

A NEW STUDY OF THE GENUS *DIPDOMYS*.

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The genus *Dipodomys* was introduced into the literature by Dr. J. E. Gray in 1841. He described the typical species under the name of *D. phillipii* (afterward changed to *D. phillipsii*) from Mexican specimens (Ann. & Mag. N. H., vii, 1841, p. 521).

In 1846 Wagner described the same genus under the name of *Macrocolus halticus*, and gave an account of the skeleton. His specimens were also from Mexico (Arch. für Naturgesch., 1846, i, 176).

In 1848 Dr. William Gambel described a new species, under the name of *D. agilis*, from specimens from the Pueblo de los Angeles, California. (Proc. Acad. Nat. Sci. Phila., 1848, p. 77).

In 1853 another species, called *D. Ordii*, was added to the list by Dr. S. W. Woodhouse, who discovered it at El Paso, on the Rio Grande. (Sitgreave's Exped. to the Zúñi and Colorado Rivers, 1853, p. 50, pl. 4.)

In the same year Dr. Le Conte revised the genus and added two species, viz, *D. Heermanni* and *D. Wagneri* (Proc. Acad. Nat. Sci. Phila., 1853, p. 224).

In 1855 Professor Baird made known a sixth species, *D. montanus* from Fort Massachusetts.

Two years later the genus was revised a second time by Professor Baird, who placed the *M. halticus* of Wagner, with a mark of interrogation, under the *D. phillipsii* of Gray, regarded his own *D. montanus* as questionably synonymous with the *D. Ordii* of Woodhouse, recognized *D. agilis* as a distinct species, and dismissed *D. Heermanni* and *D. Wagneri* with the remark that he knew nothing of them. (Rept. U. S. Pacific R. R. Survey, 1857, 406 *et seq.*)

In 1875 the genus was again reviewed by Dr. Coles, who united all the species under the *D. phillipsii* of Gray, but recognized a variety of the same, which he styled *D. phillipsii ordi* (Proc. Acad. Nat. Sci. Phila., 1875, p. 305 *et seq.*).

After so much elaboration, it would seem as if the subject of the taxonomy of this genus must be exhausted, and I should owe an apology for again calling attention to it were it not that I have discovered, upon examination of the series of specimens in the National Museum, a character, which appears to have been hitherto overlooked, and by which it becomes possible to divide the genus into two very distinct sections.

This character relates to the number of hind toes. In one series of specimens the hallux, though reduced in size, is perfectly formed and bears a rounded claw. In the other series the hallux, including the metatarsal, is entirely absent, and the hind foot has, therefore, but four toes.

In the original descriptions of the various species the references to this character are as follows:

Species.	Number of hind toes.	Locality.
<i>D. phillipsii</i> Gray.....	4	Mexico.
<i>M. hallicus</i> Wagner.....	4	Do.
<i>D. agilis</i> Gambel.....	5	California.
<i>D. Ordii</i> Woodhouse.....	*4	Rio Grande.
<i>D. Heermanni</i> Le Conte.....	(†)	Sierra Nevada.
<i>D. Wagneri</i> Le Conte.....	(†)	
<i>D. montanus</i> Baird.....	(†)	Fort Massachusetts.

\* In the figure.

† Not mentioned.

The only remark regarding the toes in Gray's original diagnosis of the genus is as follows: "Toes, 5-4."

Wagner, on the other hand, enters more into detail. Speaking of the hind feet he says: "Die Daumenzehe fehlt zugleich mit ihrem Mittelfussknochen; jede der 4 andern Zehen hat ihre gewöhnlichen Phalangen."\*

Again, on comparing his new genus with *Dipus*, *Sciortetes*, and *Jaculus*, he writes: "Von diesen allen unterscheidet ihn schon die Beschaffenheit seines Gebisses; von letzterem überdies der Umstand, dass die Hinterfüsse nur 4 zehig und der Schwanz dichter behaart ist."† Finally among his generic characters is the following: "Pedes posteriores 4 dactyli."‡

Gambel, in his description of *D. agilis*, dismisses the character with a single phrase, as follows: "Both hind and fore feet with four toes and the rudiment of a fifth."§

Of the monographers of North American mammals who have written since 1848, Audubon & Bachman (who had access to and figured Gray's type) give the genus four hind toes, while Professor Baird and Dr. Coues give it five hind toes. The discrepancy seems not to have been hitherto detected.

It will be conceded, I believe, that the presence or absence of the hallux is a character of more importance than those relating to the proportions of the feet and tail and the variation of color.|| If it be accorded specific rank, the two species resulting from the division of the genus must, I am persuaded, stand in the nomenclature hereafter under the names of *D. phillipsii* Gray, and *D. agilis* Gambel, the former, with four hind toes, being the type of the genus; and the latter, the first of the subsequently described species in which the possession of five hind toes is distinctly recognized.

\* Wiegman's Archiv, 1846, i, p. 175.

† L. c.

‡ Op. cit., p. 276.

§ Proc. Acad. Nat. Sci., 1848, p. 78.

|| The absence of the thumb has, indeed, been employed as a negative character of generic value, but Dr. Dobson has recently pointed out the inadvisability of such a course.

Having adopted these two species, it becomes desirable to ascertain in how far they are commensurate with the *Dipodomys phillipsi* (*typicus*)\* and *Dipodomys ordi* of Dr. Coues, the latest writer upon the genus.

To this end I have remeasured the entire alcoholic series of *Dipodomys* in the collection of the National Museum.

*Specimens having 5 toes on the hind foot.*

Number.	Locality.	Dr. Coues' identification.	Sex.	Length of head and body.	Length of head.	Length of tail vertebrae.	Nose to eye.	Nose to ear.	Length of eye.	Height of ear.	Length of fore foot (with claw).	Length of hind foot (with claw).
				mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
9478	Washington Territory		♂	97	40	136	24	35	6	12	12.5	41
7345	Crossing Little, Colo.		♂	106	41	127	23	36	8	15	13	41
			♀	114	43	170	24	41	8	17	12.5	44
2621	Coahuila, Mexico		♂	99	38	133	22	35	7	13	10	36
7344	Platte Valley, Nebraska		♂	105	39	151	23	37	8	13	11	40
4871	Cimarron, N. Mex		♂	105	41	130	25	38	7	11	13	40
10722	No locality		♂	101	39		23	35	8	14	10	39
2625	San Francisco, Cal.		♂	97	38	156	22	35	7	15	12	42
7348	Fort Tejon, Cal.	D. phillipsi	♂	109	46	174	25	42	9	17	13	45
4870	Fort Laramie, Wyo.		♂	100	40.5	148	22	35	7.5	13	14	41
14064	Fort Walla Walla, Wash.		♂	103	40	144	22	35	7	13	12	39
	Averages			103.4	40.5	141.1	23.2	36.7	7.4	13.8	12.05	40.7
	Percentages			100	39.2	138.5	22.4	35.5	7.2	13.5	11.65	39.4

*Dipodomys phillipsi* (4 hind toes).

4922	Mohave village		♂	90	37	131	23	34	7.5	12.5	10	38
4922	do		♂	90	37	145	22	33	7	12.5	9.2	38
4970	Cape Saint Lucas	D. phillipsi	♂	93	38	148	22	36	8	11.5	9	36
4970	do	D. phillipsi	♂	92	38	117	23	35	7.5	13.5	9.5	36
4970	do	D. phillipsi	♂	89	36	135	22.5	33	7	12	10	36
4970	do	D. phillipsi	♂	93	38	147	23	36	7	13	9	36
15109	No locality		♂	87	37	159	23	33	7.5	11.5	11	39
12408	Rocky Mountains		♂	109	42	187		40		15		43
2627	Fort Reading, California	D. phillipsi	♂	80	33	148	20	31	7	13	11	40
2626	do	D. phillipsi	♂	82	37	149	21.5	32	7	15	11	40
	Averages			90.5	37.3	150	22.3	34.3	7.27	12.9	9.9	38.2
	Percentages			100	41.2	184.5	27.4	37.9	8.9	14.2	12.2	42.2

\* Broken.

† Average for 9 specimens.

‡ Percentage for 9 specimens.

It will be perceived upon examination of these tables that the four-toed specimens have relatively longer tails, ears, and feet than the five-toed series. In respect to each of these characters the former series agrees with the series which Dr. Coues called *D. phillipsi* (*typicus*). I quote from his monograph, page 539: "The western animal averages smaller and of more slender build, with larger ears and longer limbs, and especially longer tail." These differences hold good for my four-toed series. The portion of Dr. Coues' diagnosis of his *D. phillipsi ordi* bearing on these characters is as follows: "Larger: rather over than under 4 inches in length of head and body, with (comparatively) stout shape, small ears, short limbs, and short tail." (p. 541.)

\* I add this subspecific name in order to prevent confusion in the remarks I have to make upon the two varieties recognized by Dr. Coues.

This diagnosis, which is the converse of that given for *D. phillipsi* (*typicus*), is applicable throughout to my five-toed series, although it includes a specimen (No. 7348) coming under Dr. Coues' *D. phillipsi* (*typicus*).

It is also to be observed that the proportion of the tail to the head and body, which Dr. Coues places at 150:100 for *D. phillipsi* (*typicus*), rises to 184:100 in my four-toed series.

In addition, the eyes and ears are relatively larger and further removed from the extremity of the snout in the four-toed series than in the five-toed specimens.

The differences of color which Dr. Coues places among the "observed matters of fact, not open to question," I am unable to appreciate in the material at command. I cannot picture in my mind the difference between mouse-brown lightened with tawny, or fulvous, on the one hand, and tawny, or fulvous, deepened with mouse-brown, on the other. In the series of skins as a whole I find only—so far as color is concerned—that insensible blending of differences which Dr. Coues insists upon. I believe that it would be impossible to classify subspecifically any single specimen by its color alone.

The localities from which the specimens having, respectively, four toes and five toes on the hind foot were derived are as follows:

D. PHILLIPSII (4 toes).	D. AGILIS (5 toes).
4970. Cape St. Lucas, Lower California. (Alec.)	7347. Running Water, Nebraska. (Alec.)
2628. Southern California. (Alec.)	14064. Fort Walla Walla, Wash. Ter. (Alec.)
4922. Mohave village, Arizona. (Alec.)	2625. San Francisco, California. (Alec.)
4923. Mohave village, Arizona (juv.). (Alec.)	7344. Platte Valley, Nebraska. (Alec.)
2626. Fort Reading, California. (Alec.)	9478. Washington Territory. (Alec.)
12408. Rocky Mountains. (Alec.)	7345. Crossing Little, Colorado. (Alec.)
12730. New Mexico. (Alec.)	7348. Fort Tejon, California. (Alec.)
1741. Pecos, New Mexico. (Skin.)	4870. Fort Laramie, Wyoming. (Alec.)
1742. Pecos, New Mexico. (Skin.)	15110. Arizona. (Alec.)
491. Llano Estacado. (Skin.)	4871. Cimarron, New Mexico. (Alec.)
7182. Fort Mohave, Colorado River. (Skin.)	8436. Fort Whipple, Arizona. (Skin.)
14641. Fort Cummings, New Mexico. (Mounted.)	1739. Pecos, Texas. (Skin.)
4015. Pecos River, Texas. (Mounted.)	9282. Fort Cobb, Arkansas. (Skin.)
8855. Camp Grant, Arizona. (Skin.)	8437. Fort Whipple, Arizona. (Skin.)
8856. Camp Grant, Arizona. (Skin.)	143. Sonora. (Skin.)
12382. Fort McRae, New Mexico. (Skin.)	7825. Bill Williams Mountains, Arizona. (Skin.)
13585. San José, Lower California. (Skin.)	3046. Three hundred miles from Fort Riley.
14640. Fort Cummings, New Mexico. (Skin.)	n. n. South Platte River. (Skin.)
n. n. Eastern Mexico. (Skin.)	995. Fort Walla Walla, Wash. Ter. (Skin.)
n. n. Eastern Mexico. (Skin.)	943. ♀ Los Angeles, California. (Skin.)
4170. ♀ Fort Crook, California. (Skin.)	1062. San Diego, California. (Skin.)
	7181. California. (Skin.)
	1063. San Diego, California. (Skin.)
	3159. Fort Laramie, Wyoming. (Skin.)
	11661. Pompey's Pillar, Yellowstone R. (Skin.)
	11663. Mouth of Powder River, Montana. (Skin.)
	3771. Camp Floyd, Utah. (Skin.)
	n. n. Powder River, Montana. (Skin.)
	11662. Mouth of Powder River, Montana. (Skin.)
	14805. Trego County, Kansas. (Skin.)
	21658. Trego County, Kansas. (Skeleton.)
	14009. Lee's Ferry, Colorado River, Ariz. (Skin.)
	13572. (?) Fort Defiance. (Skin.)
	9608. Don Carlos, Colorado. (Skin.)
	12668. Camp Harney, Oregon. (Skin.)
	12441. San Diego, California. (Skin.)
	489. ? Monterey, California. (Skin.)
	473. Posa Creek, California. (Mounted.)
	472. Posa Creek, California. (Mounted.)
	442. Huerfano River, New Mexico. (Mounted.)
	1044. Mesilla Valley, New Mexico. (Mounted.)
	2621. Coahuila, Mexico. (Alec.)
	372. Durango, Mexico. (Mounted.)



Upon marking the localities of *D. phillipsi* on a map of the United States in Mercator's projection, I find that with one exception they lie upon or *south* of a line running approximately northwest and southeast between Fort Reading, California, and Fort McRae, New Mexico. Specimen No. 1742 came from Pecos, New Mexico, near Santa Fé, which is considerably north of this line. On the other hand, all the five-toed specimens came from localities lying upon or *north* of this line, except seven.

Five of these are skins from the following localities :

San Francisco, California.	? Monterey, Cal.
Posa Creek, Cal.	Fort Tejon, Cal.
San Diego, Cal.	

It will be perceived that all these specimens are from the coast of Southern California and west of the coast range. The type of *D. agilis* came from Los Angeles, which is also in this section.

A sixth specimen, No. 2621, is from Coahuila, Mexico, and according to Professor Baird, probably from near Santa Catarina, a village a few miles west of Monterey, Mexico. This specimen is, therefore, from further south than any other of the representatives of *D. agilis* except the next.

This seventh specimen, No. 372, is labeled Durango, Mexico. If the record is correct (and there seems to be no reason to doubt that it is) it appears that the range of the species extends far into Mexico.

From the material at command the boundaries of the ranges of the two species are approximately as follows:

*D. phillipsi* Gray. Fort Reading, California, on the west; Pecos River, Texas, on the east; Fort Reading, California, and Pecos, N. Mex., on the north; and Reale del Monte, near Mexico City, Mexico (Gray), on the south.

*D. agilis* Gambel. San Francisco, Cal., on the west; Fort Cobb, Arkansas, on the east; Fort Walla Walla, Wash. Ter., and Powder River, Montana, on the north; and Durango, Mexico, on the south.

*D. phillipsi* extends farthest south and west, *D. agilis* farthest north and east, but the ranges of the two species interdigitate extensively.