

CONCORSO PUBBLICO PER TITOLI ED ESAMI, PER IL RECLUTAMENTO DI UN TECNOLOGO DI RICERCA DI II LIVELLO, AI SENSI DELL'ART. 24-BIS DELLA LEGGE N. 240/2010, CON RAPPORTO DI LAVORO SUBORDINATO A TEMPO DETERMINATO E A TEMPO PIENO (36 ORE SETTIMANALI), PER LA DURATA DI 18 MESI (CON TRATTAMENTO ECONOMICO CORRISPONDENTE ALLA RETRIBUZIONE DELL'AREA DEI FUNZIONARI PREVISTA DAL VIGENTE C.C.N.L. DEL COMPARTO ISTRUZIONE E RICERCA EX CATEGORIA D – POSIZIONE ECONOMICA D3), PER LE ESIGENZE DEL DIPARTIMENTO DI SCIENZE TEORICHE E APPLICATE – DISTA - CUP J53C24000320005 (CODICE BTA102)

TRACCE PROVA ORALE

Per l'Immagine che segue:

1. Il candidato descriva quanto rappresentato nella micrografia
2. Il candidato descriva le possibili tecniche di preparazione
3. Il candidato commenti il valore diagnostico.



Prova di inglese:

Visual method for evaluating the state of sexual development in male grey squirrels (*Sciurus carolinensis*)

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Abstract. Stages of sexual development in grey squirrels were classified by scoring the presence of periscrotal hair and staining, as well as the position, size and colour of testes, to develop a visual breeding score (VBS). The VBS was a highly significant predictor of the presence and concentration of epididymal spermatozoa, which were produced from 12 months of age. Two classes of producers were identified: 'high' with spermatozoa levels $>10 \times 10^6 \text{ mL}^{-1}$ and 'low' with spermatozoa levels $<10 \times 10^6 \text{ mL}^{-1}$. Sperm motility was variable across all levels of productive males but was generally higher in the 'high' group, indicating that these were 'functional' males. Sexual regression was observed in two autumn periods. The VBS was less effective in determining states of regression and redevelopment; the confidence of classification improved when age class (adult or prepubertal) and date of capture was known. The use of the VBS to classify stages of sexual development in grey squirrels will improve selection of animals for studies of population biology and fertility control, and has potential application in captive breeding studies of rare Sciuridae species.

Extra keywords: age class, breeding condition, epididymal spermatozoa, sperm motility.

Prova di informatica

Il candidato analizzi il set di dati valutando la correlazione tra massa corporea e lunghezza del tarso. Si richiede di presentare i dati anche in forma grafica, separando i dati per sesso.

I candidati devono:

1. Organizzare lo spazio di lavoro su disco in maniera coerente.
2. Avviare e impostare una sessione di lavoro in RStudio.
3. Importare il dataset fornito nell'ambiente di lavoro R/RStudio.
4. Applicare i metodi statistici indicati nella traccia della prova (vedi sotto) per analizzare i dati.

Interpretare e commentare i risultati ottenuti.

ID	SEX	SEASON	YEAR	BODY_MASS	FOOT_LENGTH
5651	F	spr-sum	2021	600	65
5653	F	spr-sum	2021	560	61
5789	M	spr-sum	2021	570	63
5771	F	spr-sum	2021	530	65
5675	F	spr-sum	2021	595	62
5781	F	spr-sum	2021	590	63
5706	M	aut	2021	550	61
5712	F	win	2022	610	61.5
5798	M	win	2022	570	61
4935	F	win	2021	610	61

5775	M	win	2021	605	60.5
4904	M	win	2021	445	60
4948	M	win	2021	590	61.5
5764	F	aut	2021	660	68
4907	M	aut	2021	625	63
4914	M	aut	2021	620	64
4376	M	aut	2021	580	63
5788	M	aut	2021	615	65
5644	M	win	2021	470	61
5662	M	win	2021	440	60
5639	F	win	2021	570	61
4900	F	win	2021	490	59
5782	F	win	2021	550	60
5760	F	win	2021	455	62
5638	F	win	2021	590	62
5659	F	win	2021	420	60
5601	F	win	2021	540	61
5605	M	win	2021	530	60
5657	M	win	2021	440	59
5663	M	win	2021	510	62
5608	F	win	2021	610	62
5637	M	win	2021	540	61
5762	M	win	2021	510	60

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Prova di inglese:

A comparison of Eurasian red squirrel distribution in different fragmented landscapes

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Summary

1. The occurrence of species vulnerable to habitat fragmentation is likely to depend on the size and separation of the fragments. However, the shape of the function that relates occurrence to these landscape parameters may be affected by other factors that are less easily measured, in which case relationships with size and separation in one area may predict occurrence elsewhere only poorly.

2. We explored how well the distribution of red squirrels *Sciurus vulgaris* in fragmented woodlands was predicted by simple logistic regression models empirically derived in other fragmented landscapes.

3. Comparisons between predictions lead us to identify thresholds in fragment size (> 10 ha) and distance to a source (< 600 m) where the probability of squirrel occupancy was at least 0.9 in all landscapes. These values may reflect squirrel minimum habitat requirements for home range and dispersal in the worst study area.

4. For fragments < 10 ha (outside shared thresholds), models developed in a landscape could predict squirrel occupancy elsewhere only in 17% of cases, as other factors such as demography or habitat quality might become relevant in very small and isolated fragments.

5. The predictive ability for small fragments also improved when the range of fragment sizes in the area of observation fell within the range of sizes in the area where the model was developed.

6. Some models gave correct between-year predictions of squirrel distribution in the same landscape despite noticeable changes in regional squirrel population density.

7. When size and distance thresholds were met, we found that models could be used successfully elsewhere. In addition, threshold values indicate how large forest fragments should be and how they should be arranged to favour squirrel occurrence in a landscape.

Key-words: habitat fragmentation, incidence models, predictive ability, *Sciurus vulgaris*, thresholds in landscape attributes.

Journal of Applied Ecology (1999) **36**, 649–662

Prova di informatica

Il candidato analizzi il set di dati valutando la presenza di eventuali differenze nella massa corporea dipendenti dal sesso. Si richiede di presentare i dati anche in forma grafica, separando i dati per stagione.

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Prova di inglese:

J. Zool., Lond. (2003) **259**, 327–336 © 2003 The Zoological Society of London Printed in the United Kingdom DOI:10.1017/S0952836902003229

Home range of the squirrel glider (*Petaurus norfolcensis*) in a network of remnant linear habitats

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(Accepted 13 June 2002)

Abstract

Linear strips of natural or semi-natural vegetation are a characteristic feature of rural landscapes throughout the world. Their value for the conservation of fauna in heavily modified landscapes depends on the response of species to the linear shape of the habitat, and the pressures this imposes on population processes and spatial organization. In south-eastern Australia, woodland habitats occupied by the squirrel glider *Petaurus norfolcensis*, a threatened species of arboreal marsupial, have been preferentially cleared for agriculture leaving only remnants within cleared farmland. In this study, the home range of *P. norfolcensis* was investigated by radio-tracking 40 gliders within a highly modified landscape where the majority (83%) of remaining wooded habitat occurs as a network of linear strips along roadsides and streams. Individuals were tracked for one to four seasons, resulting in the collection of 4213 independent locational 'fixes'. All fixes of animals were from remnant woodland. Home ranges were elongated and linear, primarily determined by the shape and arrangement of woodland habitat. Seasonal home ranges were small (mean of 1.4–2.8 ha) and ranged between 320 and 840 m long. Small patches of trees in farmland adjacent to the linear habitats were also extensively used. Despite the highly modified landscape structure, home ranges of *P. norfolcensis* in the linear network were smaller than those estimated from other studies of this species in continuous habitat. The apparent high quality of the linear habitats is attributed to the density of large old trees, which provide foraging and breeding resources, and the productivity of the environment. Linear landscape elements may have a valuable conservation function where they provide resident habitat or enhance landscape connectivity, but their long-term viability is vulnerable to disturbance.

Key words: home range, *Petaurus norfolcensis*, linear habitats, habitat fragmentation, habitat geometry, wildlife corridor

Prova di informatica

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