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Population dynamics of Peromyscus leucopus in Point Pelee National Park, southwestern Ontario.

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POPULATION DYNAMICS OF PEROMYSCUS LEUCOPUS IN POINT PELEE NATIONAL PARK, SOUTHWESTERN ONTARIO.

by

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ABSTRACT

Field work to examine the population parameters of *Peromyscus leucopus noveboracensis* was initiated in Point Pelee National Park, southwestern Ontario, during the summer of 1972. A mark-recapture trapping program of 1,644 trap nights resulted in the capture of 155 individuals 278 times.

Significant differences in white-footed mouse density were evident in the different habitats studied. Density in the forest ranged from 4.2 to 6.5 animals per .1 hectare and in the orchard from 1.7 to 3.7 animals per .1 hectare. No differences in survivorship, proportion of sexually active females, juvenile recruitment or proportions of resident and transient individuals were detected in comparisons between habitats.

This study indicates that in different types of habitat *P. leucopus* density varies, but other population parameters appear to be uniform.

ACKNOWLEDGEMENTS

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LIST OF FIGURES AND TABLES

INTRODUCTION

Mice of the genus *Peromyscus* are one of the most widely distributed groups of small mammals occurring in North America. They occupy a variety of environments and ecological conditions. When a species occupies many diverse areas, a considerable amount of variation in morphological, genetic and life history attributes may exist (Sumner, 1926; Fox, 1948; Hoffmeister and De la Torre, 1961; Hnatiuk and Iverson, 1965).

Variation in population parameters, including density, juvenile recruitment and survivorship are of particular interest to population ecologists. The distribution and abundance of species vary and an understanding of the reasons why ecological variation occurs is important in explaining observed patterns.

Variation in certain population parameters within the genus *Peromyscus* has been well documented. For example, population size of *P. maniculatus bairdi* has been shown to vary from 0.2 to 9.12 individuals per acre (Blair, 1940, and *P. m. gracilis* illustrate a similar range in density from 0.5 to 7.0 per acre. Variation in density is also evident within *P. leucopus noveboracensis*. Burt (1940) noted densities of 10.42 per acre, Snyder (1956) recorded a value of 5.7 per acre, and Howell (1954) listed densities as low as 0.4 per acre. In addition, there are significant differences in the natality and mortality patterns of Peromyscus. Litter size among Peromyscus spp. varies from 1.87 in P. californicus (Svihla, 1932) to 6.1 in P. oreas (Sheppe, 1961). Annual mortality has been recorded as high as 99 per cent in P. m. bairdi (Howard, 1949), 96 per cent in P. leucopus (Burt, 1940) and from 63 to 94 per cent in P. m. gracilis (Blair, 1941; Manville, 1949).

These differences in population parameters among the various species of Peromyscus suggest two questions. Does large variation in population paremeters reflect variation in local environmental conditions? Are differing patterns of density, survivorship and recruitment associated with the local distribution of a species?

The life-history strategy of a species can be described in terms of energy expenditures. In opportunistic species, energy for reproduction is maximized (r-selection), whereas in equalibrium species energy is utilized in the production of fewer, well fit individuals (K-selection). In species such as Peromyscus leucopus which occupy a variety of environments, r-selection would be favoured.

The purpose of this paper is to examine population parameters of Peromyscus leucopus noveboracensis in Southern

Ontario and to test the null hypothesis that r-selection is characteristic of this species. Field-measured survivorship, recruitment, residency, proportion of sexually active females and density were determined for a population of P. l. noveboracensis occupying a variety of seral stages within Point Pelee National Park, Ontario. These plant communities constitute different micro-environments and the population densities of P. leucopus in these habitats may be a function of habitat structure (M'Closkey, 1974), or other environmental factors associated with each micro-habitat. This work was conducted during the summer of 1972, and the results are compared with previous work from 1971 (Lajoie, 1972).

STUDY AREA

Point Pelee National Park, Ontario (approximately 42^{o} North latitude, 82.5^{o} East longitude) is the southern-most part of the mainland of Canada. The area supports one of the richest avifaunas of North America during spring and fall migration and it also contains many plant species rare to Southern Ontario (Maycock, 1972). The uniqueness of the area was recognized in the early 1900's and it was given National Park status in 1918 (Purdue, 1957). Although part of Point Pelee has been previously used for fruit and truck crops and still is being used for public recreation, much of the park has remained in its natural state.

A variety of plant communities representing different successional stages are present at Point Pelee. These range from early grassland, characterized by wheat grass (*Agropyron trachycaulum*), to a climax forest of black walnut (*Juglans nigra*), basswood (*Tilia americana*) and red oak (*Quercus rubra*). A beach dune (edaphic climax) is also present along the eastern shoreline. This area is characterized by vanilla grass (*Hierochloe odorata*), river-bank grape (*Vitis riparia*), and fragrant sumac (*Rhus aromatica*).

To examine the variation in population parameters of *P. leucopus*, two different types of habitat were selected during the summer, 1972. The first, an abandoned apple orchard, consisted of staghorn sumac (*Rhus typhina*), red-osier dogwood (*Cornus stolonifera*), red cedar (*Juniperus virginiana*), and a dense understory of river-bank grape and various grasses typical of secondary succession. The second habitat, a forest, consisted of black walnut, red oak, basswood, and hackberry (*Celtis occidentalis*). The understory was composed of virginia creeper (*Parthenocissus quinquefolia*), Herb-Robert (*Geranium robertianum*), anise-root (*Osmorhiza longistylis*), tall bellflower (*Campanula americana*), downy-yellow violet (*Viola pubescens*), Solomon's seal (*Polygonatum canaliculatum*), and false Solomon's seal (*Smilacina racemosa*).

METHODS

Plot Design

Study areas were selected and a trapping grid was established with trap stations at intervals of 15 m along lines 15 m apart. The size of both plots was determined by the extent of surrounding vegetation. For example, the eastern boundary of the forest plot was contaguous with a 10 m wide, water-filled ditch (former shoreline ridge). The orchard plot (1.93 hectares) contained 94 trap stations and the forest plot (1.1 hectares) had 64 trap stations.

Trapping

Each study plot was live trapped for up to three nights per week from the 24th of May to the 6th of July, 1972. Sherman live traps (7.5 x 8.5 x 23 cm) baited with either Quaker Oats or peanut butter were used to capture the animals. Captured animals were identified, and after marking with either steel ear tags or by toe clipping, they were released. For each animal, the point of capture, sexual condition and relative age were recorded.

The reproductive condition of males was determined by locating the position of the testes. Abdominal testes indicate a sexually inactive animal, while scrotal or descended testes indicate potential sexual activity (M'Closkey, 1972). The condition of the nipples was used to classify each female as either lactating or non-lactating. Relative age of individuals was based on pelage colour. Three classes were recognized: juvenile, sub-adult and adult.

Vegetation

Vertical stratification or layering of the vegetation in each area was measured using the profile method of MacArthur and MacArthur (1961), and Rosenzweig and Winakur (1969). Using this procedure one person moves a 5 x 22 cm board away from a second person until one-half of its surface area is obscured by vegetation. The distance from the observer to the board is recorded. The reciprocal of the distance between the board and observer is an estimate of the vegetation density. These measurements were taken at heights of 7 cm, 15 cm, 30 cm, and then at 30 cm intervals to 2.1 m above ground and were repeated in three directions at each of 15 randomly selected points.

Vegetation Analysis

Foliage height diversity (F.H.D.) measures the relative evenness in which the foliage is distributed in the vegetation layers. This was calculated for each point in both plots. Absolute densities at each height were converted to proportions of the total density and F.H.D. was then computed from the expression:

$$\text{F.H.D.} = \frac{1}{\sum p_i^2},$$

where p_i is the proportion of vegetation in the i^{th} layer (Levins, 1968). The layers used for computation were: 0 - 15 cm, 15 - 60 cm, and 60 cm.

Population Parameters

Single classification analysis of variance (ANOVA) was used to test the null hypothesis that the means of population parameters for *Peromyscus* were equal. In order to use this statistical approach effectively, arcsine transformations of observed proportions were used in each of the ANOVA tests performed. A detailed description of this method can be found in Sokal and Rohlf (1969).

RESULTS

Vegetation

Comparison of F.H.D. for the two study plots did not satisfactorily discriminate between the two areas. The mean F.H.D. of the orchard plot (2.57) was not significantly different from the mean F.H.D. (2.78) of the forest plot ($t = 1.88$; $.05 < p < .10$). To illustrate the difference between these two habitats, F.H.D. for each point was plotted against the corresponding profile density measure (Fig. 1). When habitat variables were treated in this manner, the difference between the two areas was more easily visualized. A greater degree of patchiness or variation in habitat structure is present in the orchard than in the forest. This is indicated by the greater dispersal of points for the orchard measurements.

FIGURE 1

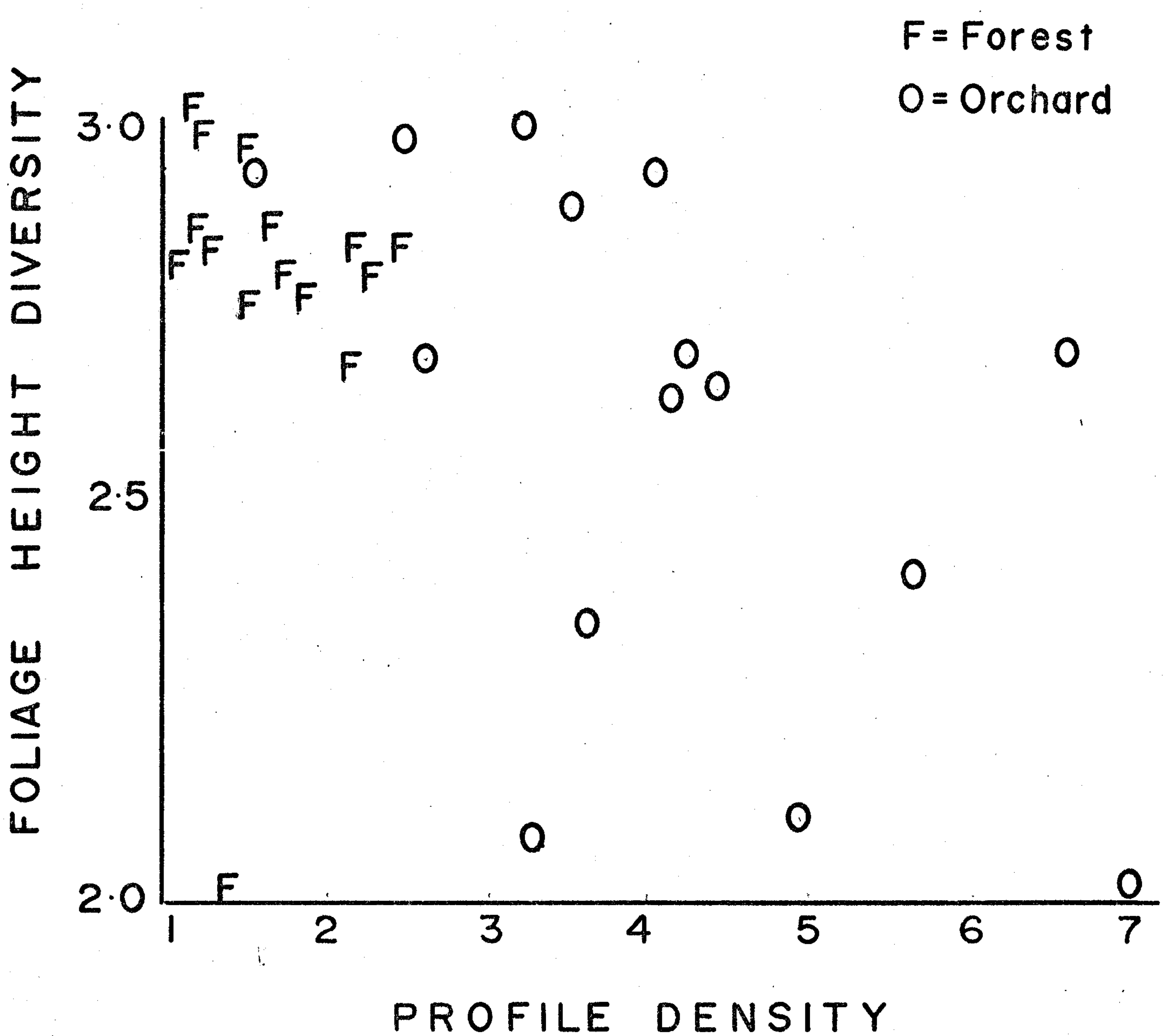
Foliage Height Diversity (F.H.D.)

vs.

Profile Density

for forest and orchard study areas.

FIGURE I


F = Forest
O = Orchard
FOLIAGE HEIGHT DIVERSITY
3·0
2·5
2·0
1
2
3
4
5
6
7
PROFILE DENSITY

Population Parameters

Density

A total of 1,644 trap nights (one trap per night = one trap night) resulted in the capture of 155 white-footed mice a total of 278 times. Seventy-two different individuals were trapped in the orchard while 83 were trapped in the forest. The trapping schedule for *P. leucopus* during the summer for 1972 is presented in TABLE 1.

Trap-revealed densities for June 1st to July 6th, using the Lincoln Index estimate for population size (Hayne, 1949) are presented in Figure 2. White-footed mouse density varied from 1.7 to 3.7 per .1 ha in the orchard and ranged from 4.2 to 6.5 per .1 ha in the forest. The difference in density between the two areas was significant ($F = 14.1$, $p < .01$) (TABLE 1a). The forest maintained a higher density and population numbers increased steadily throughout the duration of the study.

To illustrate the tendency of an individual to be trapped, a trapability index (T), given by the ratio of the number of animals trapped, to the number of animals known alive, has been calculated for the middle three census periods (TABLE 2). A low value of (T) could indicate trap avoidance and/or high mortality rates and hence, trap-revealed estimates of density would be

TABLE I

Trapping schedule for P. leucopus, summer, 1972

TRAPPING DATE	
Forest	Orchard
May 30,31	May 24,25,26
June 1,2	June 6,7
June 6,7	June 20,21
June 15,16	June 27
June 28,29,30	July 5,6

FIGURE 2

Changes in trap-revealed densities of *Peromyscus leucopus noveboracensis* for forest and orchard study areas.

FIGURE 2

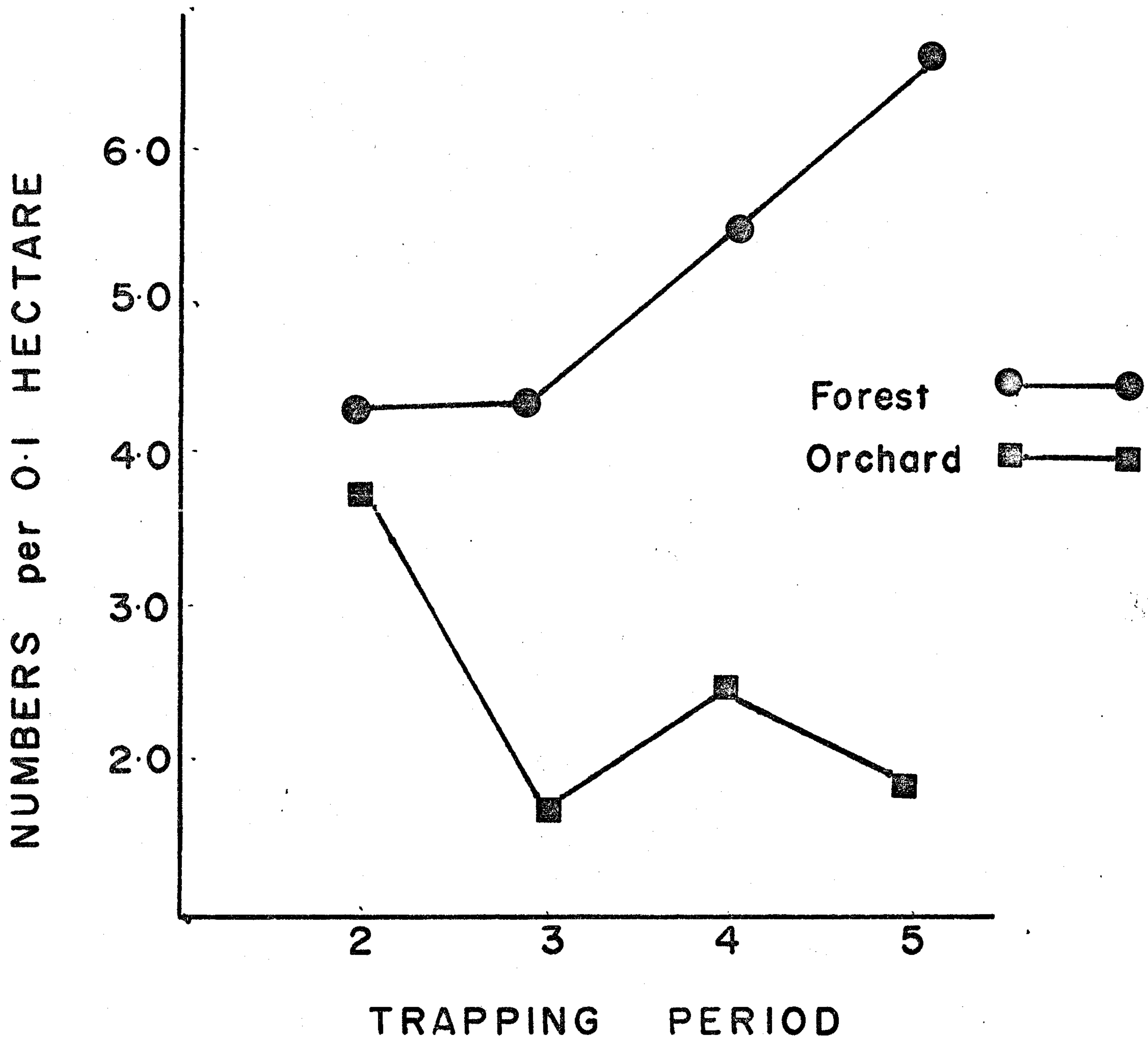

NUMBERS per 0·1 HECTARE
6·0
5·0
4·0
3·0
2·0
2
3
4
5
TRAPPING PERIOD
Forest
Orchard

TABLE Ia

Comparison of density for *P. leucopus* between forest and orchard

Source of Variation	df	SS	MS	F
Among Groups	1	13.7	13.7	14.1*
Within Groups	6	5.8	0.97	
Total	7	19.5		

$F_{.05}$ (1,6) = 5.99 $F_{.01}$ (1,6) = 13.7

* significant

TABLE 2

Trapability (T) of P. leucopus = $\frac{\text{number of animals trapped (N)}}{\text{number of animals alive (N*)}}$

Trapping Date	FOREST N	N*	T	Trapping Date	ORCHARD N	N*	T
June 1,2	36	37	.91	June 6,7	12	16	.75
June 6,7	25	31	.80	June 20,21	17	22	.77
June 15,16	36	39	.92	June 27	18	26	.69
Entire Study	97	107	.90		47	64	.73

correspondingly affected. Trapability for *P. leucopus* was high in both areas: 0.90 in the forest and 0.73 in the orchard. These high values for (T) indicate little interference from trap avoidance or mortality and imply that the trap-revealed densities are reasonable estimates of the population size.

Residency

An indication of the stability of a population is given by the proportion of resident and transient individuals.

The members of each census period are divided into transients and residents (TABLE 3). Transients are individuals captured only once during the study and residents are those individuals that were captured during two or more trapping periods.

The proportion of resident *P. leucopus* in the forest was high throughout the duration of the study. Of 118 captures made during the first four trapping periods 85% were of resident animals. In contrast, the orchard was initially composed of transient individuals (72%) and the overall resident value was 61%.

The difference in mean proportions for resident animals was not significant ($F = .09$, $p > .75$) TABLE 4. This suggests that the numbers of resident animals in the population are not associated with habitat type.

TABLE 3

Proportion of resident and transient _P. leucopus_

FOREST

Trapping Date	Total Captures	Proportion of Residents	Proportion of Transients
May 30,31	21	.81	.19
June 1, 2	36	.81	.19
June 6,7	25	.96	.04
June 15,16	36	.84	.16
Entire Study	118	.85	.15

ORCHARD

Trapping Date	Total Captures	Proportion of Residents	Proportion of Transients
May 24,25,26	36	.28	.72
June 6,7	12	1.00	0
June 20,21	17	.88	.12
June 17	18	.78	.22
Entire Study	83	.61	.38

TABLE 4

Comparison of resident *P. leucopus* between forest and orchard

Source of Variation	df	SS	MS	F
Among Groups	1	49.5	49.5	0.097*
Within Groups	6	3049	508.2	
Total	7	3098.5		

$F_{.05}(1,6) = 5.99$ $F_{.01}(1,6) = 13.7$

*not significant

Comparison of transient *P. leucopus* between forest and orchard

Source of Variation	df	SS	MS	F
Among Groups	1	130	130	.59*
Within Groups	6	1303	217.1	
Total	7	1433		

$F_{.05}(1,6) = 5.99$ $F_{.01}(1,6) = 13.7$

*not significant

The proportion of transient mice in the forest population was consistently low for the duration of the study (TABLE 3). In the orchard, the proportion of transient mice was initially high (72%); however, by the end of the study the proportion of transient individuals had dropped to 22%. ANOVA (TABLE 4) revealed no significant differences in mean proportions of transient individuals between habitats ($F = .59$, $.50 < p < .25$).

Reproduction and Recruitment

The reproductive condition of any population is reflected by the proportion of sexually active adults. The proportion of potentially reproductive males in the forest was initially high (.87) but steadily declined during the study. No trends in male sexual condition for the orchard were apparent as reproductive potential was generally high for the entire study (TABLE 5).

A better indication of the reproductive condition of a population is obtained when the proportion of sexually active females is examined together with the data on juvenile recruitment. These data are presented in TABLES 5 and 6, respectively.

Two peaks in recruitment were evident in the orchard. One peak occurred at the onset of trapping followed by a second peak about a month later between June 20th and 27th. The second peak was accompanied by a high proportion of

TABLE 5

Sexual activity of *P. leucopus*

FOREST

Trapping Date	N Females	Proportion Sexually Active	N Males	Proportion Sexually Active
May 30,31	13	.46	8	.87
June 1,2	18	.61	19	.68
June 6,7	15	.45	16	.68
June 15,16	14	.38	25	.56
June 28,29,30	12	.08	38	.44
Entire Study	72	.41	100	.59

ORCHARD

Trapping Date	N Females	Proportion Sexually Active	N Males	Proportion Sexually Active
May 24,25,26	14	.14	22	.45
June 6,7	6	.33	10	.90
June 20,21	5	.60	17	.76
June 27	7	.14	19	.68
July 5,6	12	.08	20	.75
Entire Study	44	.20	88	.68

TABLE 6

Proportion of juvenile P. leucopus

FOREST			ORCHARD		
Trapping Date	N	Proportion Juveniles	Trapping Date	N	Proportion Juveniles
May 30,31	21	.09	May 24,25,26	36	.33
June 1,2	37	.27	June 6,7	16	.06
June 6,7	31	.29	June 20,21	22	.18
June 15,16	39	.33	June 27	26	.23
June 28,29,30	44	.34	July 5,6	32	.12
Entire Study	172	.29		132	.20

sexually active females in the population (.60). Only one period of breeding activity was evident in the forest. The highest proportion of sexually active females (.61) occurred during the trapping period of June 1st and 2nd, and then declined during the remainder of the study. The proportion of juvenile mice in the population steadily increased during this same period from .27 to .34 (TABLE 6).

The proportion of sexually active females was generally higher in the forest; however, the mean proportion of sexually active females from each area was not significantly different ($.50 < p < .25$) (TABLE 7). The overall proportion of juvenile mice in both the orchard (.20) and forest (.29) was high. The observed F of 2.56 (TABLE 8) was not significant ($.25 < p < .10$) and therefore the null hypothesis that the mean proportions of juvenile mice in the population are equal was accepted. This indicates there are no differences in juvenile recruitment between the two populations.

<u>Survivorship</u>

Loss of individuals from a population can occur either by death or emigration. Survivorship, the proportion of individuals surviving between consecutive trapping periods, is a measure of this loss without separating emigration from mortality.

Overall survivorship in the forest was 69%, and it

TABLE 7

Comparison of sexual activity for *P. leucopus* between forest and orchard

FEMALE

Source of Variation	df	SS	MS	F
Among Groups	1	185.9	185.9	1.15*
Within Groups	8	1292.8	161.6	
Total	9	1478.7		

$F_{.05}(1,8) = 5.32$ $F_{.01}(1,8) = 11.3$

*not significant

MALE

Source of Variation	df	SS	MS	F
Among Groups	1	64.3	64.3	0.37*
Within Groups	8	1383.3	172.9	
Total	9	1447.6		

$F_{.05}(1,8) = 5.32$ $F_{.01}(1,8) = 11.3$

*not significant

TABLE 8

Comparison of juvenile recruitment between forest and orchard

Source of Variation	df	SS	MS	F
Among Groups	1	55.5	55.5	1.15*
Within Groups	8	289.3	36.1	
Total	9	344.8		

$F_{.05}(1,8) = 5.32$ $F_{.01}(1,8) = 11.3$

*not significant

steadily declined during the study (TABLE 9). The lowest value for survivorship (.28) occurred in the orchard between May 26th and June 7th. A high value (.72) for transients during the May 24th to 26th trapping period, suggests this loss is most probably the result of high emigration from the area. Survivorship in the orchard for the entire study was 60%.

Analysis of variance (TABLE 10) indicates that the means of the two samples are not significantly different ($F = .06$, $p > .75$) implying there is no difference in survivorship between the two study areas.

Results of Earlier Work

The combined results of the ANOVA on 1972 data suggest that the samples are representative of the same population as no significant differences in means of population parameters were detected.

I extended this analysis to include data collected during the summer of 1971 (Lajoie, 1972) in which four types of habitat were investigated. These habitats included a sand prairie, a deciduous forest, an old field and a mixed deciduous forest (TABLE 11). The population parameters for which analysis of variance could be computed were: proportion of sexually active females, juvenile recruitment and survivorship (TABLES 12, 13, and 14, respectively).

TABLE 9

Proportion of individuals surviving between trapping periods

FOREST			ORCHARD		
Trapping Date	N	Proportion Surviving	Trapping Date	N	Proportion Surviving
May 30,31 to June 1,2	21	.81	May 24,25,26 to June 6,7	36	.28
June 1,2 to June 6,7	37	.70	June 6,7 to June 20,21	16	.81
June 6,7 to June 15,16	31	.71	June 20,21 to June 27	22	.73
June 15,16 to June 28,29,30	39	.61	June 27 to July 5,6	26	.81
Entire Study	128	.69		100	.60

TABLE 10

Comparison of survivorship for *P. leucopus* between forest and orchard

Source of Variation	df	SS	MS	F
Among Groups	1	12.5	12.5	.06*
Within Groups	6	1113.5	185.5	
Total	7	1126.0		

$F_{.05}(1,6) = 5.99$ $F_{.01}(1,6) = 13.7$

*not significant

TABLE 11

Habitat types investigated during summer, 1971

Habitat Type	Size of Study Plot (m^2)	Stage of Succession	Major Plant Species
Sand Prairie	6,200	edaphic climax	vanilla grass, river-bank grape, fragrant sumac
Deciduous Forest	5,625	climax stage	hackberry, basswood, black walnut, red oak
Old Field	8,100	early successional stage	horseweed willow and cottonwood seedlings
Deciduous Forest (Mixed)	2,925	old successional stage converging to climax	hackberry, black walnut white pine

TABLE 12

Comparison of sexual activity for *P. leucopus* (1971 data)

Source of Variation	df	SS	MS	F
Among Groups	3	3351	1117	1.37*
Within Groups	12	9778	814	
Total	15	13,129		

$F_{.05}(3,12) = 3.49$ $F_{.01}(3,12) = 5.95$

*not significant

TABLE 13

Comparison of juvenile recruitment for *P. leucopus* (1971 data)

Source of Variation	df	SS	MS	F
Among Groups	3	104	34.8	1.16*
Within Groups	12	357	29.8	
Total	15	461		

$F_{.05}(3,12) = 3.49$ $F_{.01}(3,12) = 5.95$

*not significant

TABLE 14

Comparison of survivorship for *Pleucopus* (1971 data)

Source of Variation	df	SS	MS	F
Among Groups	3	461	153.7	0.93*
Within Groups	8	1313	164.2	
Total	11	1774		

$F_{.05}\ (3,8) = 4.07$ $F_{.01}\ (3,8) = 7.59$

*not significant

The results from analysis of variance on the 1971 data were in agreement with the results from the 1972 data. Of the three parameters examined, no significant differences were detected. This suggests that any differences in the population parameters observed are not associated with different habitat types, but are most likely the result of other factors that may be associated with the habitat differences.

DISCUSSION

Fundamentally, there are two aspects to the life history strategies of any population - the innate capacity of a genotype to contribute to population growth, and the way in which this innate capacity is regulated by population density (King and Anderson, 1971). Selection based on these two strategies has been termed r-selection and K-selection, respectively, (MacArthur and Wilson, 1967), where r refers to the maximal intrinsic rate of increase and K to the carrying capacity of the environment for that species. K-selection implies population regulation under conditions of density-dependence. Available energy is channeled into the maintenance and production of few, extremely fit individuals, whereas r-selection refers to opportunistic species in which energy for reproduction is maximized. No organism is completely r-selected or K-selected as both types of selection are in operation during population growth. For example, when density is relaxed, as in populations that are periodically reduced in numbers by seasonal climatic changes, r-selection is favoured; however, as the population density increases, there is a gradual shift to K-selection to counteract the effects of high population density. Pianka (1970) states that in temperate zones r-strategists would be favoured whereas in the tropics, K-strategists would be favoured. Gadgil and Bossert (1970) postulate that r-strategists live in environments with high availability of resources and K-strategists live in environments with low availability of resources.

Differences in life history strategies exist between species as well as within species, and these differences may be reflected by differing patterns of survivorship, recruitment, residency and transiency. M'Closkey (1972) has shown that in rodent communities, periods of population increase were generally characterized by greater than average survivorship and recruitment, while during periods of population decrease, survivorship, addition of residents and transients were usually low. There were however exceptions, and he concluded that the variation may be the result of different life history strategies.

Peromyscus leucopus occupies a variety of habitats and fluctuations in density are common (Burt, 1940; Howell, 1954; Snyder, 1956). In the present study fluctuations in density were evident. Differences in densities can be maintained by different habitat structure or other factors correlated with it (M'Closkey and Lajoie, 1974). In comparing the other population parameters between habitats, I found that there were no differences in survivorship, proportion of sexually active females, juvenile recruitment or proportions of resident and transient individuals. The main conclusion that can be drawn from these data is that population parameters characteristic of this species are relatively constant and are not associated with differences in habitat. However, certain patterns in the population parameters were evident.

In the forest plot, the population steadily increased from June 6th to the end of the study. Associated with this increase were; constant recruitment (29% to 34%), high residency (84% to 96%) and high survivorship (61% to 71%). A similar trend was evident in the orchard plot from June 20th to June 27th. Increasing numbers of individuals were accompanied by constant recruitment (18% to 23%), high survivorship (73%) and high residency for the beginning and the end of this period (78% and 88%). A decrease in population size occurred in the orchard plot between June 6th and June 21st. Residency was high during this period (100% and 88%); however, recruitment was low (6%) at the beginning of the period and survivorship was low (28%) in the preceding period (May 24th to June 6th).

A more general pattern in population parameters is observed when the values for the entire study period are considered. Survivorship for P. leucopus over the duration of this study was high (64.5%). On an annual basis, this value would be approximately 17%, also high as available evidence indicates that a few Peromyscus live longer than one year. Estimated survivorship for one year has been as low as 1% for *P. m. bairdi* (Howard, 1949), 4% for *P. leucopus* (Blair, 1953; Burt, 1940), and ranging from 6 to 37% in *P. m. gracilis* (Blair, 1941; Manville, 1949). Survivorship ranging from 11 to 19% for *P. l. noveboracensis* and from 15 to 36% for *P. m. bairdi* have also been recorded (Blair, 1948). An exception to these low values was observed by Bendall (1959) in which survivorship for *P. l. noveboracensis* was 81% per month, a value consistent with my results.

The overall proportion of resident animals in this study was also high (73%). This value compares favourably with those reported for *P. polionotus* (60 to 96%; Blair, 1951) and also with residency recorded for *P. leucopus* (80%) by Lajoie (1972). The proportion of transient individuals during the study was low (27%).

The overall value for proportion of sexually active females (30%) is lower than values characteristic of *Peromyscus* spp. The proportion of sexually active females during the breeding period approximates 60% for *P. maniculatus* and *P. leucopus*, but values as low as 30%, and as high as 100% have been reported (Coventry, 1937; Jackson, 1952; Jameson, 1953; Bendall, 1959; Beer and MacLeod, 1966). If one considers only the peaks in sexual activity (June 1st in the forest and June 20th in the orchard) the observed values of 60% and 61% respectively, are consistent with the published values.

Except for the data of Lajoie (1972), published information on recruitment for *P. leucopus* is not available. Overall recruitment for *P. leucopus* observed by Lajoie was 10%, while juvenile recruitment for this study was relatively high (24.5%). High reproductive effort in an opportunistic species such as *P. leucopus* is expected.

Summarizing these findings for *P. leucopus*, evidence indicates that the population parameters of white-footed mice can be characterized by high survivorship, high residency and high reproductive effort or juvenile recruitment. This type of life history pattern characterizes r-strategy. Although *P. leucopus* is geographically ubiquitous and may be found in many types of habitats, in a given locality it appears to be uniform with respect to its population parameters.

SUMMARY

1) A mark-recapture trapping program was established in Point Pelee National Park during the summer of 1972 to examine the population parameters of *Peromyscus leucopus noveboracensis* in southwestern Ontario.

2) Single classification analysis of variance (ANOVA) was used to test the null hypothesis that the means of population parameters for *Peromyscus* were equal.

3) The only significant difference for population parameters between habitats was for density. Density of *P. leucopus* in the forest habitat varied from 4.2 to 6.5 animals per .1 ha., while in the orchard habitat density ranged from 1.7 to 3.7 animals per .1 ha.

4) No differences in survivorship, juvenile recruitment, proportion of sexually active females and proportions of resident and transient individuals were detected in comparisons between habitats.

5) *P. leucopus* populations were characterized by high survivorship, high residency and a high reproductive effort (r-strategy).

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