

Metodologia Ecológica

Abordagens e Métodos Estatísticos em Ecologia

Tabelas de Contingência e modelos log-lineares

TABLE 11.1 Three rows from a dataset measuring factors associated with population status of rare plant species in New England

Species	Invasive species present?	Population declining?	Legal protection?	Light level
<i>Aristolochia</i>	No	No	No	2
<i>Hydrastis</i>	No	Yes	No	0
<i>Liatris</i>	Yes	Yes	No	4
...

TABLE 11.2 Two-way contingency table summarizing the relationship between protection and population status

Population status	Protection status		Row total
	Not protected	Protected	
Declining	$Y_{1,1} = 18$	$Y_{1,2} = 8$	$\sum_{j=1}^m Y_{1,j} = 26$
Stable or increasing	$Y_{2,1} = 15$	$Y_{2,2} = 32$	$\sum_{j=1}^m Y_{2,j} = 47$
Column total	$\sum_{i=1}^n Y_{i,1} = 33$	$\sum_{i=1}^n Y_{i,2} = 40$	$\sum_{i=1}^n \sum_{j=1}^m Y_{i,j} = 73$



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TABLE 11.3 Expected values for data in Table 11.2

Population status	Protection status		<i>Row total</i>
	Not protected	Protected	
Declining	11.75	14.25	26
Stable or increasing	21.25	25.75	47
<i>Column total</i>	33	40	<i>Grand total = 73</i>

$$G = 2 \times \left(\sum_{i=1}^n \sum_{j=1}^m [Y_{i,j} \ln(Y_{i,j})] - \sum_{i=1}^n \left[\left(\sum_{j=1}^m Y_j \right) \ln \left(\sum_{j=1}^m Y_j \right) \right] - \sum_{j=1}^m \left[\left(\sum_{i=1}^n Y_i \right) \ln \left(\sum_{i=1}^n Y_i \right) \right] + \left[\left(\sum_{i=1}^n \sum_{j=1}^m Y_{i,j} \right) \ln \left(\sum_{i=1}^n \sum_{j=1}^m Y_{i,j} \right) \right] \right) \quad (11.8)$$

TABLE 11.4 Observed (in bold) and expected (in parentheses) values used to test the independence of population status and light level

Population status	Light level					Row total
	0	1	2	3	4	
Declining	5 (3.2)	0 (0.7)	3 (3.6)	12 (12.5)	6 (6.0)	26
Stable or increasing	4 (5.8)	2 (1.3)	7 (6.4)	23 (22.5)	11 (11.0)	47
Column total	9	2	10	35	17	Grand total = 73