraorbital ridges are present in all members of the species and are more prominent in older than in younger individuals. It is true, nevertheless, that the ridges are more uniformly developed and ledge-like in most Central American and western Colombian mice than in many other series of the subspecies.

Western Colombian (Socorré, Purí, Catival) mice are indistinguishable from their Panamanian relatives. In one specimen from Purí, Antioquia, the upperparts and sides are grizzled with an interspersion of wholly white cover hairs. A female from Socorré, upper Río Sinú, Córdoba, shows the molt from dark to bright pelage.

The name *frontalis* Goldman is based on eastern Panamanian mice that are less tawny above and less buffy beneath than the average of western Panamanian *tectus*. The difference, although locally constant, is slight.

REMARKS: The original description of *Hesperomys concolor* includes the following Latin diagnosis: "*H[esperomys]* fulvus, subtus abrupte

albus, pedibus fuscantibus; cauda nuda longitudine corporis; pilis gastraci unicoloribus."

Measurements, presumably taken from the dry skin are: "Körper [head and body], 4'' 10''' [=126 mm.] and Schwanz [tail] 4'' 9''' [=124 mm.]" These measurements do not tally with those taken in the flesh by the collector (see below). Either set of measurements, however, lies within the range of variation for the species. Wagner compared the type of *concolor* with the larger *Hesperomys anguya* (= *Oryzomys buccinatus* Olfers) and noted that in the former the color of the upperparts are much brighter, more reddish, the hair of the underparts pure white, the cheeks without the gray as in *anguya*, the feet covered with brownish hair, and the tail dark and with short hairs.

Field notes by the collector, Johann Natterer, published by Pelzeln (1883) are translated from the German as follows:

The tarsus [of the type of *concolor*] is much broader than that of No. 173 [*Hesperomys russatus* Wagner=*Holochilus brasiliensis* Desmarest]. My dogs found it in the opening of a hollow tree and I got it out with the aid of a mattock. Its color is exactly like that of a reddish, white-bellied mouse from Ypanema [? species]. Incisors ochraceous; ears round, gray brown, the base grayish buff, toes and upperside of tarsus apparently naked and covered with small brown scales on a buffy base where, on closer inspection, extremely fine short hairs become visible. The hairs are somewhat longer at the roots of the claws but do not extend as far as the tips of the claws. Only 6''' [13 mm.] of the base of the tail is covered with fur. Total length, 10'' [=261 mm.], tail 5¼'' [=137 mm.].

The size, color, broad hind foot, and relatively long and thinly haired tail of *concolor* are diagnostic of *Oecomys*. There is no other cricetine in the upper Rio Negro region with which it can be confused.

SPECIMENS EXAMINED: One hundred and sixty-one, from the following localities:

COSTA RICA: San Gerónimo, San José, 1 (CNHM); El General, Puntarenas, 1 (UMMZ); Boruca, 2 (CM).

PANAMA: Bugaba, Chiriquí, 2 (BM, type of *tectus*; USNM, 1); Barro Colorado, Canal Zone, 1 (UMMZ); Cana, Darién, 11 (USNM, 9 including type of *frontalis*; CNHM, 2).

COLOMBIA: Catival, Córdoba, 1 (CNHM); Socorré, Río Sinú, Córdoba, 3 (CNHM); Purí, Río Cauca, Antioquia, 1 (CNHM); Muzo, Río Minero, Boyacá, 2 (CNHM); "W. Cundinamarca," 1 (BM, type of *subluteus*); Paimé, Río Minero, Cundinamarca, 3 (AMNH); Pueblo Viejo, Magdalena, 5 (AMNH, 3; MCZ, 2); Concepción, Magdalena, 1 (MCZ); Palomino, Magdalena, 1 (MCZ); Don Diego, Magdalena, 8 (CM); Bonda, Magdalena, 3 (AMNH); Mamatoca, Magdalena, 1 (AMNH); El Líbano, Magdalena, 1 (AMNH, type of *trichurus*); Minca, Magdalena, 1 (AMNH, type of *mincae*); Pueblo Bello, Magdalena, 3 (USNM); El Salado, Magdalena, 5 (USNM); El Orinoco, Río Cesar, Magdalena, 7 (USNM); Villanueva, Magdalena, 6 (USNM); Sierra Negra, Sierra de Perijá, 4 (USNM); Las Marimondas, 2 (USNM); Mambita, Cundinamarca, 2 (AMNH); Medina, Cundinamarca, 1 (AMNH); Buenavista, Meta 5 (AMNH); Guaicaramo, Meta, 2

(AMNH); Villavicencio, Meta, 2 (AMNH, types of *helvolus* and *vicencianus*); Maipures, Río Orinoco, Vichada, 1 (BM, type of *marmosurus*).

VENEZUELA: Río Cogollo, Mérida, 1 (CNHM); La Azulita, Mérida, 4 (CNHM); Mérida, Mérida (includes Cafetos de Mérida, Milla, Lourdes, Chama, Montes de la otra banda) 37 (BM, type of *flavicans*; AMNH, 23; CNHM, 3; USNM, 10); Caicara, Río Orinoco, Bolívar, 4 (AMNH, includes type of *caicarae*); El Yagual, 1 (AMNH, type of *klagesi*); Río Casiquiare, Amazonia, 1 (AMNH); Río Casiquiare, near Raudal Tamasú, Amazonia, 1 (AMNH); El Merey, Río Casiquiare, Amazonia, 2 (AMNH); Esmeralda, Río Orinoco, Amazonia, 3 (AMNH); Ihuapo, Río Orinoco, Amazonia, 1 (AMNH); Río Ocamá, mouth, at Río Orinoco, Amazonia, 3 (AMNH).

BRAZIL: Jauararé, Río Uaupés, Amazonas, 1 (AMNH); Yavanari, Río Negro, Amazonas, 1 (AMNH); Igarapé Piaba, mouth, Río Amazonas, Pará, 1 (MCZ); Lago Cuiteúá, Río Amazonas, Pará, 1 (MCZ); Rosarinho, Lago Miguel, Río Madeira, Amazonas, 1 (AMNH); Tauary, Río Tapajóz, Pará, 2 (MCZ); Ilha Manapiri, Río Tocantins, Pará, 1 (AMNH); Barão de Melgaço, Mato Grosso, 3 (AMNH).

Oryzomys concolor speciosus J. A. Allen and Chapman

Oryzomys speciosus J. A. Allen and Chapman, Bull. Amer. Mus. Nat. Hist., vol. 5, p. 212, 1893; vol. 9, p. 18, 1897 (Caparo, Trinidad).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 300, 1953 (type history and measurements).

Oryzomys trinitatis J. A. Allen and Chapman, Bull. Amer. Mus. Nat. Hist., vol. 5, p. 213, 1893 (type locality, Prince's Town, Trinidad); vol. 9, p. 18, 1897 (Trinidad: Caparo; Caura).—Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, p. 190, 1939 (Bartica, British Guiana; Arabupu, Mt. Roraima, and Sucre, Venezuela; and Trinidad. Synonyms: *palmarius*, *fulviventris*).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 301, 1953 (type history and measurements).

Oryzomys palmarius J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 12, p. 211, 1899 (type locality, Quebrada Seca, Río Manzanares, Cumanacoa, Sucre, Venezuela; another specimen from Los Palmales, Sucre).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 301, 1953 (type history; "may be a subspecies of *O. flavicans* [sic = *flavicans*] Thomas").

Oryzomys fulviventris J. A. Allen, Bull. Amer. Mus. Nat. Hist., vol. 12, p. 212, 1899 (type locality, Quebrada Seca, Cumanacoa, Sucre, Venezuela).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 301, 1953 (type history and measurements).

Oecomys guianae Thomas, Ann. Mag. Nat. Hist., ser. 8, vol. 6, p. 187, 1910 (type locality, Supinaam River, Demerara, British Guiana).—Anthony, Zoologica, vol. 3, No. 13, p. 274, 1921 (Kartabo, British Guiana).

Oecomys guianae guianae, Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, p. 193, 1939 (listed).

Oecomys splendens Hayman, Ann. Mag. Nat. Hist., ser. 11, vol. 1, p. 381, 1938 (type locality, Mayaro, southeastern Trinidad).

Oecomys auyantepui Tate, Bull. Amer. Mus. Nat. Hist., vol. 76, p. 193, 1939 (type locality, southern slopes of Mt. Auyan-tepuí, Río Caroni, Bolívar, Venezuela, altitude, 3,500 feet).—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 302, 1953 (type history and measurements).

TYPE: Adult female, skin and skull (AMNH 5942/4672) collected Apr. 26, 1893, by Frank M. Chapman.

TYPE LOCALITY: Prince's Town, Trinidad.

DISTRIBUTION: Trinidad, the Guianas, and eastern Venezuela, including the coast and delta and basin of the lower Río Orinoco; altitudinal range from sea level to about 1,500 meters above.

CHARACTERS: Like *concolor* but darker throughout; upperparts tawny finely ticked with dark brown; underparts gray, sometimes whitish or buffy with the plumbeous basal portions of the hairs showing through.

MEASUREMENTS: See table 8.

VARIATION: Underparts vary from whitish to dark gray with or without a light buffy wash. In all specimens, however, the basal portions of the hairs of belly and chest are plumbeous and show through the surface. A pectoral streak is present in the two specimens from Caura, Trinidad, and in the specimens from Quebrada Seca and Neveri, Venezuela.

REMARKS: Of a series of four specimens collected in Prince's Town, Trinidad, Allen and Chapman described one as *Oryzomys speciosus* and the others as *O. trinitatis*. The basal portions of the belly hairs in the first are more nearly white than in the others. The authors noted that "in size, proportions and coloration [*speciosus*] strongly suggests *Hesperomys concolor* Wagner." Paradoxically, they failed to recognize the same relationship to the specimen they named *trinitatis*.

Oryzomys palmarius J. A. Allen and *Oryzomys fulviventris* J. A. Allen are likewise based on differently colored individuals of a small series taken from Nov. 23 through Dec. 10, 1898, in Quebrada Seca, Sucre, Venezuela. In the first, the underparts are typically grayish white with the dark basal color of the hairs showing through. In the second, the belly is buffy, the throat whitish.

When Thomas erected the subgenus *Oecomys* in 1906, he failed to include in it the named forms *speciosus*, *trinitatis*, *palmarius* and *fulviventris*. A consequence of the omission was a dual system of classification and the multiplication of names for the eastern Venezuelan and Guianan race of *Oryzomys concolor*. Thus, *Oecomys guianae* Thomas, described in 1910, was compared only with *marmosurus* of Venezuela and *tapijinus* of Brazil, while *Oecomys splendens* Hayman was described in 1938 as the first Trinidad record of arboreal rice rats.

The two specimens from Auyan-tepui, on which the description of *Oecomys auyantepui* Tate is based, are colored like other mainland representatives of *speciosus*. Their shorter hind feet and narrower zygomatic plates, however, are more nearly as in *O. bicolor*. A skull only from Kartabo, British Guiana, also has the narrow zygomatic plate. Its small molars also indicate affinity with *O. bicolor*. Ostensibly, the large and small species of arboreal rice rats have not diverged as widely in the Guianan region as they have elsewhere.

TABLE 8.—*Oryzomys concolor speciosus* J. A. Allen and Chapman: Measurements (in millimeters) of adults (except where otherwise noted).

Locality	Head and body	Tail	Hind foot	Ear	Skull greatest length	Zygomatic breadth	Postrostrum width	Incisive foramina	Diastema	Alveolar length of molar row	Zygomatic plate width
TRINIDAD											
Prince's Town ¹	124	137	24	—	30.5	17.3	—	5.6	7	4.5 ²	—
Prince's Town ³	123	148	25	—	32.5	17.8	—	6.4	8.4	4.5 ²	—
Prince's Town	—	155	26	—	32.2	16.5	5.8	6.2	8.0	5.1	3.5
Mayaro ⁴	110	146	25 ⁵	—	—	15.5	—	5.8	—	5.0	—
San Rafael	129	141	18	—	33.0	17.4	6.3	6.4	8.9	5.1	3.8
Cumaca	110	105	—	—	31.5	—	5.9	5.7	7.9	5.5	3.6
St. Pats	137	131	—	—	33.4	17.0	6.5	6.5	8.4	5.1	3.8
Caura	122, 125	135, 155	27, 27	18, 20	31.9, 32.9	16.5, 17.4	5.8, 5.4	6.3, 6.2	7.9, 8.0	5.4, 5.3	3.4, 3.7
VENEZUELA											
Q. Secca ⁷	119	150	24	19	31.0	18.6	—	6.5	—	5.0 ²	—
Q. Secca ⁸	131	139	27	19	32	17.0	—	5.7	—	5.0 ²	—
Q. Secca ⁹	—	—	27	—	30.3	15.6	5.3	5.9	7.8	4.9	—
Neveri	120	149	27	—	31.6	16.7	5.4	5.8	7.9	5.4	3.5
Auyantepui ¹⁰	123	133	24.5 ¹¹	—	30.2 ¹¹	16.3	—	6.3	—	4.5 ²	2.7
Auyantepui	114	110	24	—	—	—	5.3	5.4	8.0	5.0	2.6
Arabupu	136	156	27	—	—	—	5.5	5.7	8.1	5.3	3.4
BRITISH GUIANA											
Supinam ¹²	115	155	26	16	32.7	17.7	—	5.7	—	4.9 ²	—
Kartabo ¹³	—	—	—	—	31.1	16.0	5.0	5.2	8.3	4.7	2.7

¹ Type of *speciosus* J. A. Allen, from original description.² Crown length.³ Type of *trinitatis* J. A. Allen, from original description.⁴ Type of *splendens* Hayman, from original description; external measurements from specimen preserved in alcohol.⁵ Without claw.⁶ Condylar-basal length = 29 mm.⁷ Type of *palmaris* J. A. Allen, from original description. Type locality, Quebrada Seca.⁸ Type of *fulviventris* J. A. Allen from original description.⁹ Subadult.¹⁰ Type of *ayantepui* Tate, from original description.¹¹ Hind foot, dry, zygomatic breadth and molar row from Goodwin, 1953 (Bull. Amer. Mus. Nat. Hist., vol. 102, p. 302). Tate gives 23 mm. for hind foot, 28.6 for condylar-basal length of skull, and 4.6 for molar row.¹² Type of *guyanensis* Thomas, from original description.¹³ A skull only (AMNH 42435) with molars extremely worn. It may be an extremely large individual of *Oryzomys bicolor*.

SPECIMENS EXAMINED: Twenty-eight, from the following localities:

TRINIDAD: Prince's Town, 4 (AMNH, includes types of *speciosus* and *trinitatis*); Caura, 2 (AMNH); Mayaro, 1 (BM, type of *splendens*); Cumaca, 1 (AMNH); St. Pats, 1 (AMNH); San Rafael, 1 (CNHM).

VENEZUELA: Quebrada Seca, Sucre, 5 (AMNH, includes types of *palmarius* and *fulviventris*); Neveri, Sucre, 3 (AMNH); San Rafael, Sucre, 1 (CM); Río Yuruán, Bolívar, 1 (AMNH); Auyan-tepui, Bolívar, 2 (AMNH, includes type of *ayuantepui*); Arabupu, Mt. Roraima, Bolívar, 2 (AMNH).

BRITISH GUIANA: Kartabo, 4 (BM, type of *guianae*; AMNH, 3).

Oryzomys concolor superans Thomas

ecomys superans Thomas, Ann. Mag. Nat. Hist., ser. 8, vol. 8, p. 250, 1911; ser. 10, vol. 2, p. 261, 1928 (San Jerónimo, Peru, 1,000 feet altitude; *palmeri* Thomas, a synonym).

Oryzomys (Oecomys) superans, Sanborn, Publ. Mus. Hist. Nat. "Javier Prado," ser. A, Zool., No. 6, p. 21, 1951 (Quincemil, Cuzco, Peru).

ecomys palmeri Thomas, Ann. Mag. Nat. Hist., ser. 8, vol. 8, p. 251, 1911 (type locality, Canelos, Río Bobonaza, upper Río Pastaza, Napo-Pastaza, eastern Ecuador; altitude 2,100 feet).

ecomys melleus Anthony, Amer. Mus. Nov., No. 139, p. 4, 1924 (type locality, Zamora, Santiago-Zamora, eastern Ecuador, altitude 3,250 feet.—Goodwin, Bull. Amer. Mus. Nat. Hist., vol. 102, p. 302, 1953 (type history and measurements).

ecomys osgoodi Thomas, Ann. Mag. Nat. Hist., ser. 9, vol. 14, p. 287, 1924 (type locality, Moyobamba, Amazonas, Peru; altitude about 820 meters above sea level); ser. 9, vol. 19, p. 369, 1927 (Yurac Yacu, San Martín, Peru); ser. 9, vol. 20, p. 601, 1927 (Tingo María, Peru, 2,000 feet altitude; measurements).

Oecomys osgoodi, Laurie, Ann. Mag. Nat. Hist., ser. 12, vol. 8, p. 276, 1955 (Río Tigre, Ecuador, 2,000 feet altitude).

Oryzomys auriventris, J. A. Allen (not Thomas), Bull. Amer. Mus. Nat. Hist., vol. 35, p. 118, 1916 (Zamora, Ecuador) [= type series of *O. melleus* Anthony].

TYPE: Adult female, skin and skull (BM 11.7.19.12) collected Apr. 28, 1910, by M. G. Palmer.

TYPE LOCALITY: Canelos, Río Bobonaza, Napo-Pastaza Province, eastern Ecuador; altitude, 640 meters above sea level.

DISTRIBUTION: Base, lower slopes, valleys, and foothills of the Andes drained by the Amazon in Colombia, Ecuador, and Peru, from approximately 200 to 1,200 meters above sea level.

CHARACTERS: Largest and darkest of the subspecies; upperparts and sides tawny, the back evenly mixed or heavily lined with dark brown; underparts gray to buff or ochraceous orange, the dark plumbeous basal portions of the hairs showing through; throat and chest not markedly different from belly.

MEASUREMENTS: See table 9.

VARIATION: Twenty-five specimens of *superans* taken during the dry season (January–March) along the upper and middle Río Caquetá (Florencia; Mecaya; Tres Troncos) vary considerably *inter se*. A few in prime pelage show either the dark color phase or the bright color

phase on upperparts and sides. Most of the other specimens are in old worn pelage of one color phase with patches of new pelage of the other phase. Underparts range from "dirty gray," sharply defined from sides, to gray washed with buff on chest and belly and hardly or not at all defined from sides.

The arboreal rice rats of the rain forests of eastern Ecuador vary like the preceding but average darker, especially on the underparts. Twenty-two adults and subadults at hand collected in February, March, June, August, October, and November reveal no seasonal molt pattern. One specimen collected in each of the months of February, August and October is in old pelage. Others taken at the same times and during other months of the year are in good to prime pelage.

Specimens from higher altitudes in the valleys and slopes of the Andes (Zamora and Chonta Urcu in Ecuador; Moyobamba, Amazonas, and Hacienda Exito, Huanuco, in Peru) are smaller, have longer pelage and are more richly colored, especially on underparts, than their relatives from the base of the Cordillera.

REMARKS: *Oryzomys concolor superans* is the most distinctive race. The transition in eastern Colombia from *concolor* of Orinoco drainage to the larger darker *superans* of Amazonian drainage seems to be abrupt. Likewise, the contrast between smaller white-bellied *roberti* of northwestern Bolivia and *superans* of southeastern Peru is sharp.

Oecomys palmeri Thomas is merely a small topotype of *superans* collected the same day by the same collector. Four specimens from Zamora, eastern Ecuador, first recorded by J. A. Allen as *Oryzomys auriventer*, were described as *Oecomys melleus* by Anthony. They average slightly smaller with underparts more generally ochraceous orange. Individually, however, they are indistinguishable from other eastern Ecuadorian representatives of *superans*. The type of *Oecomys osgoodi* Thomas is another small individual of *superans*. Its author compared it with *O. palmeri* only. In 1927, Thomas (Ann. Mag. Nat. Hist., ser. 10, vol. 2, p. 261) observed that *palmeri* was "not really distinct from *Æ. superans*" and that the Peruvian "bush rat" was also the same. He concluded that "throughout the tropical regions of S. America almost every district has two members of this genus—a large one, the size of a rat [= *concolor*], and a much smaller one, that of a large mouse [= *bicolor*]."

SPECIMENS EXAMINED: Sixty-three, from the following localities:

COLOMBIA: Florencia, Caquetá, 1 (CNHM); Tres Troncos, Río Caquetá, Putumayo, 7 (CNHM); Río Mecaya, Río Caquetá, Putumayo, 17 (CNHM).

ECUADOR: Río Napo, Napo-Pastaza, 1 (UMMZ); Llunchi, Río Napo, Napo-Pastaza, 1 (UMMZ); Chonta Urcu, Napo-Pastaza, 6 (MCZ, 4; CNHM, 2); Canelos, Río Bobonaza, Napo-Pastaza, 3 (BM, types of *superans* and *palmeri*;

TABLE 9.—Oryzomys concolor superans Thomas: Measurements (in millimeters) of adults. (Number of specimens, when more than three, indicated by *italic figures*.)

Locality	Head and body	Tail	Hind foot	Ear	Skull, greatest length	Zygomat. breadth	Rostrum width	Incisor foramina	Diastema	Alveolar length of molar row	Zygomat. plate width
COLOMBIA											
Caquetá ¹	157 (141-176)19	172 (158-183)15	30 (28-32)20	18 (17-21)17	35.4 (32.5-37.9)16	18.3 (16.9-19.8)17	6.3 (5.9-7.3)18	6.1 (5.1-6.8)19	9.4 (8.8-10.1)19	5.7 (5.2-6.0)20	3.5 (3.0-3.9)20
ECUADOR											
Llunchi	153	178	31	18	37.1	18.8	6.9	6.8	9.9	5.8	4.1
Canelos ²	150	199	31 ³	17	37.3	18.7	6.2	6.3	—	6.2	—
Canelos ⁴	131	156	30 ³	15	33.4	17.0	—	6.2	—	5.6	—
Canelos	165	172	29	—	37.5	19.4	7.5	6.7	10.1	5.8	3.9
Montalvo	155, 172, 162	168, 188, 188	30, 30, 28	18, 20, 17	37.2, 37.8, 38.8	19.0, 21.4, 19.0	6.3, 7.0, 7.5	6.6, 6.7, 7.2	9.1, 10.0, 10.4	5.7, 5.8, 5.8	3.2, 3.6, 3.4
Yana Rumi	140, 167, 150	170, 168, 190	30, 31, 32	17, 16, 17	33.0, 34.4, 37.0	17.4, 17.7, 18.6	5.9, 6.0, 6.6	5.4, 5.5, 6.1	8.8, 8.7, 9.1	5.8, 5.6, 6.1	3.2, 3.2, 3.3
Capihuara	142, 155	178, 185	30, 31	20, 20	34.9, 37.4	17.5, 18.7	5.8, 6.3	6.9, 6.2	8.9, 9.0	6.4, 6.7	3.3, 3.3
Pindo Yacu	154 (135-165)5	169 (155-175)5	30 (29-31)4	18 (15-20)5	36.2 (34.5-37.4)5	18.4 (17.4-20.0)5	6.2 (5.9-6.9)5	6.2 (5.9-6.5)5	9.2 (8.7-9.7)5	5.8 (5.6-5.9)5	3.3 (3.1-3.4)5
Chonta Urcu	140, 140	160, 160	31, 30	—	34.8, 34.9	17.9, 17.1	6.3, 6.3	5.9, 5.7	8.4, 9.1	6.0, 5.6	3.1, 3.3
Zamora ⁵	140	150	28	—	33.5	17.8	—	6.0	—	5.4	—
Zamora	130, 140	150, 150	29, 28	—	32.8, 33.1	17.1, 16.9	6.2, 6.0	6.5, 5.9	8.2, 8.1	5.7, 5.5	3.1, 3.0
PERU											
Moyobamba ⁶	120	140	25 ³	19	31.7	16.6	—	5.5	—	5.2	3.5
Exito	—	—	—	—	33.4, 33.4	16.9, 17.3	5.8, 6.1	5.4, 5.5	8.4, 8.1	5.3, 5.5	3.1, 3.1
La Pampa	124	181	—	—	34.0, 34.9, 35.6	18.4, 17.5, 18.7	6.2, 6.2, 6.3	5.6, 6.3, 6.3	8.7, 8.5, 9.1	5.5, 5.8, 5.7	3.3, 3.3, 3.3
Marcapata	143, 155, 161	150, 160, 170	29, 27, 30	18, 16, 19	34.5	18.0	6.1	9.2	9.2	5.5	3.0
Itahuana	135	160	28	17	36.1	18.5	6.5	5.7	8.3	5.8	3.8
Boca Colorado	152	183	29	17	—	—	—	—	—	—	—

¹ Includes all adult specimens from Florencia, Tres Troncos, and Río Mecaya.

² Type of *superans* Thomas, from original description.

³ Without claw.

⁴ Type of *palmeri* Thomas, from original description.

⁵ Type of *melles* Anthony, from original description.

⁶ Type of *osgoodi* Thomas, from original description.

AMNH, 1); Montalvo, Río Bobonaza, Napo-Pastaza, 3 (CNHM); Río Pindo Yacu, Napo-Pastaza, 5 (CNHM); Yana Rumi, Napo-Pastaza, 3 (CNHM); Capahuari, Napo-Pastaza, 2 (CNHM); Zamora, Santiago-Zamora, 4 (AMNH, includes type of *melleus*).

PERU: Moyobamba, Amazonas, 1 (BM, type of *osgoodi*); Hacienda Exito, Río Cayumba, Huanuco, 2 (CNHM); Satipo, Junín, 1 (MCZ); La Pampa, Puno, 1 (MCZ); Quincemil, Cuzco, 3 (CNHM); Itahuania, Madre de Dios, 1 (CNHM); Boca Colorado, Madre de Dios, 1 (CNHM).

Oryzomys concolor roberti Thomas

Rhipidomys roberti Thomas, Proc. Zool. Soc. London (1903), No. 2, p. 237, 1903. [*Oryzomys* (*Æcomys*)] *Roberti*, Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 18, p. 445, 1906.

Æ[comys] roberti, Thomas, Ann. Mag. Nat. Hist., ser. 8, vol. 3, p. 378, 1909 (comparison).

Oecomys roberti, Vieira, 1945, Arq. Zool. São Paulo, vol. 4, p. 428, 1945 (Fazenda Aricá, Rio Aricá, Mato Grosso, Brazil).

Oryzomys (*Æcomys*) *mamorae* Thomas, Ann. Mag. Nat. Hist., ser. 7, vol. 18, p. 445, 1906 (type locality, "Mosetenes," upper Río Mamoré, Yungas, Cochabamba, Bolivia).

Æcomys mamorae, Osgood, Field Mus. Nat. Hist., zool. ser., vol. 10, p. 206, 1916 (Todos Santos, Río Chaparé, Cochabamba, Bolivia).

TYPE: Adult male, skin and skull (BM 3.7.7.67) collected July 6, 1902, by Alphonse Robert.

TYPE LOCALITY: Santa Ana de Chapada, Mato Grosso, Brazil; altitude, 800 meters above sea level.

DISTRIBUTION: Northern Bolivia in the departments of Bení, Cochabamba, Santa Cruz, and Chuquisaca west into Mato Grosso, Brazil, in the Río Paraguay basin; altitudinal range approximately 200 to 1,500 meters above sea level.

CHARACTERS: Smaller and paler than *superans*; upperparts buffy to tawny mixed with dark brown, underparts entirely white and sharply defined from sides, or, sometimes, with a buffy or ochraceous wash on chest and belly; skull with supraorbital ridges less developed and divergent posteriorly than in other races.

MEASUREMENTS: See table 10.

VARIATION: The type and two specimens at hand from Mato Grosso, Brazil, are the palest representatives of the species east of the Andes. Specimens from the Bolivian departments of Chuquisaca, Bení, and Santa Cruz show a heavier mixture of dark brown on upperparts and sides. Six specimens from Todos Santos, Río Chaparé, collected by R. H. Becker, average nearly as dark on upperparts as *superans*. The underparts, however, are pure white in two, more or less buffy on belly and midline of chest in the others.

REMARKS: The clear white or buffy underparts distinguish every member of *roberti* from *superans*. On the other hand, subspecies *roberti* is hardly separable from Amazonian *concolor* by its paler color,

TABLE 10.—*Oryzomys concolor roberti* Thomas: Measurements (in millimeters) of adults (except as otherwise noted).

Locality	Head and Body	Tail	Hind foot	Ear	Skull, greatest length	Zygomatic breadth	Rostrum width	Incisive foramina	Diastema	Alveolar length of molar row	Zygomatic plate width
BRAZIL Chapada ¹	110	145	26.7	16	32.0	16.0	—	5.0	8.0	4.8 ²	—
BOLIVIA Mosctenes ³	130	161	27 ⁴	—	33.5	17.5	—	5.7	8.6	5.3 ²	—
Todos Santos ⁵	123, 147, 149	146, 181, 184	28, 28, 29	—	31.4, 33.7, 34	15.9, 17.0, 17.6	5.3, 5.6, 6.0	5.2, 5.8, 6.1	7.8, 8.5, 8.8	5.3, 5.2, 5.5	3.0, 3.3, 3.5
Buenavista	135, 160, 140	160, 165, 160	28, 29, 28	—	32.0, 33.3, 34.3	17.0, 17.8, 18.2	5.6, 5.3, 6.5	6.3, 6.5, 6.7	8.1, 8.6, 9.0	5.0, 5.2, 5.6	3.0, 3.8, 3.7
Tleucha	—	—	—	—	32.5	—	5.7	6.1	7.9	5.4	3.2

¹ Type of *roberti* Thomas, from original description.² Crown length.³ Type of *marmorae* Thomas, from original description.⁴ Without claw.⁵ First measurements given are those of a subadult.

slightly larger size, and, more significantly, by its narrower supra-orbital region and weaker temporal ridges.

SPECIMENS EXAMINED: Twenty-three, from the following localities:

BRAZIL: Santa Ana de Chapada, Mato Grosso, 1 (BM, the type of *roberti*); Descalvados, Mato Grosso, 1 (CNHM); Urucum de Corumbá, Mato Grosso, 1 (CNHM).

BOLIVIA: "Mosetenes," Cochabamba, 1 (BM, type of *mamorae*); Todos Santos, Cochabamba, 10 (AMNH, 5; CNHM, 5); Buenavista, Santa Cruz, 6 (CNHM, 5; MACN, 1); Río Yapaçani, Santa Cruz, 1 (MACN); Marbán, Río Mamoré, Santa Cruz, 1 (MACN); Ticueha, Río Capirenda, Chuquisaca, 1 (CNHM).

***Oryzomys concolor bahiensis*, new subspecies**

Mus cinnamomeus Pictet and Pictet, Notices sur les animaux nouveaux ou peu connus du musée de Genève, p. 64, pl. 19 (animal), pl. 23, fig. 5 (molars), 1844 (type locality, Bahía, Brazil; name preoccupied by *Mus cinnamomeus* Lichtenstein, 1830, Darstellung neuer oder weniger bekannter Säugethiere, Berlin, pl. 36, fig. 2 [= *Proechimys myosuroides* Lichtenstein]).

Oecomys cinnamomeus, Moojen, Os roedores do Brasil, p. 53, 1952 (Ilhéus, Bahía, Brazil).

TYPE: Adult male, skin and skull (CNHM 63780) collected Sept. 19, 1944, by the Serviço de Estudos e Pesquisas Sobre a Febre Amarela; original number M 19330.

TYPE LOCALITY: Fazenda Almada, Ilhéus, Bahía, Brazil.

DISTRIBUTION: Known only from eastern Bahía, Brazil, but possibly ranges south into Minas Gerais and north and west into the Rio São Francisco basin.

CHARACTERS: Darker throughout than *concolor*; upperparts tawny, underparts gray with a buffy wash, the slaty basal portions of the hairs of belly, chest and limbs showing through; supraorbital region broad, the ridges well developed and ledge-like.

MEASUREMENTS: Of the type and paratype, respectively, as follows: Head and body, 140, 130; tail, 145, 150; hind foot, dry with claw, 27, 28; weight, —, 57 grams; greatest length of skull, 33.0, 36.6; zygomatic breadth, 18, 16.7; width of rostrum, 5.9, 6.0; nasals, 11.7, 11.5; incisor foramina, 6.0, 5.9; diastema, 8.0, 7.9; alveolar length of molar row, 5.3, 5.3; zygomatic plate, 3.8, 3.4.

Measurements of the type of *cinnamomeus* Pictet and Pictet, given in the original description, are as follows: head and body, 148; tail, 121; hind foot, 27.

REMARKS: In the type, the upperparts are ochraceous tawny mixed with the dark brown of the guard hairs; a faint ochraceous buff lateral line is present; belly and underside of limbs gray, washed with buff, the slaty basal portion of the hairs showing through; posterior half of chest like belly, anterior portion and throat nearly pure white; tail brown, upperside of metacarpus and metatarsus brownish, digits silvery gray. A paratopotype is hardly distinguishable from the type.

The present specimens agree closely with the original description of *Mus cinnamomeus*. The colored plate of *cinnamomeus*, however, shows the wrist and adjoining part of the arms wholly white. This condition is not only anomalous for *Oecomys* but is not in accord with the text where it is stated that the anterior and outer sides of the forelimbs are colored like the dorsal surface of the head and body. The name *Mus cinnamomeus* Pictet, 1844, is preoccupied by *Mus cinnamomeus* Lichtenstein, 1830, a *Proechimys*.

SPECIMENS EXAMINED: Two, from Brazil: Almada, Ilhéus, Bahía, 1, the type (CNHM); Urucutuca, Ilhéus, Bahía, 1 (CNHM).

GAZETTEER

(With Name of Collector and Name of Species)

BOLIVIA

Buenavista (400–500 m.), 17°27' S.,
63°21' W.

Río Yapacani, Ichilo, Santa Cruz.
F. and J. Steinbach; *Oryzomys*
concolor.

Chimate (700 m.), 15° S., 68° W.

Upper Río Beni, La Paz.
P.O. Simons; *O. bicolor*.

El Palmal (Palmal), 17°05' S.,
65°23' W.

Chaparé, Cochabamba.
F. Steinbach; *O. bicolor*.

Marban (240 m.)

Río Mamoré, Beni.
F. Steinbach; *O. bicolor*, *O. con-*
color.

"Mosetenes" (probably a mis-
spelling)

Upper Río Mamoré, Yungas,
Cochabamba.

L. Balzan; *O. concolor*.

Ticuche (1,500 m.) 20°25' S.,
63°58' W.

Río Capirenda, Chuquisaca.
J. Arduz Tardio; *O. concolor*.

Ticunhuaya (1,500 m.), 15°35' S.,
68°10' W.

La Paz.

G. H. H. Tate; *O. bicolor*.

Todos Santos (250 m.), 16°40' S.,
65°15' W.

On Río Chaparé, Cochabamba.
R. H. Becker; *O. concolor*.

BOLIVIA—Continued

Yapacani, Río

Same general collecting locality as
Buenavista, Santa Cruz (q.v.).
F. Steinbach; *O. concolor*.

BRAZIL

Almada (Fazenda) (near sea level),
14°50' S., 39° W.

Ilhéus, Bahía.
Rockefeller Institution; *O. con-*
color.

Aricá (Fazenda) (203 m.), 15°45' S.,
55°46' W.

Río Aricá, Mato Grosso.
O. concolor.

Barão de Melgaço (350 m.), 11°52'
S., 60°48' W.

Río Comemoração, upper Río
Gy-Paraná, Mato Grosso.

L. E. Miller; *O. bicolor*, *O. con-*
color.

Descalvados (142 m.), 17°15' S.,
57°48' W.

Mato Grosso.

C. C. Sanborn; *O. concolor*.

Igarapé-açu (50 m.), 1°00' S.,
47°35' W.

Between Belém and Braganza,
Pará.

A. Robert; *O. bicolor*.

Igarapé Bravo

Río Tapajóz, Pará.

A. M. Olalla; *O. bicolor*.

BRAZIL—Continued

- Ilha de Manapiri
Rio Tocantins, Pará.
M. Goeldi; *O. concolor*.
- Jauararé [Yauareté] (82 m.), 1°24' N., 69°12' W.
Rio Uaupés (left bank), Amazonas.
Olalla Bros.; *O. concolor*, *O. bicolor*.
- Juruá, Rio (150 m.), 6°45' S., 79° W.
Amazonas.
Garbe; *O. bicolor*.
- Limontuba
Rio Tapajóz, Pará.
A. M. Olalla; *O. bicolor*.
- Manacapurú, 60°40' W.
Rio Solimões, Amazonas.
O. concolor.
- Marajó (Island)
At mouth of Rio Amazonas below the Equator in Pará.
O. concolor.
- Monte Alegre (10 m.), 2°00' S., 54°04' W.
Rio Solimões, east of Santarém, Pará.
O. concolor.
- Recreio, 3°30' N., 61° W.
Rio Majary, Amazonas.
A. M. Olalla; *O. bicolor*.
- Rosarinho (about 25 m.), 3°41' S., 59°07' W.
Lago Miguel, Rio Madeira.
Olalla Bros., *O. concolor*.
- Santa Ana de Chapada (855 m.), 12°25' S., 55°25' W.
Mato Grosso.
A. Robert; *O. concolor*.
- Santa Rosa, 5°20' S., 55°30' W.
Rio Jamanchim, Rio Tapajóz, Pará.
E. Snethlage; *O. concolor*.
- Tauary, 3°50' S., 55°00' W.
Rio Tapajóz, Pará.
A. M. Olalla; *O. concolor*.
- Urucum de Corumbá, 19°00' S., 57°40' W.
Corumbá, Mato Grosso.
C. C. Sanborn; *O. concolor*; *O. bicolor*.

BRAZIL—Continued

- Urucutuba (near sea level), 14°50' S., 39°00' W.
Ilhéus, Bahia.
Rockefeller Institution; *O. concolor*.
- Urupá, 10°50' S., 61°35' W.
Rio Urupá, a tributary of the Paran, Mato Grosso.
L. E. Miller; *O. bicolor*.
- Villa Braga, 4°20' S., 56°00' W.
Rio Tapajz, Par.
O. concolor.
- Yauanari, 0°30' S., 64°50' W.
Rio Negro, Amazonas.
Olalla Bros.; *O. concolor*.

BRITISH GUIANA

- Barakara, 5°52' S., 57°28' W.
Canje River, 50 km. southeast of New Amsterdam.
W. Beebe; *O. bicolor*.
- Bartica (near sea level), 6°24' N., 58°36' W.
At junction of Essequibo and Mazaruni Rivers, Essequibo.
O. concolor.
- Essequibo River (lower), 6°–7° N., 58°35' W.
S. B. Warren; *O. bicolor*.
- Holmia, 4°55' N., 55°35' W.
Potaro Highlands.
M. A. de Freitas; *O. bicolor*.
- Kartabo, 6°23' N., 58°42' W.
At junction of Mazaruni and Cuyuni Rivers, Essequibo.
W. Beebe; *O. bicolor*, *O. concolor*.
- Supinaam (River)
Demerara; enters mouth of Essequibo (q.v.) from west.
O. concolor.

COLOMBIA

- Andaluca (630 m.), 2°15' N., 75°30' W.
Huila.
L. E. Miller; *O. bicolor*.
- Bonda (50–80 m.), 11°17' N., 74°02' W.
Northwest slope of the Sierra Nevada de Santa Marta, Magdalena.
Mrs. H. H. Smith; *O. concolor*.

COLOMBIA—Continued

- Buena Vista (1,500 m.), 4°20' N., 73°40' W.
Above Villavicencio, Meta.
Chapman, Cherrie, et al.; *O. concolor*.
- Catival (120 m.), 8°17' N., 75°41' W.
Upper Río San Jorge drainage, Córdova.
P. Hershkovitz; *O. concolor*.
- Concepción (La) (about 900 m.), 11°01' N., 73°26' W.
Río San Antonio, northern slope of Sierra Nevada de Santa Marta, Magdalena.
W. W. Brown; *O. concolor*.
- Donama (600 m.), 11°13' N., 74°00' W.
Northwestern slope of Sierra Nevada de Santa Marta, Magdalena.
M. A. Carriker, Jr.; *O. concolor*.
- Don Amo [=Donama (q.v.)]
Don Diego (sea level), 11°16' N., 73°37' W.
Northern slope of the Sierra Nevada de Santa Marta, Magdalena.
M. A. Carriker, Jr.; *O. concolor*.
- El Líbano (1,250 m.), 11°10' N., 74°00' W.
Northwestern slope of Sierra Nevada de Santa Marta, Magdalena.
H. H. Smith; *O. concolor*.
- El Orinoco, 10°13' N., 73°23' W.
Río Cesar, Magdalena.
P. Hershkovitz; *O. concolor*.
- El Salado (430 m.), 10°22' N., 73°29' W.
Southeastern slope of Sierra Nevada de Santa Marta, Magdalena.
P. Hershkovitz; *O. concolor*.
- Florencia (450 m.), 1°45' N., 75°40' W.
Río Ortegua, Caquetá.
L. E. Miller; *O. bicolor*. P. Hershkovitz; *O. concolor*.
- Guaicaramo (about 250 m.), 4°35' N., 73°00' W.
Northeast of Villavicencio, Río Upía, Meta.

COLOMBIA—Continued

- Hermano Nicéforo María; *O. concolor*. González; *O. bicolor*.
- Jino Goje, 0°15' S., 70°28' W.
Río Apoporis, Amazonas.
I. Cabrera; *O. bicolor*.
- Mamatoca (2 m.), 11°15' N., 74°09' W.
Three miles east of Santa Marta, Magdalena.
H. H. Smith; *O. concolor*.
- Mambita (700 m.), 4°46' N., 73°20' W.
Río Guavio, eastern Cundinamarca.
González; *O. concolor*, *O. bicolor*.
- Maipures (115 m.), 5°18' N., 67°50' W.
Río Orinoco, Vichada.
G. K. and S. M. Cherrie; *O. concolor*.
- Las Marimondas (1,000 m.), 10°52' N., 72°43' W.
Sierra de Perijá, Magdalena.
P. Hershkovitz; *O. concolor*.
- Mecaya, Río (185 m.), 0°29' N., 75°10' W.
Río Caquetá, Putumayo.
P. Hershkovitz; *O. bicolor*, *O. concolor*.
- Medina, 4°30' N., 72°45' W.
East slope of Eastern Andes, Cundinamarca.
Hermano Nicéforo María; *O. concolor*.
- Minca (660 m.), 11°12' N., 74°04' W.
Northwestern slope of Sierra Nevada de Santa Marta, Magdalena.
H. H. Smith; *O. concolor*.
- Muzo (1,000–1,300 m.), 5°30' N., 74°10' W.
Western slope of the Cordillera Oriental, Boyacá.
P. Hershkovitz; *O. concolor*.
- Paima (1,038 m.), 5°25' N., 74°10' W.
Cundinamarca.
Hermano Nicéforo María; *O. concolor*.

COLOMBIA—Continued

Palomino (about 1,200 m.), 11°17' N., 73°34' W.

Northern slope of the Sierra Nevada de Santa Marta, Magdalena.

W. W. Brown; *O. concolor*.

Pueblo Bello (1,067 m.), 10°24' N., 73°43' W.

Southern slope of the Sierra Nevada de Santa Marta, Magdalena.

P. Hershkovitz; *O. concolor*.

Pueblo Viejo (853 m.), 10°58' N., 73°26' W.

Northern slope of the Sierra Nevada de Santa Marta, Magdalena.

W. W. Brown; *O. concolor*.

Purí (140 m.), 7°25' N., 75°20' W.
Río Cauca valley above Cáceres, Antioquia.

P. Hershkovitz; *O. concolor*.

San Antonio, 11°00' N., 73°26' W.

Río San Antonio, northern slope of the Sierra Nevada de Santa Marta, Magdalena.

W. W. Brown; *O. concolor*.

Sierra Negra (1,265 m.), 10°36' N., 72°55' W.

Western slope of the Sierra de Perijá, Magdalena.

P. Hershkovitz; *O. concolor*.

Socorré (100–150 m.), 7°51' N., 76°17' W.

Río Sinú, Córdoba.

P. Hershkovitz; *O. concolor*.

Tres Troncos (150 m.), 0°05' N., 74°17' W.

Right bank, Río Caquetá, La Tagua, Putumayo.

P. Hershkovitz; *O. concolor*, *O. bicolor*.

Villanueva (274 m.), 10°37' N., 72°58' W.

Río Cesar Valley, Magdalena.

P. Hershkovitz; *O. concolor*.

Villavicencio (498 m.), 4°10' N., 73°40' W.

Meta.

G. M. O'Connell; *O. concolor*.

COSTA RICA

Boruca (500 m.), 9°04' N., 83°27' W.
Puntarenas.

M. A. Carriker, Jr.; *O. concolor*.

El General (625 m.), 9°21' N., 83°40' W.

Puntarenas.

A. Smith; *O. concolor*.

San Gerónimo (about 150 m.), 9°39' N., 84°18' W.

Río Pirris, San José.

C. F. Underwood; *O. concolor*.

ECUADOR

Avila (600 m.), 0°38' S., 77°25' W.
Río Suno, Napo-Pastaza.

E. J. Brundage; *O. bicolor*.

Canelos (530 m.), 1°35' S., 77°45' W.
Río Bobonaza, Napo-Pastaza.

G. H. H. Tate; *O. bicolor*. M. G. Palmer; *O. concolor*.

Capahuari, Río (300 m.), 1°55' S., 77°20' W.

A tributary of the Río Pastaza, Napo-Pastaza.

R. Olalla; *O. concolor*.

Chonta Urcu (700 m.)
Upper Río Napo, Napo-Pastaza.

W. Clark-MacIntyre; *O. concolor*.

Chonta Urcu, east (500 m.)
Napo-Pastaza.

C. Olalla; *O. concolor*.

Copataza, Río (650 m.), 1°45' S., 77°50' W.

Enters Río Pastaza, Napo-Pastaza.

M. Olalla; *O. bicolor*.

Gualaquiza (885 m.), 4°22' N., 78°32' W.

Río Gualaquiza, Santiago-Zamora.

O. bicolor.

Jatun Yacu, Río (700 m.), 1°04' S., 77°47' W.

Río Napo, mouth at Puerto Napo.
W. Clark-MacIntyre; *O. bicolor*.

Jollín, Río (700 m.), 0°45' S., 77°40' W.

Enters the Misaguallí east of Tena.

W. Clark-MacIntyre; *O. bicolor*.

ECUADOR—Continued

- Llunchi (250 m.), 0°37' S., 76°46' W.
Río Napo, Napo-Pastaza.
P. Hershkovitz; *O. concolor*, *O. bicolor*.
- Montalvo, 1°40' S., 77°20' W.
Río Bobonaza, Napo-Pastaza.
R. Olalla; *O. bicolor*, *O. concolor*.
- Napo, Río
Napo-Pastaza
L. Söderström; *O. concolor*.
- Pambilar (20 m.), 1° N., 79° W.
Esmeraldas.
G. Fleming; *O. bicolor*.
- Paramba (1,100 m.), 0°49' N.,
78°22' W.
Río Mira, Imbabura.
R. Miketta; *O. bicolor*.
- Pindo Yacu [Pinto Yacu] (250 m.),
2°33' S., 76°38' W.
Río Bobonaza near junction with
Río Pastaza.
R. Olalla; *O. concolor*.
- San José (below) (500 m.), 0°32' S.,
77°26' W.
Río Payamino, Napo-Pastaza.
Olalla Bros.; *O. bicolor*.
- Suno, Río (below), 0°40' S., 77°05'
W.
Enters Río Napo, Napo-Pastaza.
Olalla Bros.; *O. bicolor*.
- Yana Rumi
Napo-Pastaza.
R. Olalla; *O. concolor*.
- Zamora (1,000 m.), 4°10' S., 78°43'
W.
Río Zamora, Santiago-Zamora.
H. E. Anthony; *O. bicolor*. W. B.
Richardson; *O. concolor*.

PANAMA

- Barro Colorado, Canal Zone.
R. K. Enders; *O. concolor*, *O. bicolor*.
- Bogava [Bugaba (q.v.)]
Bugaba (250 m.), 8°28' N., 83°38'
W.
Pacific coast, Chiriquí.
H. J. Watson; *O. concolor*.
- Cana [Santa Cruz de Cana] (600 m.),
7°43' N., 77°40' W.
Darién.
E. A. Goldman; *O. concolor*.

PANAMA—Continued

- Corozal, Canal Zone.
O. concolor.
- Jesunito, Río (near sea level),
8°03' N., 78°14' W.
A tributary of the Sambu,
Darién.
T. Barbour and W. S. Brooks;
O. bicolor.
- Tacareuna (560–600 m.), 8°05' N.,
77°20' W.
Darién.
H. E. Anthony; *O. concolor*.

PERU

- Boca Colorado (279 m.), 12°30' S.,
70°25' W.
Madre de Dios.
C. Kalinowski; *O. concolor*.
- Camante (2,000 m.), 13°30' S.,
70°50' W.
Near Cadena, Marcapata, Cuzco.
C. Kalinowski; *O. bicolor*.
- Chanchamayo (1,000 m.), 11°10' S.,
75°20' W.
Junín.
J. M. Schunke; *O. bicolor*.
- Curaray, Río (mouth) (140 m.),
2°26' S., 74°04' W.
Loreto.
Olalla Bros.; *O. bicolor*.
- Exito (Hacienda) (940 m.), 9°25' S.
Río Cayumba, Huanuco; the
Cayumba enters the Huallaga.
E. Heller; *O. concolor*.
- Itahuania, 12°40' S., 71°10' W.
Madre de Dios.
C. Kalinowski; *O. concolor*.
- Lagarto Alto, 5°55' S., 74°35' W.
Río Ucayali, Loreto; the coordi-
nates are those of "Lagarto,"
which may not be the actual
collecting locality.
Olalla Bros.; *O. bicolor*.
- La Pampa (573 m.), 13°38' S.,
69°36' W.
On road between Limbani and
Astilleros, Puno.
O. Pearson; *O. concolor*.
- Mazón, Río (100 m.), 3°20' S.,
73°05' W.
Tributary of Río Napo, Loreto.
Mendo B.; *O. bicolor*.

PERU—Continued

- Monte Alegre
Presumably in Loreto Department.
G. Tessman; *O. bicolor*.
- Moyobamba (820 m.), 6°03' S., 76°58' W.
At head of Río Moyobamba, Amazonas.
L. Rutter; *O. concolor*.
- Pozuzo, 9°55' S., 75°35' W.
Huanuco.
E. Heller; *O. bicolor*.
- Pucallpa (180 m.), 8°25' S., 74°35' W.
Loreto.
J. M. Schunke; *O. bicolor*.
- Puerto Indiana (100 m.), 3°20' S., 72°40' W.
North bank of Río Marañon, above mouth of Río Napo, Loreto.
Olalla Bros.; *O. bicolor*.
- Quincemil (680 m.), 13°17' S., 70°35' W.
Río Marcapata, Cuzco.
C. Kalinowski; *O. concolor*, *O. bicolor*.
- Sagrario (1,020 m.), 13°55' S., 69°41' W.
Upper Río Inambari, Puno.
P. O. Simons; *O. bicolor*.
- San Jerónimo (300 m.), 7°45' S., 74°50' W.
Río Ucayali, Loreto.
R. W. Hendee; *O. concolor*, *O. bicolor*.
- Santiago, Río
J. M. Schunke; *O. bicolor*.
- Sarayacu, 6°45' S., 75°15' W.
Río Ucayali, Loreto.
Olalla Bros.; *O. bicolor*.
- Satipo, 11°12' S., 74°32' W.
Junín.
O. Pearson; *O. concolor*. Pearson and Gardner; *O. bicolor*.
- Tambo Yacu (1,000 m.), 6°00' S., 77°10' W.
Rioja, San Martín.
Osgood and Anderson; *O. bicolor*.
- Tingo María (700 m.), 9°10' S., 75°45' W.
Río Huallaga, Huanuco.
R. W. Hendee; *O. concolor*.

PERU—Continued

- Villa Carmen (Hacienda) (600 m.), 12°52' S., 71°15' W.
Cosñipata, Cusco.
C. Kalinowski; *O. bicolor*.
- Yarinacocha (160 m.), 10°15' S., 74°45' W.
Río Ucayali, Loreto.
J. M. Schunke; *O. bicolor*.
- Yurac Yacu (800 m.), 6° S., 77° W.
San Martín.
R. W. Hendee; *O. concolor*, *O. bicolor*.

TRINIDAD

- Caparo
Caroni, Port of Spain.
F. M. Chapman; *O. concolor*.
- Caura
Caroni.
F. M. Chapman; *O. concolor*.
- Cumaca
W. G. Downs; *O. concolor*.
- Mayaro, 10°20' N., 61°00' W.
Southeastern Trinidad.
O. concolor.
- Prince's Town, 10°16' N., 61°22' W.
Victoria.
F. M. Chapman; *O. concolor*.
- San Rafael, 10°30' N., 61°15' W.
F. Wonder; *O. concolor*.
- St. Pats
W. G. Downs; *O. concolor*.

VENEZUELA

- Aguíta (1,000 m.), 3°22' N., 65° 35' W.
Southeast slope of Mt. Duida, Amazonas.
G. H. H. Tate; *O. concolor*.
- Arabupu (1,280 m.), 5°03' N., 60°39' W.
South side of Mt. Roraima, Bolívar.
G. H. H. Tate and T. D. Carter; *O. concolor*.
- Ayantepuí (1,100 m.), 5°45' N., 62°30' W.
East of Río Caroni, Bolívar.
G. H. H. Tate; *O. concolor*.
- Caicara (146 m.), 7°38' N., 66° 10' W.
Right bank of Río Orinoco, Bolívar.
G. K. Cherrie; *O. concolor*.

VENEZUELA—Continued

Caño Seco (700 m.), 3°21' N.,
65°35' W.

Southeast slope of Mt. Duida,
Amazonas.

Olalla Bros.; *O. bicolor*.

Caroni, Río (1,100 m.), 6°00' N.,
62°45' W.

Cerro Auyantepuf, Bolívar.

G. H. H. Tate; *O. concolor*.

Casiquiare, Río (80 m.), 2°48' N.,
65°55' W.

Two miles west of Raudal Yamadú,
Amazonas.

G. H. H. Tate, Olalla Bros.;
O. concolor.

Chama (Cafetos de) (1,600 m.),
8°33' N., 71°13' W.

Río Chama, Mérida.

S. Briceño; *O. concolor*.

Cogollo, Río (100 m.), 9°55' N.,
72°12' W.

Zulia, Perijá.

W. H. Osgood and H. B. Conover;
O. concolor.

El Llagual [Yagual], 7°12' N.,
64°58' W.

Lower Río Caura, Bolívar.

M. A. Carriker, Jr.; *O. concolor*.

El Merey, 3°06' N., 65°53' W.

Río Casiquiare, Amazonas.

Olalla Bros.; *O. concolor*.

Esmeralda (143 m.), 3°11' N.,
65°33' W.

Mt. Duida, north bank of upper
Orinoco.

G. H. H. Tate, Olalla Bros.;
O. concolor.

Ihuapo, 7°00' N., 65°27' W.

Río Orinoco, Amazonas.

Olalla Bros.; *O. concolor*.

La Azulita (1,135 m.), 8°43' N.,
71°26' W.

Mérida.

W. H. Osgood and H. B. Con-
over; *O. concolor*.

La Unión (150 m.), 7°05' N.,
65°52' W.

Río Caura, Bolívar.

S. M. Klages; *O. bicolor*.

Los Palmales, 10°30' N., 64°10' W.
East of Cumaná, Sucre.

F. M. Urich; *O. concolor*.

VENEZUELA—Continued

Lourdes (Cafetos de) (1,800 m.),
8°35' N., 71°07' W.

Mérida.

S. Briceño; *O. concolor*.

Mérida (1,641 m.), 8°36' N., 71°09'
W.

Mérida.

O. concolor.

Mérida (Cafetos de) (1,630 m.),
8°36' N., 71°09' W.

Mérida.

S. Briceño; *O. concolor*.

Milla (Cafetos de) (1,630 m.),
8°43' N., 71°00' W.

Mérida.

S. Briceño; *O. concolor*.

Milla (Montes de) (1,630–1,670 m.),
8°43' N., 71° W.

Mérida.

S. Briceño; *O. concolor*.

Montes de la Otra Banda (1,600–
1,630 m.), 8°37' N., 71°10' W.

Mérida, Mérida.

S. Briceño; *O. concolor*.

Neveri (750 m.), 10°06' N., 64°37'
W.

Sucre.

G. H. H. Tate and H. J. Clement;
O. concolor.

Ocama, Río (150 m.), 2°47' N.,
65°15' W.

At mouth of Río Orinoco, Ama-
zonas.

Olalla Bros.; *O. concolor*.

Quebrada Seca, 10°15' N., 63°55'
W.

Río Manzanares, Cumanacoa,
Sucre.

F. W. Urich; *O. concolor*.

Rancho Grande (1,100 m.), 10°21'
N., 67°41' W.

Aragua.

G. H. H. Tate and W. Beebe;
O. bicolor.

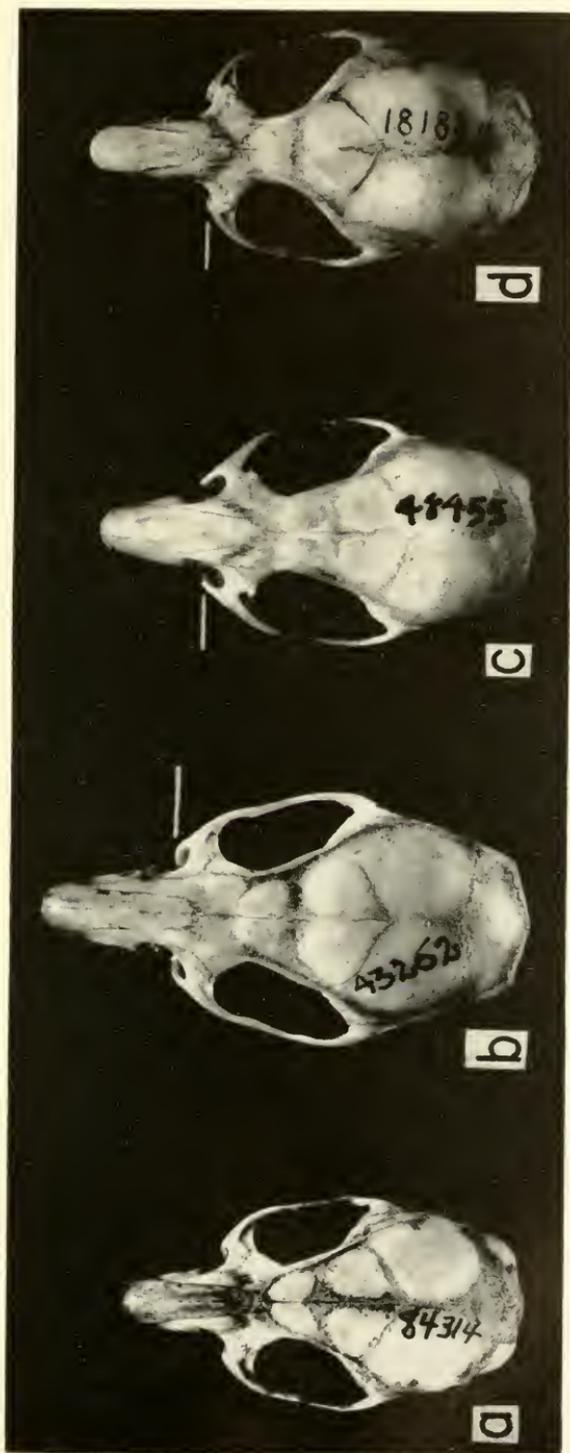
San Rafael (900 m.), 10°05' N.,
64° W.

Cumanacoa, Sucre.

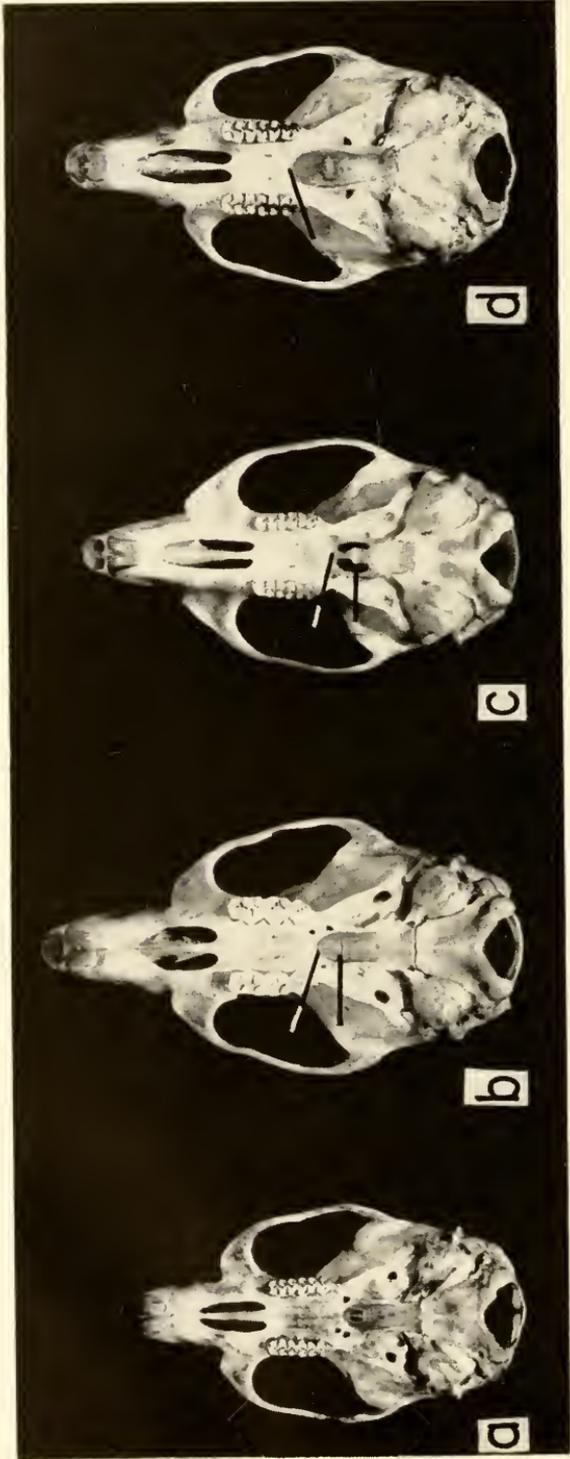
H. J. Clement; *O. concolor*.

Yuruán, Río, 6°42' N., 61°37' W.
Bolívar.

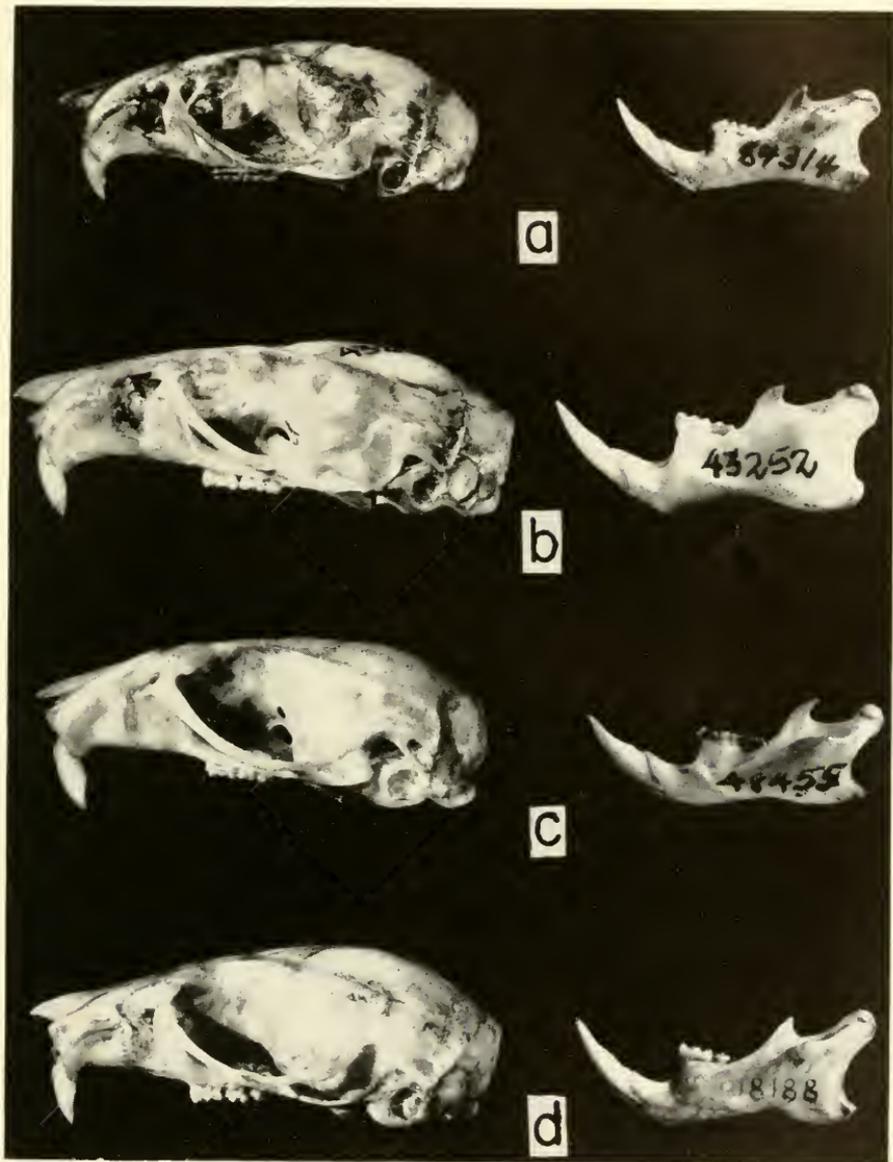
M. A. Carriker, Jr.; *O. concolor*
O. bicolor.



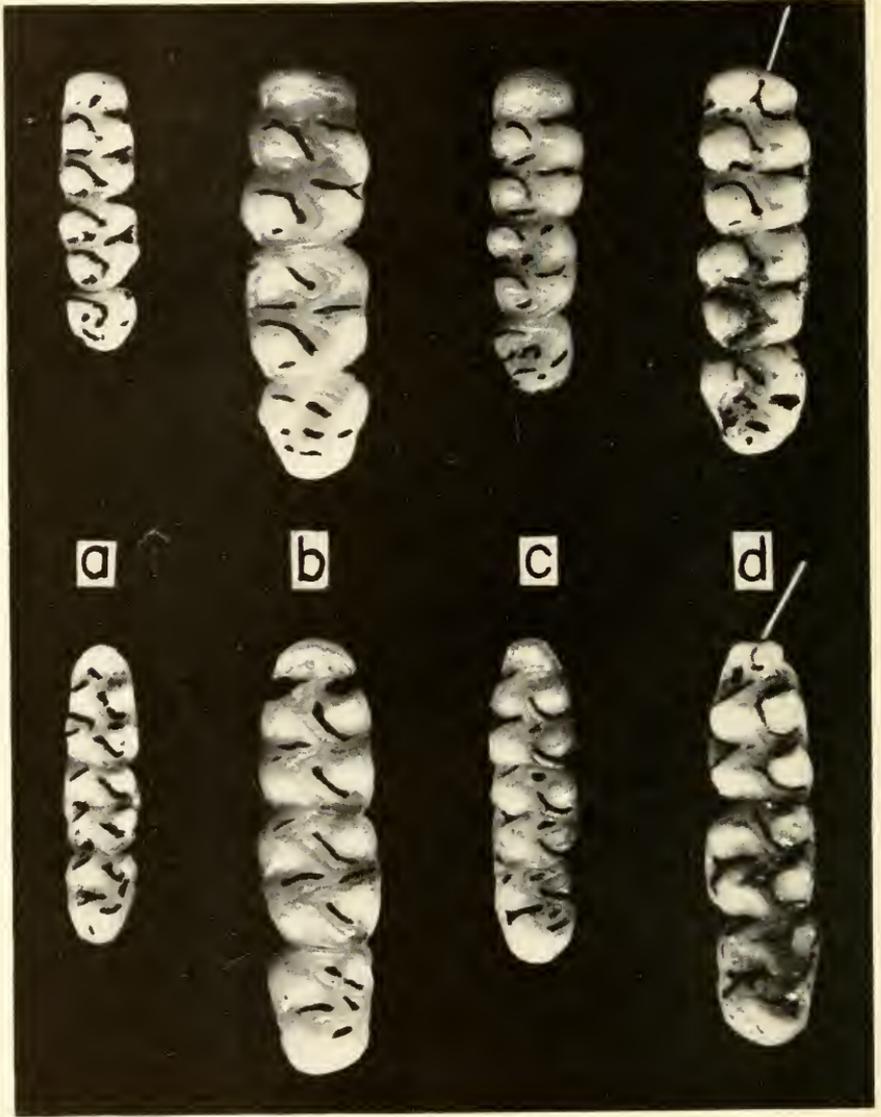
Dorsal aspect ($\times 2$) of skull of: a, *Oryzomys (Oecomys) bicolor* (CNHM 84314); b, *O. (Oecomys) concolor* (CNHM 43252); c, *O. (Oryzomys) palustris* (CNHM 48455); d, *Rhipidomys venustus* (CNHM 18188).



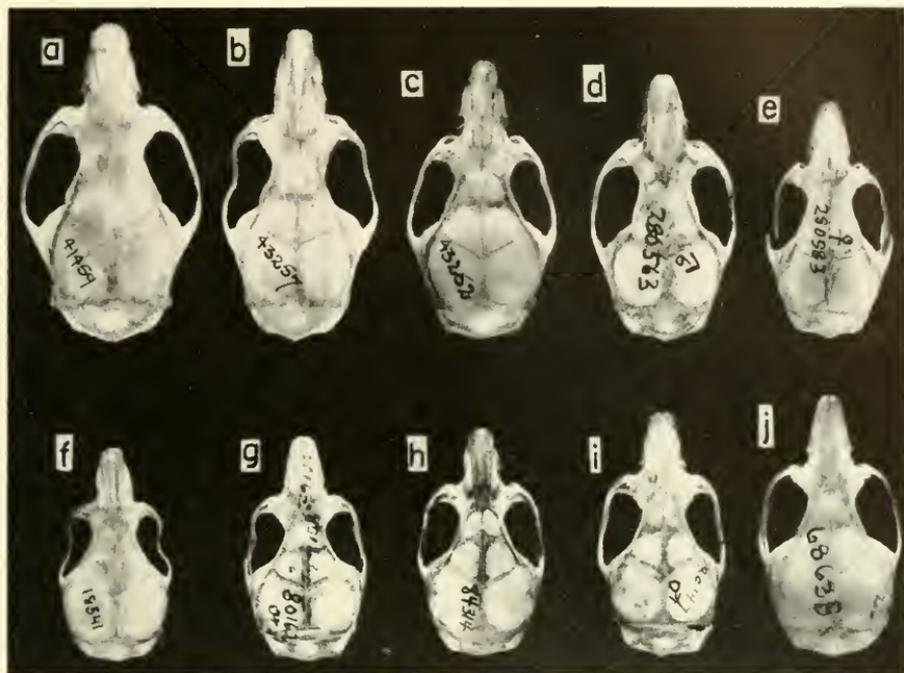
Ventral aspect ($\times 2$) of same skulls shown in plate 1: a, *Oryzomys bicolor*; b, *O. concolor*; c, *O. palustris*; d, *Rhipidomys venustus*.



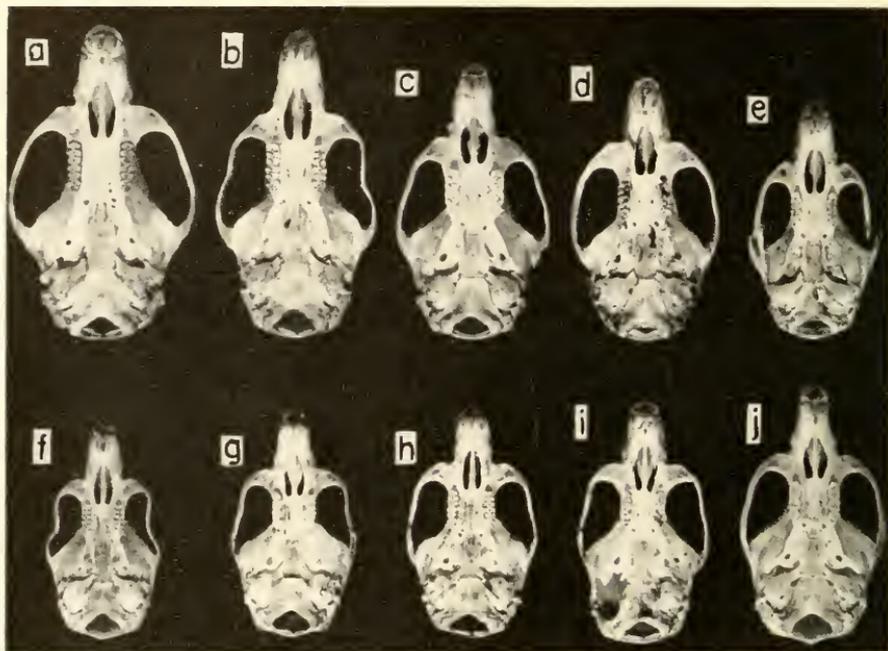
Lateral aspect ($\times 2$) of same skulls (with mandibles) shown in plates 1, 2: a, *Oryzomys bicolor*; b, *O. concolor*; c, *O. palustris*; d, *Rhipidomys venustus*.



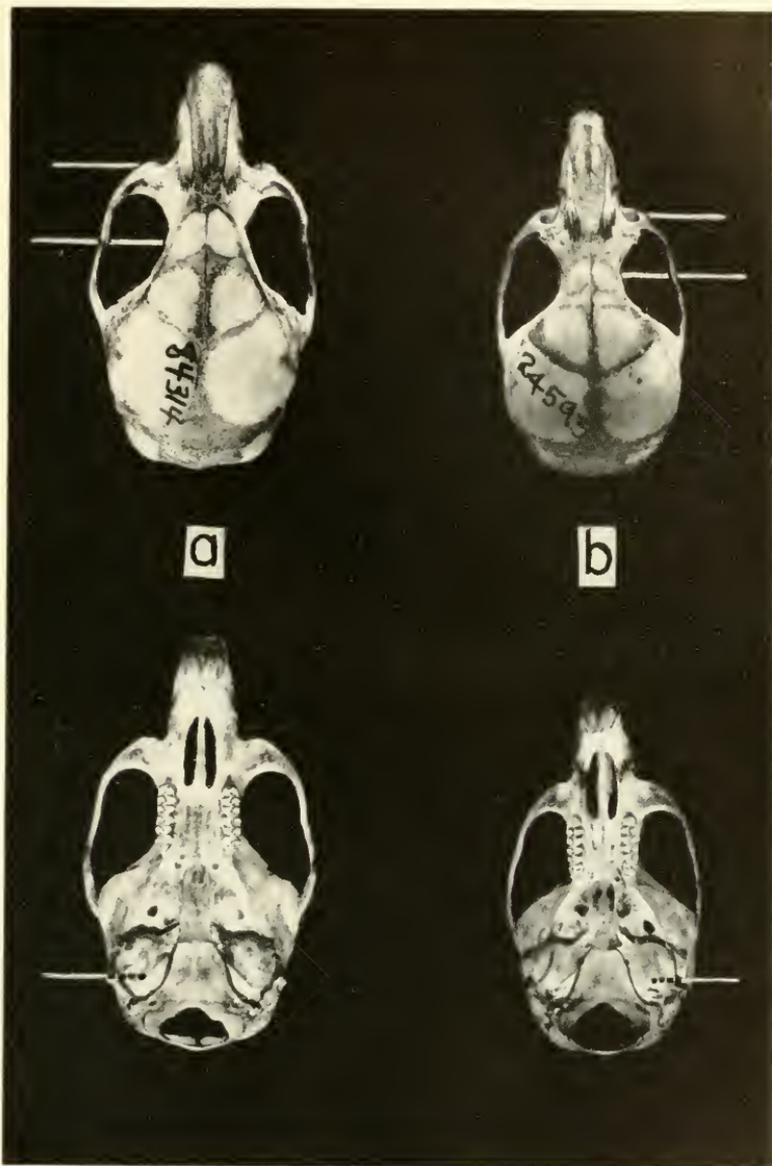
Upper and lower molars ($\times 10$) of same specimens (except as noted) shown in plate 3: a, *Oryzomys bicolor* (CNHM 18541); b, *O. concolor*; c, *O. palustris*; d, *Rhipidomys venustus*.



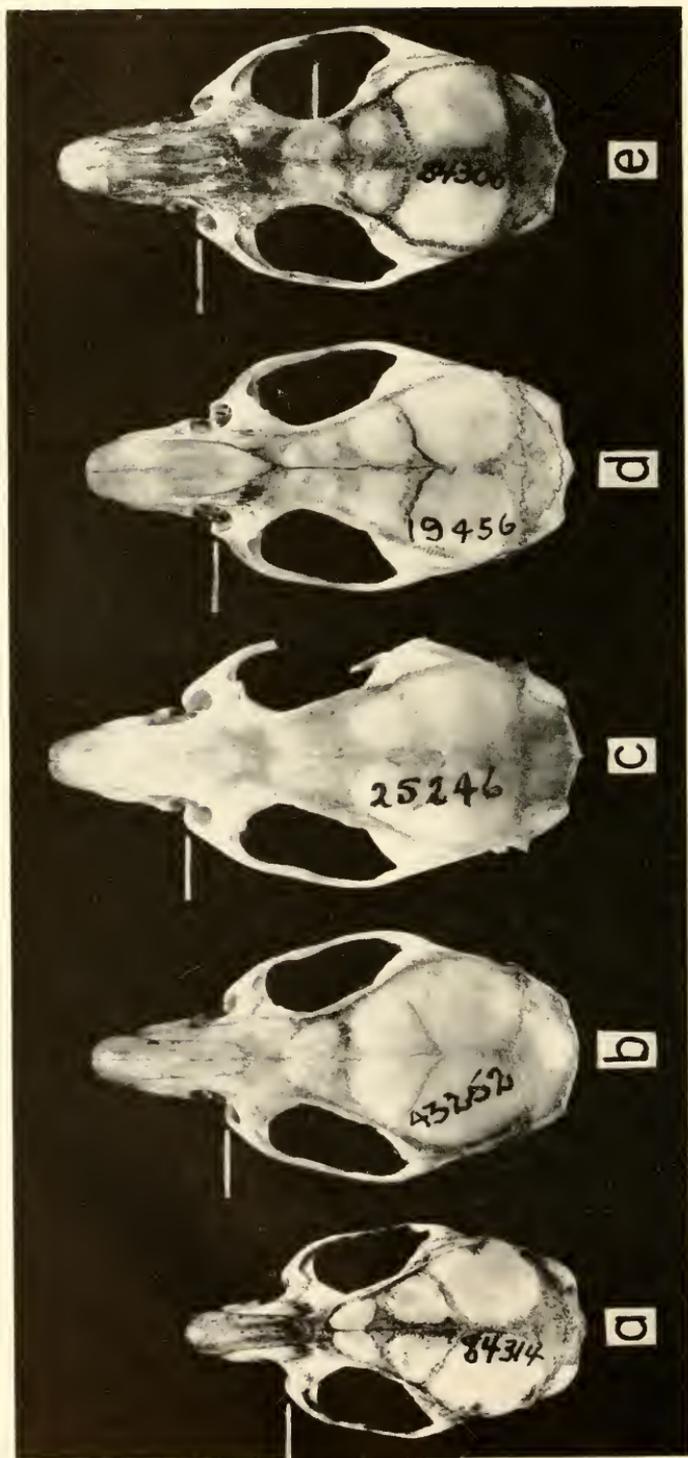
Dorsal aspect ($\times 1+$) of skull in certain subspecies of *Oryzomys concolor* (a-e) and *O. bicolor* (f-j), showing variation in size with broad overlapping in the opposite extremes of each species. a-c, *Oryzomys concolor superans*: a, Male (CNHM 41459), Montalvo, Río Bobonaza, Ecuador; b, female (CNHM 43257), Río Pindo Yacu, Ecuador; c, female (CNHM 43252), Yana Rumi, Ecuador. d, e, *Oryzomys concolor concolor*: d, male (USNM 280563), Pueblo Bello, Colombia; e, female (USNM 280583), El Orinoco, Río Cesar, Colombia. f, g, i, *Oryzomys bicolor bicolor*, males: f (CNHM 18541), Holmia, British Guiana; g (UMMZ 80162), i (UMMZ 80147), both from Llunchi, Río Napo, Ecuador. h, j, *Oryzomys bicolor phaeotis*: h, Female (CNHM 84314), Villa Carmen, Cosñipata, Peru; j, male (CNHM 68638), Camante, Marcapata, Peru.



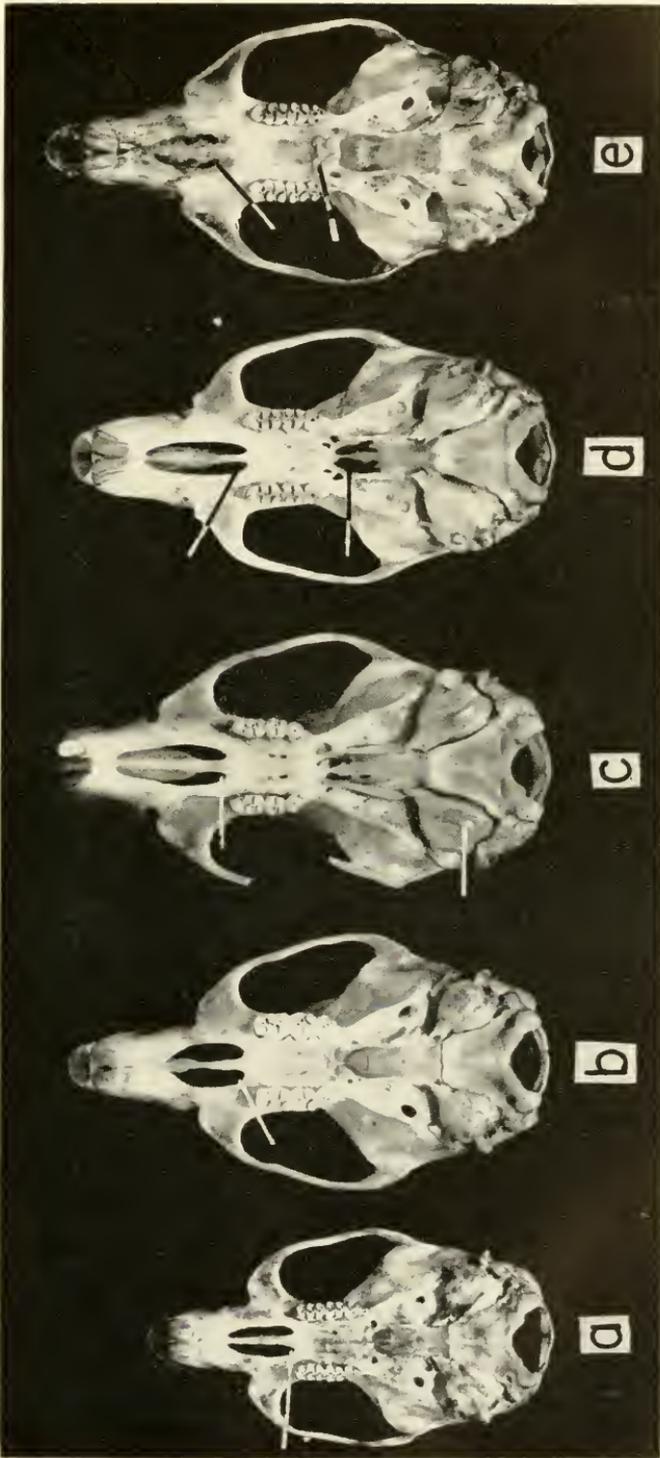
Ventral aspect of (♂ 1+) same skulls in same order as shown in plate 5: *Oryzomys concolor* (a-e) and *O. bicolor* (f-j).



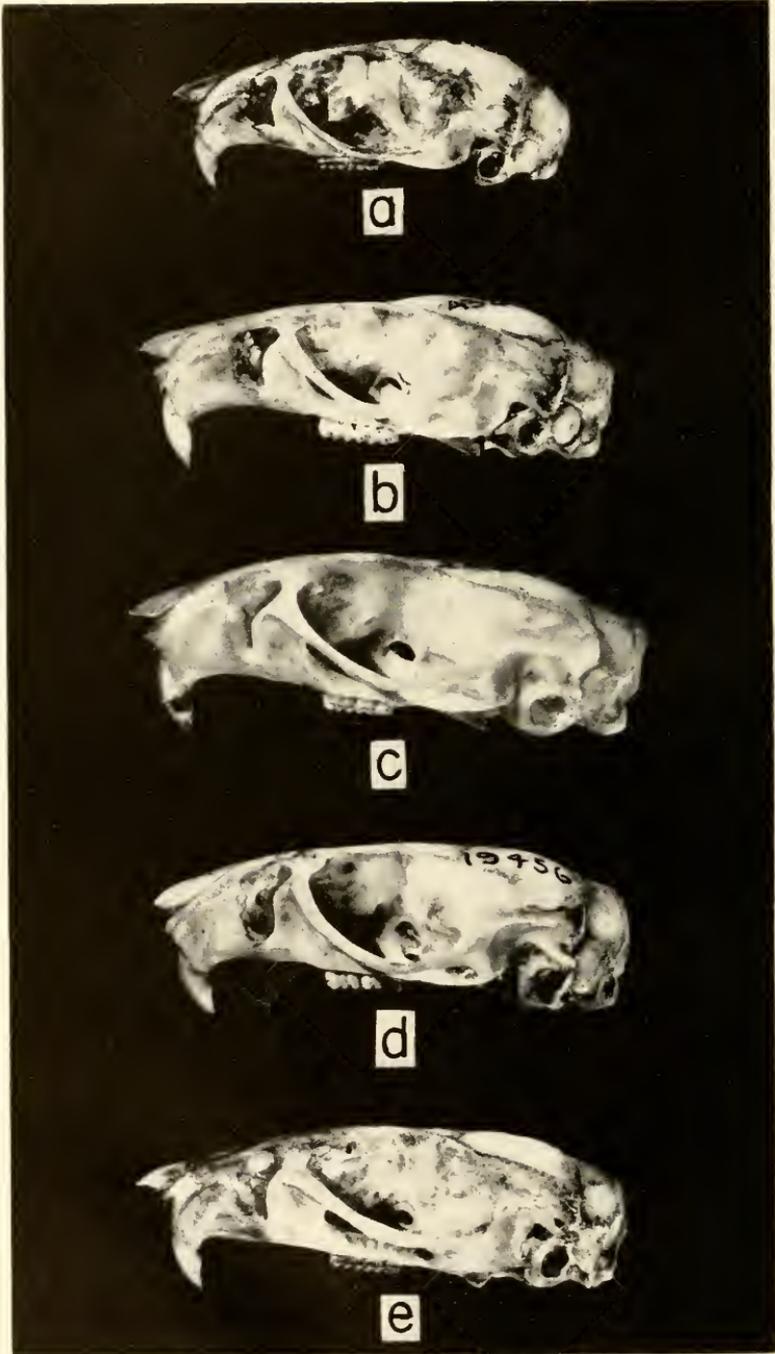
Dorsal and ventral aspect of skull ($\times 2$) of: a, *Oryzomys bicolor* (CNHM 84314); b, *O. longicaudatus* (CNHM 24593).



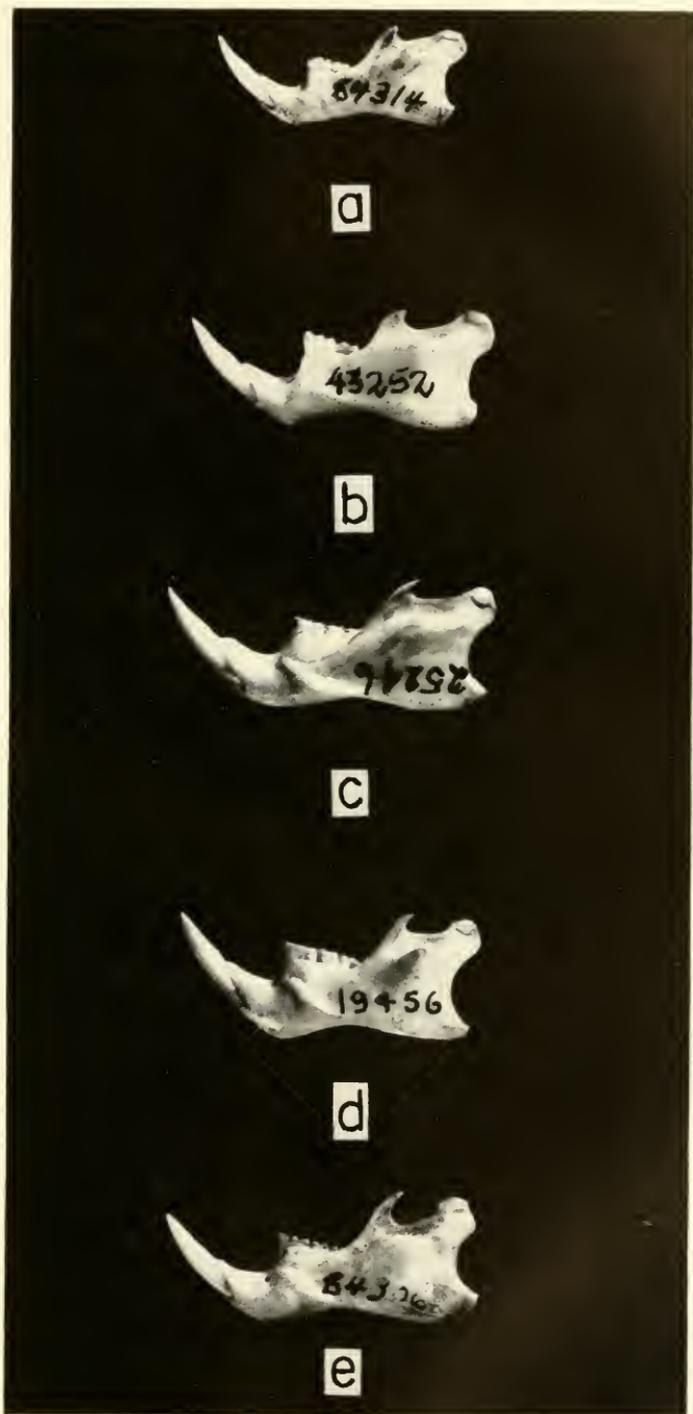
Dorsal aspect of skull ($\times 2$): a, *Oryzomys bicolor* (CNHM 84314); b, *O. concolor* (CNHM 43252); c, *O. subflavus* (CNHM 25246); d, *O. xantholeus* (CNHM 19456); e, *O. laticeps* (CNHM 84306).



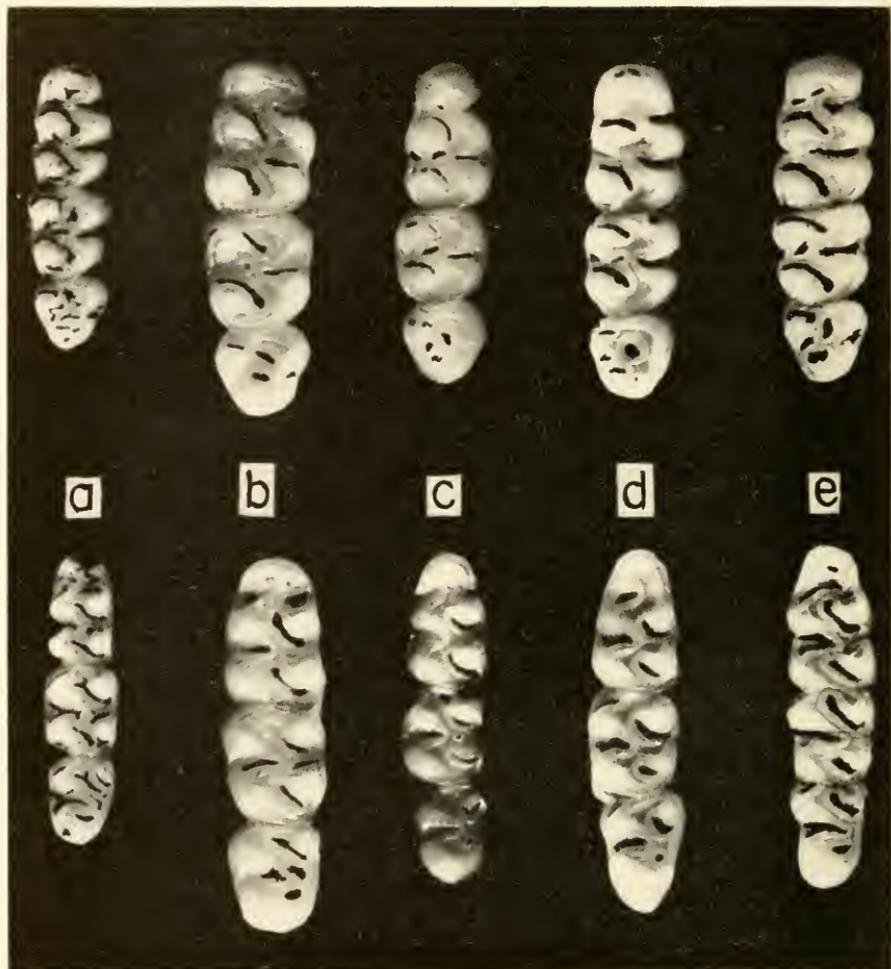
Ventral aspect ($\times 2$) of same skulls shown in plate 8: a, *Oryzomys bicolor*; b, *O. concolor*; c, *O. subflavus*; d, *O. xantholeus*; e, *O. laticeps*.



Lateral aspect ($\times 2$) of same skulls shown in plates 8, 9: a, *Oryzomys bicolor*; b, *O. concolor*; c, *O. subflavus*; d, *O. xantheolus*; e, *O. laticeps*.



Lateral aspect ($\times 2$) of left mandibles of same skulls shown in plates 8-10: *a*, *Oryzomys bicolor*; *b*, *O. concolor*; *c*, *O. subflavus*; *d*, *O. xantheolus*; *e*, *O. laticeps*.



Upper and lower molars ($\times 10$) of same specimens shown in plates 8-11: a, *Oryzomys bicolor*; b, *O. concolor*; c, *O. subflavus*; d, *O. xantheolus*; e, *O. laticeps*.