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ADDITIONAL DATA ON VARIATION IN THE PRAIRIE DEER-MOUSE, *PEROMYSCUS MANICULATUS BAIRDII*

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THE variation of the prairie deer-mouse, *Peromyscus maniculatus bairdii,* from three stations located, respectively, in the states of North Dakota, Iowa, and Michigan has previously been described (Dice, 1932). There are now at hand measurements of four additional stocks of *bairdii* from the states of Minnesota, Kansas, Indiana, and Michigan. A comparison of the measurements of these seven stocks makes necessary a revision of the previous conclusions in regard to geographical variation in this subspecies.

The methods of rearing the mice and of taking the several measurements were described in the previous paper. In the present paper the measurements of the males and females of the 1-year age class have been combined into a common mean, for there are only slight sexual differences in size. Also the tint photometer readings of pelage color, both of the males and females and of the 1-year and 2-year age classes, have been combined into a common mean, for there are no appreciable differences in color readings between the sexes nor between the 1-year old and 2-year old mice. Standard errors, rather than probable errors, are used throughout this paper.

The expenses involved in rearing these new stocks of mice, preparing and measuring the specimens, and treating the data statistically were borne by the University of Michigan through the Museum of Zoology, Faculty Research Fund, and Laboratory of Vertebrate Genetics. The body measurements were all made by myself. The measurements of the bones and the readings of pelage color were made by Reeve Bailey and Don Hayne. The statistical computations were made by Margaret Liebe. The map was drawn by Grace Eager.

Stocks of Mice

In the previous paper (Dice, 1932) accounts were given of the origins of the stocks from Alexander, Iowa, from Ann Arbor, Michigan, and from Grafton, North Dakota. The other stocks available for this study are from:

Barrett, Minnesota. The original mice were taken by H. J. Leraas during the summer of 1932, in Grant County, Minnesota, about 3 miles northwest of Barrett. Five females and 6 males became the parents of the stock, and there was no inbreeding in the laboratory.

Onaga, Kansas. Hobart M. Smith secured this stock in 1931, about 5 miles north of Onaga, in Pottawatomie County, Kansas. The laboratory stock was produced by 4 females and 4 males, and there was no inbreeding in the laboratory.

Lake Village, Indiana. This stock was trapped by Paul Hickie, in 1930, about 3 miles southwest of Lake Village, in Newton County, Indiana. One female and 3 males produced the stock, and there was a considerable amount of inbreeding in the laboratory.

Sand Point, Michigan. Philip F. Allan trapped the original animals in 1931 on the beach of Sand Point, a long sand spit extending into Saginaw Bay of Lake Huron, in Huron County, Michigan. A description of the area is given by Ruthven (1911: 21–22). The trapping locality is about 8 miles northwest of Pigeon. The parents of the laboratory stock consisted of 7 field-caught females and 7 males, and there was no inbreeding in the laboratory.

It should be noted that the Alexander, Ann Arbor, and Lake Village stocks were considerably inbred in the laboratory, and therefore the measurements given for those stocks may not give a complete indication of the variability of the three respective wild populations.

Local Variation

No two of our stocks come from localities which are immediately adjacent geographically, but the 2 Michigan stations are only about 120 miles distant from one another, and it is only about 190 miles from Grafton, North Dakota, to Barrett, Minnesota (Map 1). Comparisons between the members of each

Map 1. The geographic range of *Peromyscus maniculatus bairdii*, mostly after Osgood, showing localities at which the stocks for this study were taken.

of these 2 pairs of stocks give some indication of the amount of local variation in the subspecies.

In every measurement of body and skeleton, except foot length and tail length, the Sand Point stock is significantly larger than the Ann Arbor stock (Table I). In foot length the 2 stocks do not differ significantly, and in tail length the Ann Arbor stock averages significantly the longer, the difference between the 2 means being 1.86 ± 0.57 mm.

The Grafton stock is significantly larger than the Barrett stock in tail length and foot length, and the Barrett stock is significantly the larger in body length and length of mandible. The Barrett stock also exceeds the Grafton stock in the condylo-zygomatic measurement of the skull and the difference between the 2 means is 0.184 ± 0.069 mm., which probably is significant. The differences between the Grafton and Barrett stocks in ear length, femur length, condylo-premaxillary skull length, and bullar width of skull are not significant.

The differences between these closely adjacent stocks in body dimensions are very considerable and in certain measurements the differences approach or equal in amount the whole range of variation of the means of the 7 stocks of *bairdii* available for comparison. Thus, in body length the Sand Point stock has the second largest mean of our stocks, while the Ann Arbor stock has the smallest mean. In tail length the Grafton stock averages longest of all the stocks, and its mean exceeds that of the Barrett stock, which is intermediate in tail length, by 7.55 ± 0.67 mm., a striking difference. In ear length the Sand Point stock averages longest of all the stocks and the Ann Arbor stock the smallest.

In color of the dorsal stripe the Sand Point stock averages significantly paler than the Ann Arbor stock for every color screen (Table II). The color readings for the side of the body of the Sand Point stock also average higher than those of the Ann Arbor stock, and the differences in means are significant for green, probably significant for peacock blue, possibly significant for yellow, and not significant for red or blue-violet.

TABLE I

MEASUREMENTS OF BODY AND SKELETON OF *PEROMYSCUS MANICULATUS BAIRDII*

One-year age class; means and standard errors, in mm.

Stock	Specimens	Average age in weeks	Number of parents	Body	Tail	Foot	Ear
Grafton	79	48	10	86.35 ± .43	66.13 ± .50	18.949 ± .063	15.039 ± .067
Barrett	88	55	11	92.41 ± .47	58.58 ± .45	18.508 ± .064	15.012 ± .066
Alexander	87	47	5	83.07 ± .42	60.43 ± .33	18.115 ± .077	14.283 ± .067
Onaga	87	58	8	88.72 ± .34	55.77 ± .39	19.103 ± .055	14.884 ± .059
Lake Village ...	78	62	4	89.56 ± .38	58.62 ± .38	18.582 ± .066	14.440 ± .067
Sand Point	82	63	14	90.16 ± .33	55.34 ± .41	17.999 ± .059	15.184 ± .058
Ann Arbor	107	46	3	81.47 ± .40	57.20 ± .39	17.860 ± .061	13.656 ± .058

		Femur	Mandible	Condyle-premaxilla	Condyle-zygoma	Bullar width
Grafton	74	15.179 ± .086	15.447 ± .063	23.201 ± .081	16.878 ± .054	10.533 ± .047
Barrett	86	15.170 ± .068	15.771 ± .040	23.391 ± .057	17.062 ± .043	10.601 ± .031
Alexander	78	14.730 ± .071	15.361 ± .046	22.808 ± .081	16.573 ± .066	10.256 ± .038
Onaga	87	15.304 ± .086	15.346 ± .038	23.010 ± .059	16.774 ± .044	10.600 ± .031
Lake Village ...	75	14.608 ± .072	15.851 ± .047	23.106 ± .064	16.894 ± .047	10.369 ± .032
Sand Point	80	14.631 ± .063	15.297 ± .039	23.013 ± .042	16.830 ± .038	10.562 ± .026
Ann Arbor	94	14.072 ± .072	14.643 ± .050	22.076 ± .066	16.195 ± .049	10.124 ± .034

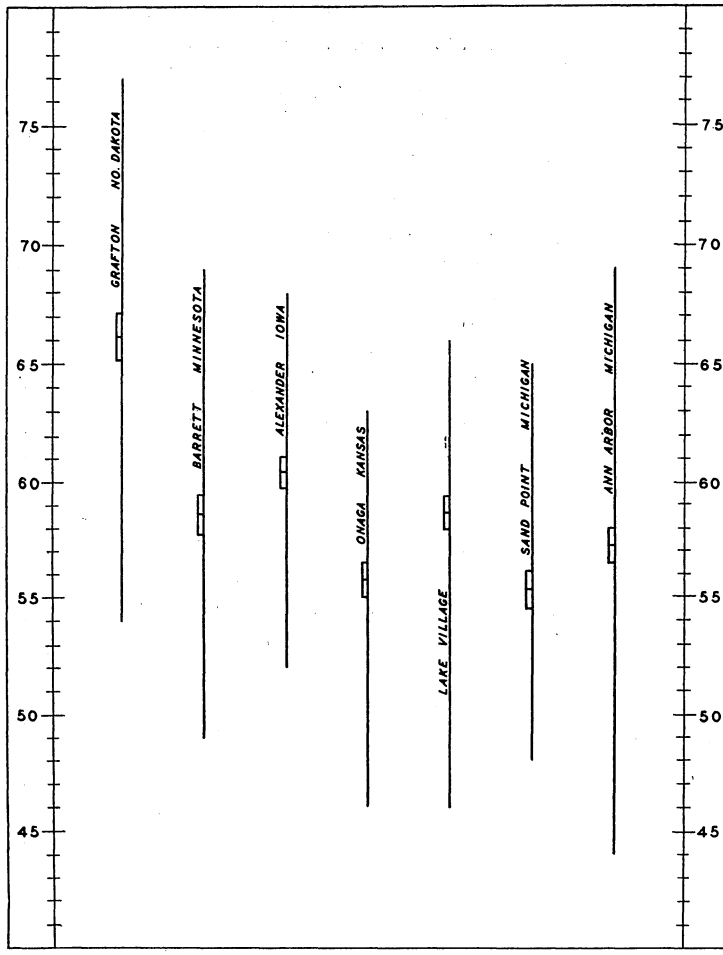

FIG. 1. Graph of variation in tail length of *Peromyscus maniculatus bairdii*. The measurements are in millimeters. The graph is drawn according to the method of Dice and Leraas (1935). If the rectangles on the two lines representing any two stocks do not overlap in vertical position the means of these stocks differ from one another by an amount which in most cases is statistically significant.

The Grafton stock likewise differs greatly from the Barrett stock in pelage color. In every color comparison, both of the

TABLE II

PELAGE COLOR OF *PEROMYSCUS MANICULATUS BAIRDII*

One-year and two-year age classes; means and standard errors of tint photometer readings, in per cent

Stock	Specimens	Dorsal Stripe				
		Red	Yellow	Green	Peacock Blue	Blue-Violet
Grafton	101	5.17 ± .09	4.40 ± .08	3.74 ± .07	3.47 ± .06	3.11 ± .06
Barrett	88	3.92 ± .11	3.42 ± .10	2.98 ± .09	2.72 ± .08	2.47 ± .08
Alexander	100	5.10 ± .12	4.25 ± .10	3.67 ± .08	3.35 ± .08	3.07 ± .06
Onaga	88	6.85 ± .16	5.69 ± .12	4.47 ± .10	3.85 ± .08	3.43 ± .08
Lake Village.....	78	4.91 ± .12	4.18 ± .10	3.44 ± .08	3.03 ± .08	2.69 ± .06
Sand Point	81	5.69 ± .13	4.88 ± .11	4.09 ± .09	3.69 ± .08	3.26 ± .08
Ann Arbor	139	4.79 ± .07	4.07 ± .06	3.52 ± .05	3.23 ± .04	2.97 ± .04
		Side				
Grafton	101	16.15 ± .21	13.41 ± .14	10.79 ± .13	8.94 ± .11	8.04 ± .12
Barrett	88	13.26 ± .18	11.63 ± .16	9.59 ± .13	8.36 ± .14	7.56 ± .12
Alexander	100	13.66 ± .16	11.37 ± .13	9.31 ± .13	7.72 ± .12	7.27 ± .13
Onaga	88	16.58 ± .25	14.13 ± .20	11.08 ± .16	9.35 ± .13	8.16 ± .12
Lake Village	78	12.78 ± .17	10.82 ± .15	8.77 ± .13	7.54 ± .11	6.80 ± .11
Sand Point	81	14.42 ± .18	12.37 ± .16	10.06 ± .12	8.89 ± .12	7.96 ± .12
Ann Arbor	139	14.20 ± .12	11.96 ± .10	9.31 ± .10	8.28 ± .08	7.91 ± .09

dorsal stripe and the side, the Grafton stock has the higher readings, and the differences between the means are all significant.

The differences in pelage color between these closely adjacent stocks, are, like the differences in body dimensions, relatively great, and for the readings of the dorsal stripe, but not for the side, the differences approach the extremes of the differences between the means of all the stocks. In readings of the dorsal stripe the Barrett stock has the lowest means of the 7 stocks, and the Grafton stock has relatively high readings though its means are exceeded by those of the Onaga and Sand Point stocks. The Ann Arbor stock also averages low in dorsal stripe readings, while the Sand Point stock has next to the highest means of all the stocks.

Although the stocks here compared do not come from stations which are immediately adjacent they do show that stocks of *bairdii* taken within a distance of less than 200 miles may differ very considerably in body dimensions and in pelage color.

The relatively pale colors of the Sand Point mice may possibly be correlated with the soil color of the habitat in which the mice live. At Sand Point the mice are found mostly on the nearly bare sand beaches. At Ann Arbor, on the contrary, these mice live in grassy fields where the soil is usually of a quite dark color. It has been shown elsewhere (Dice and Blossom, in press) that the pelage color of mice and other small mammals tends to be correlated with the color of the surface soil of their habitats. The relatively pale pelage color of the Sand Point mice and the darker color of the Ann Arbor mice, therefore, may possibly be correlated with the soil colors of the two respective habitats.

The very dark pelage color of the Barrett stock likewise may be correlated with the dark color of the soil of its habitat. This stock was taken in an area characterized by particularly dark-colored soils.

Unfortunately, no soil samples are available from any of the stations where the original breeding stocks of these mice were secured, and therefore no direct comparison can be made be-

tween the colors of the animals and the colors of the surface soil. Although there is an indication that some of the local differences in pelage color between our stocks of the prairie deer-mouse may be correlated with soil color, this is not conclusively shown for this subspecies.

Geographic Variation in Size

With the added information available from the four additional stocks of *bairdii* here described the indication previously reported (Dice, 1932: 26) of a geographic trend of body size in this subspecies is not supported.

The most northern station from which a stock is at hand is Grafton, North Dakota (Map 1). This stock averages longest of the seven stocks in tail length, and its mean is significantly greater than that of the Alexander stock, which has the next longest tail (Table I). In no other measurement does the Grafton stock average largest of the seven stocks. Nevertheless, in length of hind foot the mean of the Grafton stock is exceeded only by that of the Onaga stock; in ear length its mean is exceeded only by that of the Sand Point stock; in length of femur its mean is exceeded only by that of the Onaga stock; and in condylo-premaxillary skull length its mean is exceeded only by that of the Barrett stock; and none of these differences are of statistical significance. In body length, length of mandible, condylo-zygomatic skull distance, and bullar width of skull the Grafton stock is intermediate among the other stocks.

The second most northerly stock of the seven is that from Barrett, Minnesota. The body length of this stock averages significantly greater than that of any other stock. The mean length of the mandible of the Barrett stock is not significantly smaller than that of the Lake Village stock, which has the largest mean for this measurement. The condylo-premaxillary skull length of the Barrett stock averages the largest of the seven stocks, but the mean is not significantly greater than that of the Grafton stock. In the condylo-zygomatic skull measurement the Barrett stock also averages largest of the stocks,

but its mean does not significantly exceed that of the Lake Village stock. The bullar width of skull is greatest in the Barrett stock, but the mean is barely more than that of the Onaga stock. In tail length, foot length, ear length, and length of femur the Barrett stock is intermediate in size.

The 3 most southeasterly of our stocks are those from Ann Arbor and Sand Point, Michigan, and from Lake Village, Indiana. The Ann Arbor stock averages smallest of the stocks in all measurements except tail length, in which it is intermediate. In the measurements of ear length, femur length, length of mandible, condylo-premaxillary skull length, and condylo-zygomatic skull distance the Ann Arbor stock is significantly smaller than the next larger stock, and in the measurements of body length and bullar width the means of the Ann Arbor stock are smaller than those of the next smallest stock by amounts which are probably significant.

If we had no other stock from Michigan we might suppose, as I previously did, that the small dimensions of the Ann Arbor stock indicated a geographic trend toward small size in that State, but the measurements of the Sand Point stock do not support this supposition. In body length the Sand Point stock is exceeded by the Barrett stock, which is significantly the largest of all the stocks in this measurement, but the mean of the Sand Point stock in its turn significantly exceeds that of the Grafton stock. The Sand Point stock averages shortest of all the stocks in tail length, but its mean is very close to that of the Onaga stock, which has the next smallest mean. The Sand Point stock averages small in foot length and in length of mandible, in these measurements averaging next to the Ann Arbor stock, which averages smallest of the seven stocks. In foot length, however, the mean of the Sand Point stock does not differ significantly from that of the Alexander stock, and in length of mandible its means does not differ significantly from that of the Onaga stock. The Sand Point stock averages largest of all the stocks in ear length, though its means does not significantly exceed that of the Grafton stock. In femur length the Sand Point stock is significantly exceeded by both

the Barrett and Grafton stocks. The Sand Point stock is exceeded significantly in condylo-premaxillary skull length by the Barrett stock, but the mean of the Sand Point stock is only 0.188 ± 0.091 mm. less than that of the Grafton stock, a difference which is of doubtful significance. In the condylo-zygomatic measurement the Sand Point stock is exceeded by both of the northern stocks, but the difference between its mean and that of the Grafton stock is of no significance. The Sand Point stock averages large in bullar width of skull, and its mean is not significantly exceeded by the mean of the Barrett stock.

The Lake Village, Indiana, stock significantly exceeds in body length the Grafton stock, though its mean is less than that of the Barrett stock. The mean of its tail length slightly, though not significantly, exceeds that of the Barrett stock, but is significantly less than that of the Grafton stock. In foot length the mean of the Lake Village stock is not significantly less than that of the Barrett stock. In ear length and femur length the Lake Village stock is significantly smaller than either the Grafton or Barrett stocks. The Lake Village stock exceeds both of the more northern stocks in length of mandible, and the difference of its mean from that of the Grafton stock is significant. The Lake Village stock has a shorter condylo-premaxillary skull length than either of the two northern stocks, but the difference between its mean and that of the Grafton stock is not significant. In the condylo-zygomatic measurement of the skull the mean of the Lake Village stock does not differ significantly from that of the Grafton stock, but is smaller than that of the Barrett stock by an amount which is of probable significance. The Lake Village stock has a significantly smaller bullar width of skull than the Barrett stock and its mean is smaller also than the mean of the Grafton stock, with a difference which is of probable significance.

Although the more northern stocks, from North Dakota and Minnesota, average larger than the more southern stocks in certain measurements and are not exceptionally small in any

measurement, yet in every measurement, with the exception of femur length, one or more of the southeastern stocks, from Michigan or Indiana, have means as large or at least not significantly smaller than one or other of these northern stocks. Only in femur length do both these northern stocks significantly exceed all the stocks from Michigan and Indiana, and in this measurement they are both surpassed, though not significantly, by the Kansas stock.

The Onaga stock is the most southwesterly of the stocks here compared. In tail length it averages small, and does not differ significantly from the Sand Point stock, which has the shortest tails of all our stocks. In bullar width of skull the Onaga stock has almost exactly the same mean as the Barrett stock, which has the largest mean in this measurement, but its mean is not significantly larger than the means of the stocks from Grafton and from Sand Point. The Onaga stock averages longest of all the stocks in foot length, but its mean does not significantly exceed that of the Grafton stock. The Onaga stock averages largest of our stocks also in length of femur, but its mean does not significantly exceed the means of the stocks from Barrett and from Grafton. In the other measurements of body and of skeleton the Onaga stock is intermediate. This stock, therefore, shows no exceptional size relationship which might indicate a geographical trend in the southwestern part of the range of the subspecies *bairdii*.

The previously reported indication of a geographic trend of body size in the subspecies *bairdii* was based on only 3 of the stocks here described, those from Grafton, Alexander, and Ann Arbor. The measurements here presented of the 4 additional stocks show that there is no important tendency for the more northern stocks to exceed in body dimensions, nor for the southern stocks to be distinctly small in size.

There is in fact no apparent geographic trend in the body or skeletal measurements of this subspecies. Important variations in measurements distinguish the several stocks, and the differences between the stocks in certain measurements are of high statistical significance. Nevertheless, the differences in

body dimensions between the several stocks seem not to be correlated in any way with geographical position.

Castle (1933: 276–278) was misled by the descriptions of the first 3 stocks of *bairdii* into thinking that their measurements supported his contention of a general correlation between all the body dimensions. The additional 4 stocks here described show that within the subspecies *bairdii* a relatively long body may be correlated with a relatively short tail, or with relatively small dimensions of other parts of the body. Nevertheless, in spite of variations in the proportional size of the parts of the body among the stocks of *bairdii* it is still probable that there is a general correlation between the size of the body and the size of the tail, hind foot, and ear, and of the bones of the skeleton. I have made no attempt to solve this problem because in my opinion the data available for this subspecies are inadequate.

Geographic Variations in Pelage Color

Pale-colored races have been produced on the Great Plains by many species of mammals. A pale-colored subspecies of the deer-mouse, *Peromyscus maniculatus nebrascensis,* occupies the sandhill region of western Nebraska, and another pale-colored race, *osgoodi,* occupies the western parts of North and South Dakota. It might, therefore, be expected that the more western stocks of *bairdii* would show a tendency toward pale coloration.

The most westerly of the stocks of *bairdii* here described are those from Onaga, Kansas, and from Grafton, North Dakota, but neither of these localities is indicated by Osgood (1909: Pl. 1) to be in an area of intergradation.

The palest pelage colors of the 7 stocks of *bairdii* here compared are possessed by the Onaga stock. This stock has the highest average tint photometer readings for all color screens on both the dorsal stripe and the side (Table II). The mean tint photometer readings, however, of the dorsal stripe for peacock blue and for blue-violet of the Onaga stock are not significantly greater than those of the Sand Point stock, which

has the next highest readings. Also, the means of the readings of the side of the Onaga stock are not significantly higher for any color screen than those of the Grafton stock, which has the next highest readings for side color. Nor does the Onaga stock significantly exceed the Sand Point stock in the readings of the side for blue-violet.

The second palest pelage colors for the dorsal stripe are displayed by the Sand Point stock. Compared to the other eastern stocks of *bairdii* the Sand Point stock is distinctly pale. The tint photometer readings for every color screen average greater in this stock than in the Grafton stock, which is third highest; and the differences between the means are statistically significant for red and yellow, but not for blue-violet, and are of doubtful significance for green and peacock blue. For the side, on the other hand, the tint photometer readings average second highest in the Grafton stock, and the Sand Point stock is third in position. The differences in means between the Grafton and Sand Point stocks are of probable significance only for red, yellow, and green.

The darkest dorsal stripe is possessed by the Barrett stock, which has the lowest means of the tint photometer readings among the 7 stocks here compared. In comparison with the other western stocks of *bairdii* the Barrett stock is very dark in color. The stocks with the next lowest color readings for the dorsal stripe are those from Lake Village, Indiana, and from Ann Arbor, Michigan. The means of the tint photometer readings of the dorsal stripe for the Barrett stock are significantly less than those of the Ann Arbor stock for all color screens, and significantly less than the Lake Village stock for all color screens except blue-violet and possibly peacock blue.

For side color the order of magnitude of the means of the tint photometer readings among the several stocks is distinctly different than for the dorsal stripe. The Lake Village stock has the lowest means for all color screens. The Barrett stock has the next lowest mean for reflected red, but the difference between its mean and that of the Lake Village stock is not

significant. For all other color screens the Alexander stock is next above the Lake Village stock in depth of side color, and the differences in the means of the two stocks are significant for red and green, of probable significance for yellow and blue-violet, and not significant for peacock blue.

In addition to the differences in shade of pelage color between the several stocks there are also differences in hue. The

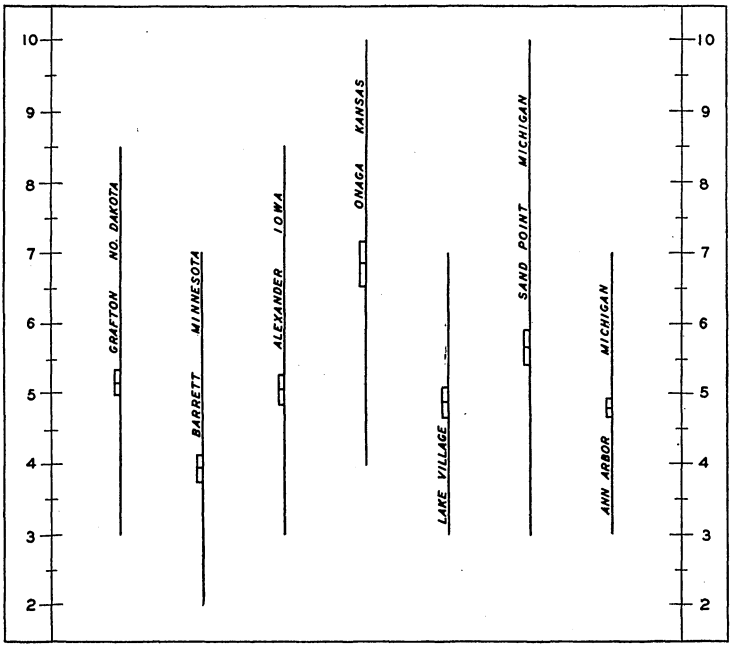

FIG. 2. Graph of variation of tint photometer readings for red reflected from the dorsal stripe of *Peromyscus maniculatus bairdii.*

Onaga and Grafton stock have significantly higher mean tint photometer readings for side color in reflected red and yellow than the Sand Point and Ann Arbor stocks, but in blue-violet the differences between the means of these western and eastern stocks are of no statistical significance. The Onaga and Grafton stocks, therefore, have a greater proportion of red and yellow in their side coat color than the other stocks of this subspecies (Fig. 2). The specimens of these most western

stocks appear to the eye to be more buffy and less grayish than the specimens of the other stocks.

The hue of the dorsal stripe of the Onaga stock is also a brighter buff than that of the other stocks, as is shown by exceptionally high tint photometer readings for red and for yellow (Fig. 3). On the contrary, the hue of the dorsal stripe of the Grafton stock does not differ greatly from the hue of the Alexander, Ann Arbor, nor Sand Point stocks.

The dorsal stripe of the Lake Village stock has a more buffy hue than the dorsal stripes of the stocks from Ann Arbor or Barrett. The mean readings for blue-violet of the Lake Village stock are intermediate between those of the Ann Arbor and Barrett stocks and differ from both of these by amounts which are probably significant, while the mean readings for red and for yellow of the Lake Village stock slightly though not significantly exceed those of the Ann Arbor stock, which has much higher readings than the Barrett stock (Fig. 3).

The brighter buff color of both the dorsal stripe and side of the Onaga mice and of the side of the Grafton mice might be assumed to indicate an approach toward the characters of the two paler subspecies which occupy western Nebraska and western Dakota. However, the dorsal stripe of the Lake Village stock also has a more buffy hue than the dorsal stripe of the Ann Arbor stock, and there is no indication of a geographic trend in the hue of the Lake Village stock.

It has been shown above that the Onaga stock has the palest pelage colors of the stocks here compared, but it differs from the Sand Point stock only in having a brighter buff hue both on the dorsal stripe and side. The Grafton stock averages next highest below the Onaga stock in mean tint photometer readings for side color, and its side therefore is relatively pale for *bairdii*. On the contrary, the mean readings of the dorsal stripe of the Grafton stock are exceeded, significantly for some color screens, by those of the Sand Point stock. The Barrett stock comes from a station which is relatively far west for *bairdii*, yet it has the darkest color on the dorsal stripe of all our stocks, and the differences between its mean tint photom-

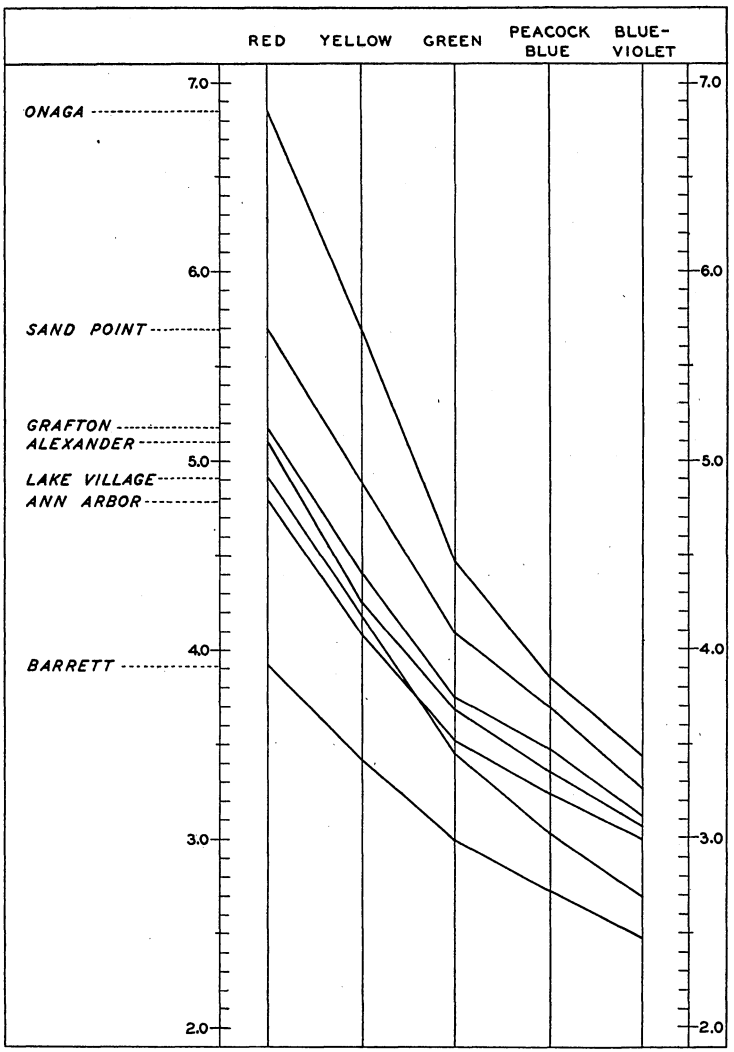

FIG. 3. Graph of means of tint photometer readings of the dorsal stripe for the several color screens in the seven stocks of *Peromyscus maniculatus bairdii.*

eter readings and those of some of the more eastern stocks, particularly of the Sand Point stock, are very considerable.

In side color the Barrett stock also averages dark, but the sides of the Lake Village and Alexander stocks are still darker. The dark color of the Barrett stock throws considerable doubt on the possibility of a westward trend toward lighter pelage color among our stocks.

There seems, therefore, no certain indication of any geographic trend in pelage color among our 7 stocks of the subspecies *bairdii.*

Summary

The measurements of 7 stocks of the prairie deer-mouse, *Peromyscus maniculatus bairdii,* from the states of North Dakota, Minnesota, Iowa, Kansas, Indiana, and Michigan, show much local variation from place to place, but there is no certain geographic trend in any dimension of body or skeleton. The indication of a geographic trend in body measurements previously reported when the descriptions of only three of these stocks were available is, therefore, not supported.

In pelage color also there is much variation among the stocks of this subspecies, but there is no certain geographic trend in pelage color. The 2 most western stocks, from Onaga, Kansas, and Grafton, North Dakota, have a brighter hue of buff on the sides of the body than the other 5 stocks, and the Onaga stock in addition is brighter buff on the dorsal stripe than the other stocks. However, it is questionable if this brighter hue of our western stocks indicates an approach toward the colors of the 2 brighter-colored, related subspecies which occupy western Nebraska and western Dakota.

It is possible that at least part of the differences in pelage color between some of the stocks may be correlated with differences in the color of the surface soils at the stations where the breeding stocks were trapped, but this cannot be proved with the data at hand.

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