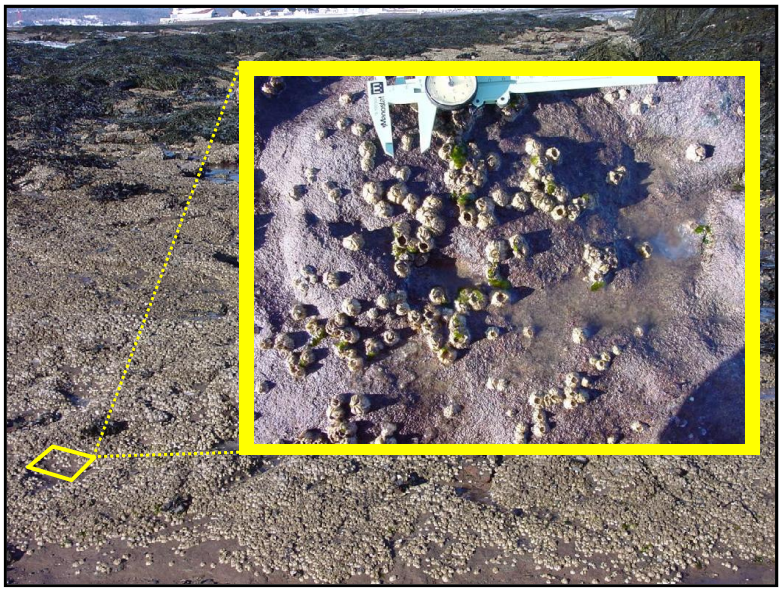
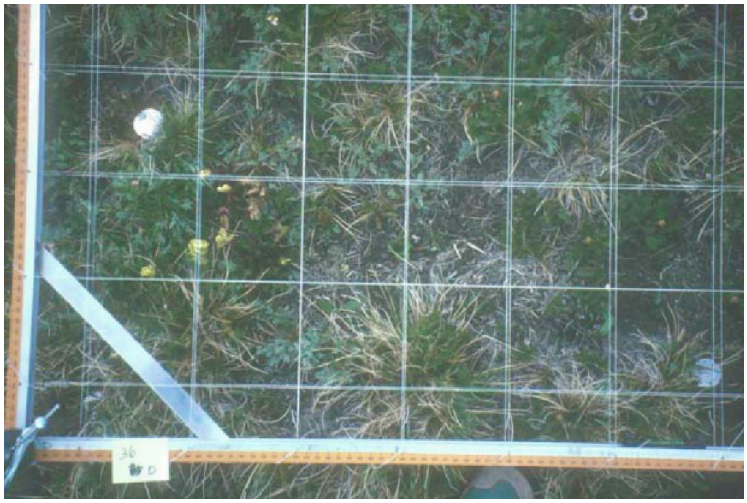
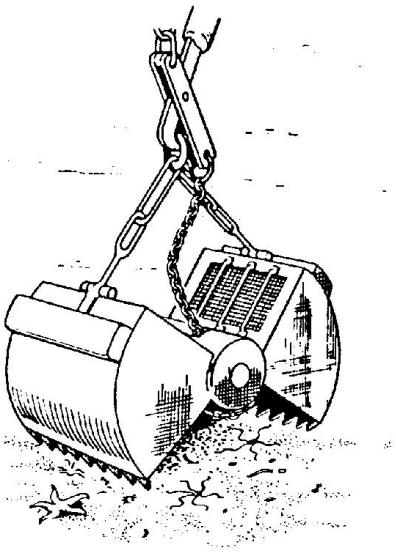
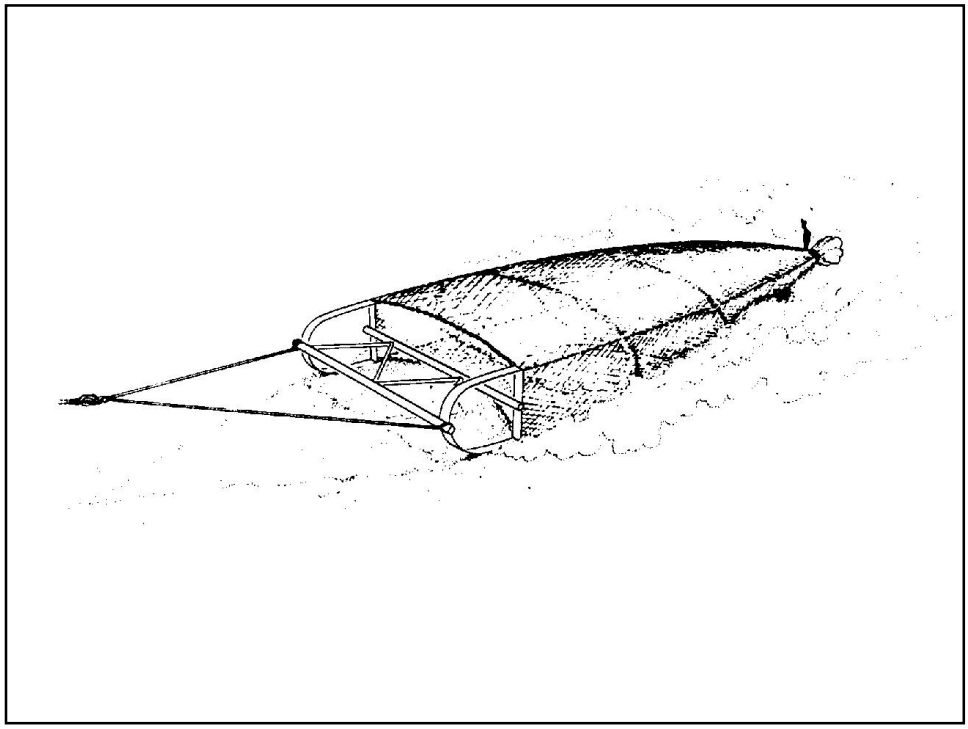
Le modalità di dispersione degli organismi nello spazio

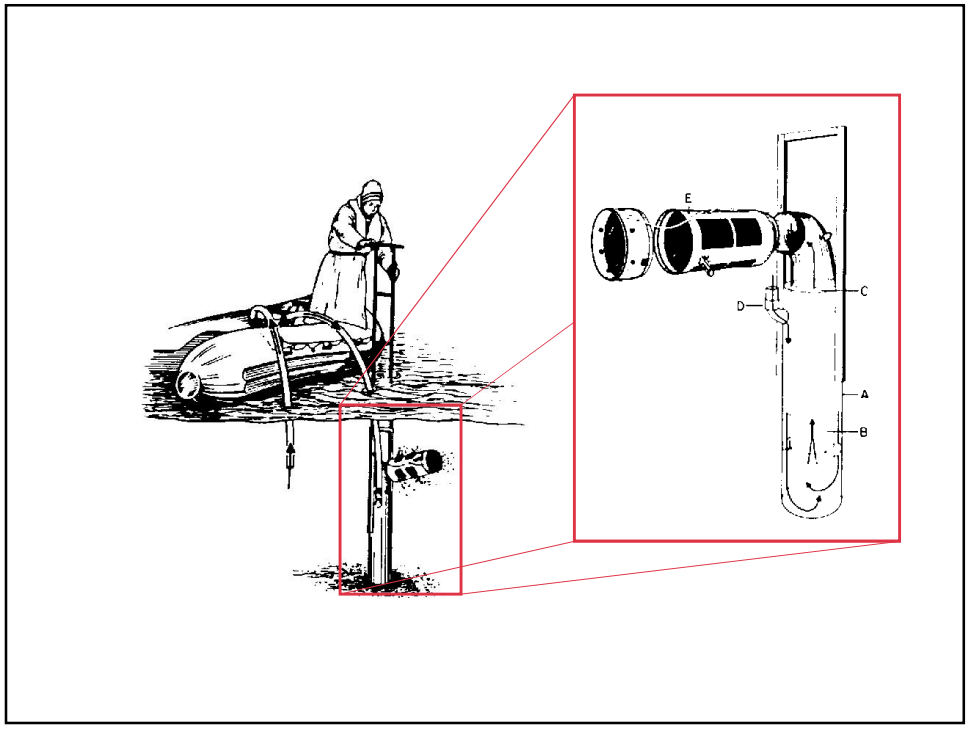


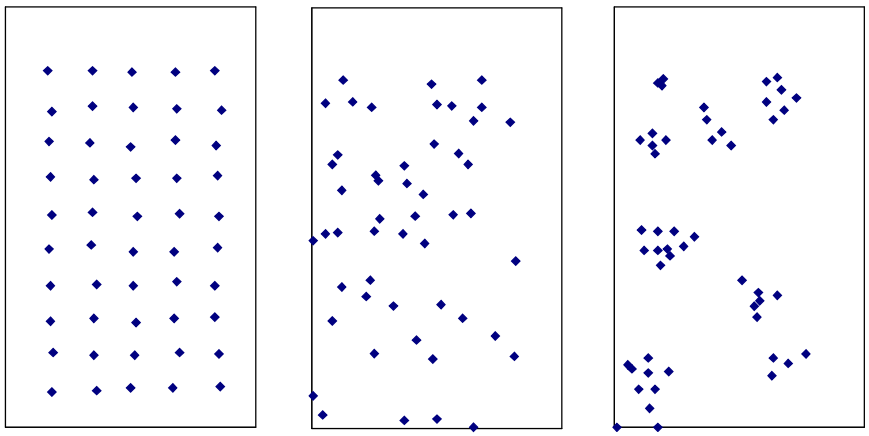

S. Walker








E
C
D
A
B



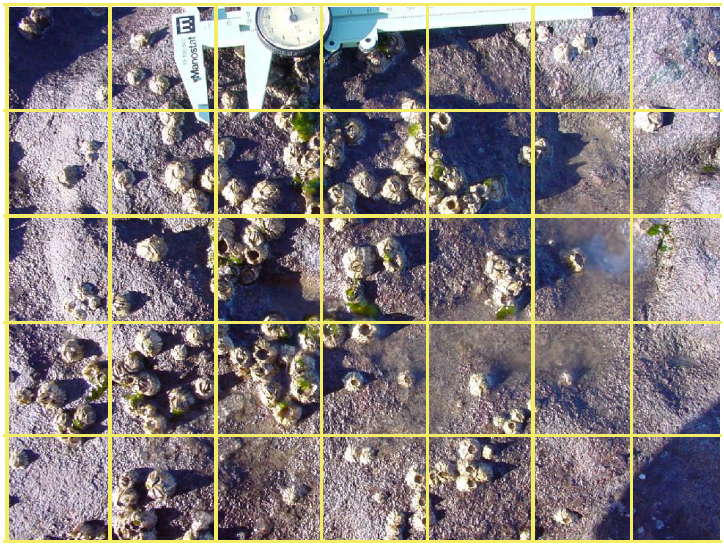
distribuzione regolare N=50

distribuzione casuale N=50

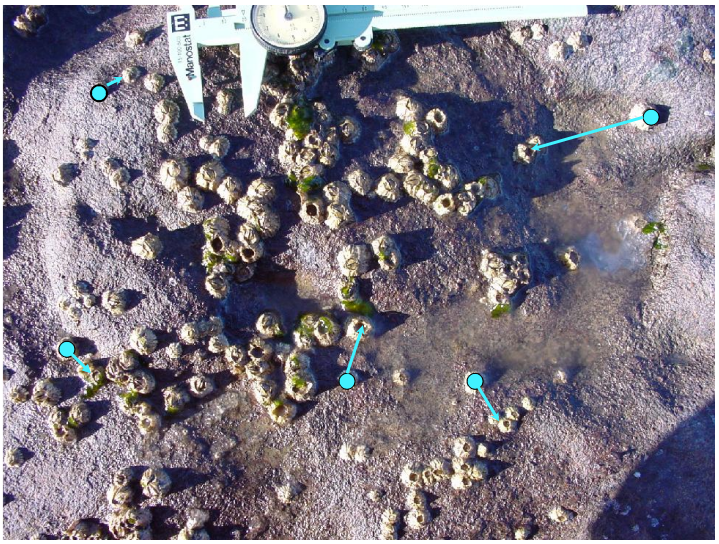
distribuzione aggregata N=50

1. Numero di individui totale nel quadrato campione

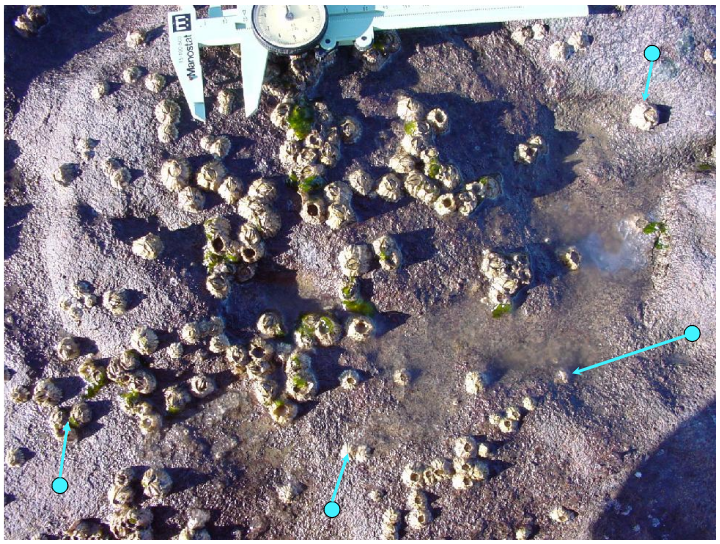
2. Numero di individui nei quadrati elementari



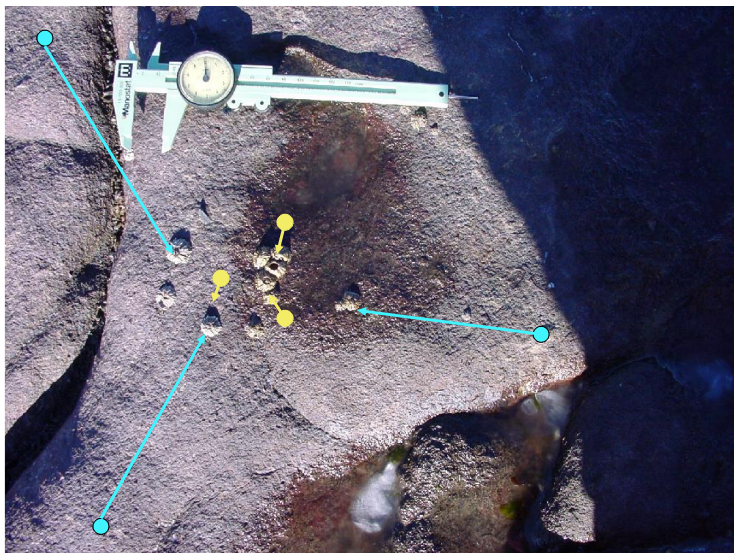
3. Distanza da un individuo a caso al vicino più prossimo



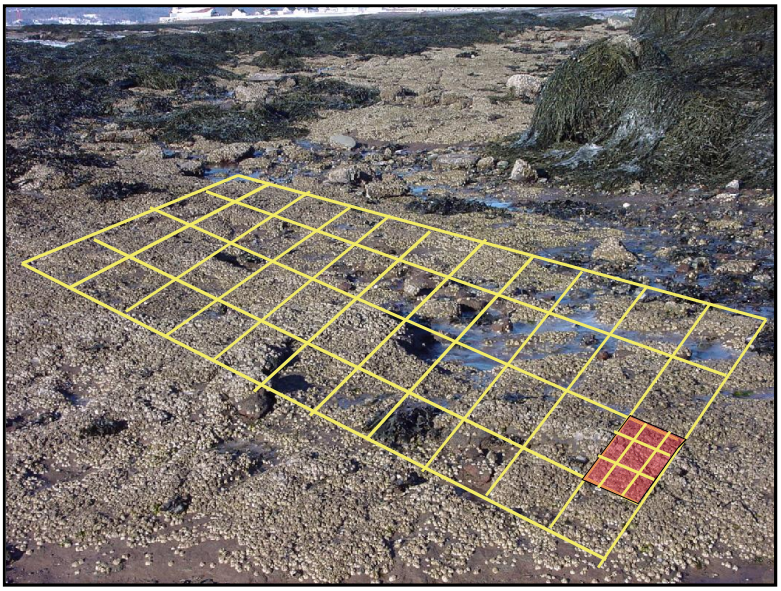
4. Distanza da un punto casuale al vicino più prossimo

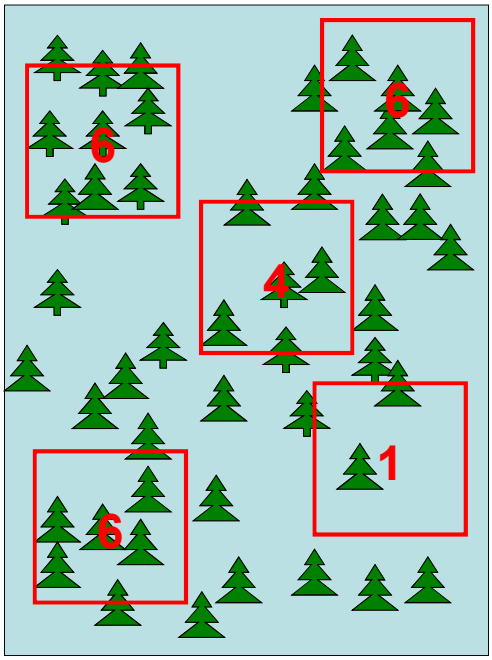


Effetto dell'aggregazione degli individui:
sovrastima o sottostima della densità



La scala di campionamento influenza tutti risultati!





$$\bar{x} = \frac{6+6+4+1+6}{5} = 4.6$$

x	$x-\bar{x}$	$(x-\bar{x})^2$
6	1.4	1.96
6	1.4	1.96
4	-0.6	0.36
1	-3.6	12.96
6	1.4	1.96

$\Sigma = 19.2$

$n-1 = 4$

$s^2 = 4.8$

$$I = \frac{s^2}{\bar{x}} = \frac{4.8}{4.6} = 1.04$$

- <1 → bassa variabilità, pattern regolare
- ≈1 → media=varianza, pattern casuale (Poisson)
- >1 → alta variabilità, pattern aggregato

$$R = \frac{(n-1)s^2}{\bar{x}} = \frac{4 \cdot 4.8}{4.6} = 4.16$$

Gradi di libertà = 5-1= 4

Attenzione

Il test è effettivamente valido solo se:

- n > 6
- $\bar{x}$ > 1

gradi di libertà		limite inferiore		limite superiore	
1		0.00		3.84	
2		0.10		5.99	
3		0.35		7.81	
4		0.71		9.49	
5	regolare	1.15	casuale	11.07	aggregata
6		1.64		12.59	
7		2.17		14.07	
8		2.73		15.51	
9		3.33		16.92	
10		3.94		18.31	
15		7.26		25.00	
20		10.85		31.41	
25		14.61		37.65	
30		18.49		43.77	
40		26.51		55.76	
50		34.76		67.50	
		$p(X^2)=0.025$		$p(X^2)=0.975$	

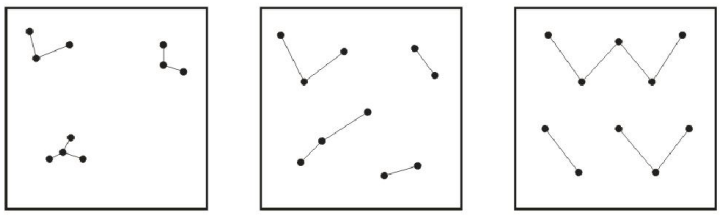
Nearest neighbour distance

distanza media attesa per una distribuzione spaziale casuale (Poisson)

$$\bar{\delta} = \frac{1}{2}\sqrt{A/n}$$

rapporto fra distanza media osservata ed attesa (distribuzione aleatoria)

$$R = \frac{\bar{d}}{\bar{\delta}}$$



R = 0 → distribuzione aggregata (contagiosa) → 0,90 → distribuzione casuale → 1,25 → distribuzione regolare → 2,191

L'area studiata è infinita o toroidale

$$\sigma^2_{\bar{\delta}} = \frac{(4-\pi)A}{4\pi n^2} = \frac{0.06831 \cdot A}{n^2}$$

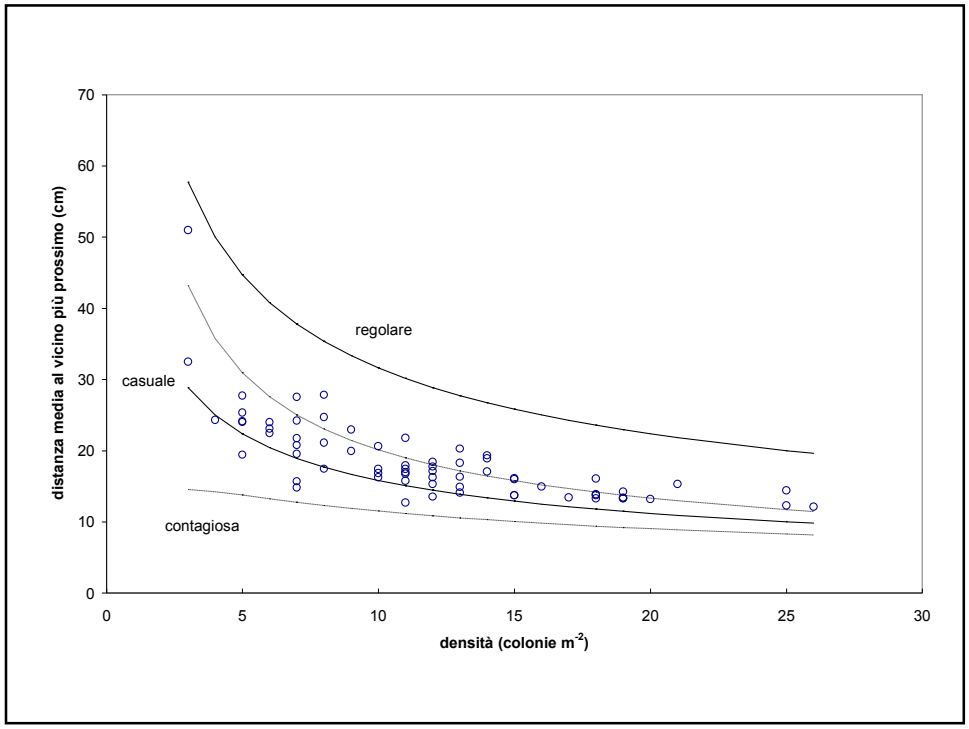
$$s_{\bar{\delta}} = \sqrt{\sigma^2_{\bar{\delta}}} = \frac{0.26136}{\sqrt{A/n^2}}$$

$$Z = \frac{\bar{d} - \bar{\delta}}{s_{\bar{\delta}}}$$

L'area studiata è finita (perimetro=p)

$$\delta \approx \frac{1}{2}\sqrt{\frac{A}{n}} + \left(0.0514 + \frac{0.0412}{\sqrt{n}}\right)\frac{p}{n}$$

$$s^2_{\bar{\delta}} \approx 0.070\frac{A}{n^2} + 0.037 p\sqrt{\frac{A}{n^5}}$$


distanza media al vicino più prossimo (cm)
densità (colonie m-2)
regolare
casuale
contagiosa
0
10
20
30
40
50
60
70
0
5
10
15
20
25
30