

ACADEMIE DE MONTPELLIER  
UNIVERSITE MONTPELLIER II  
— SCIENCES ET TECHNIQUES DU LANGUEDOC —

## THESE

présentée à l'université de Montpellier II Sciences et Techniques du Languedoc  
pour obtenir le diplôme de DOCTORAT

SPECIALITE: Mathématiques Fondamentales et Appliquées  
Formation Doctorale : Biostatistique

ESTIMATION DE L'INTENSITE LOCALE D'UN PROCESSUS  
PONCTUEL DE COX: APPLICATION A L'ANALYSE SPATIALE  
D'UN INVENTAIRE FORESTIER

par

Hélène DESSARD

### Volume 2 : ANNEXES GRAPHIQUES

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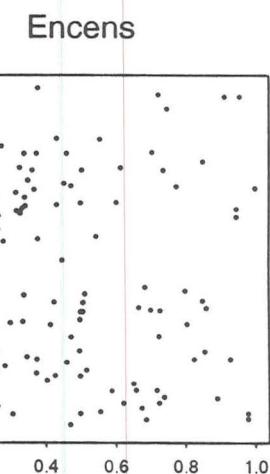
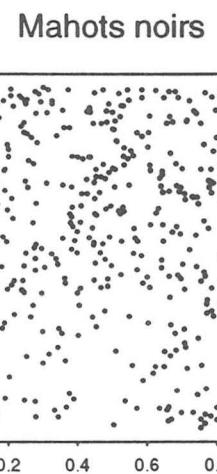
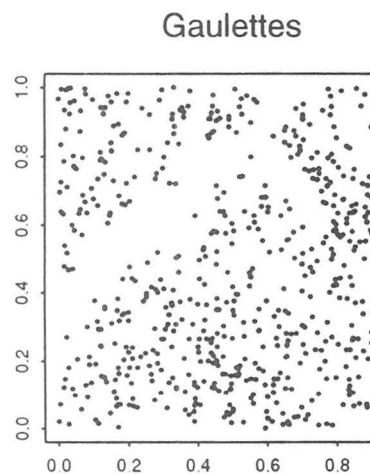
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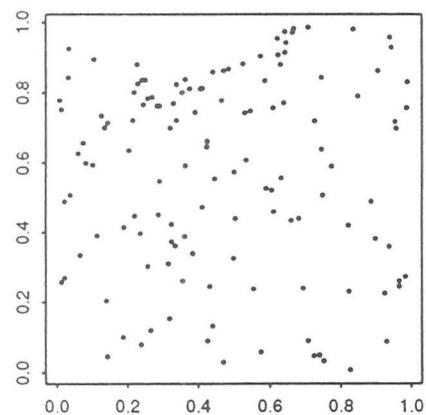
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# 1 Données : répartitions spatiales des espèces étudiées

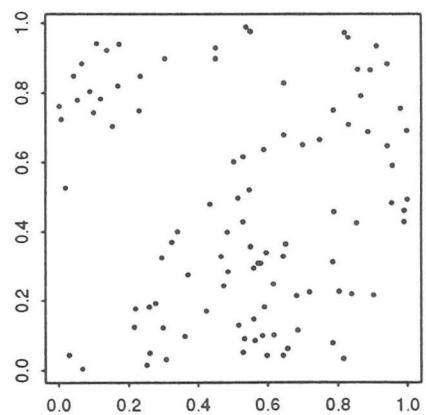
Parcelle 1



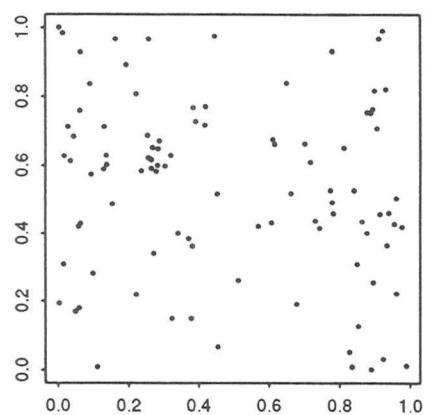
Tosso Passa



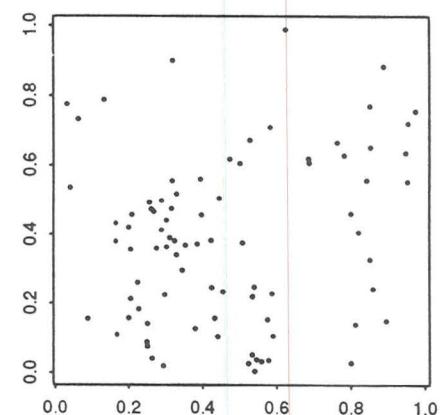
Boco



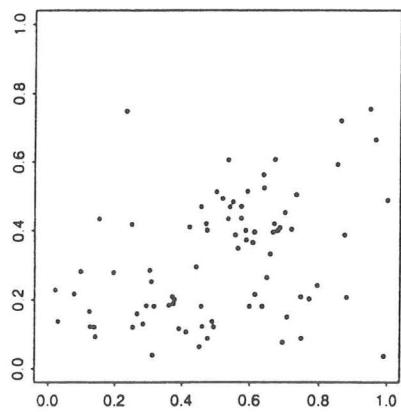
Manil Marecage



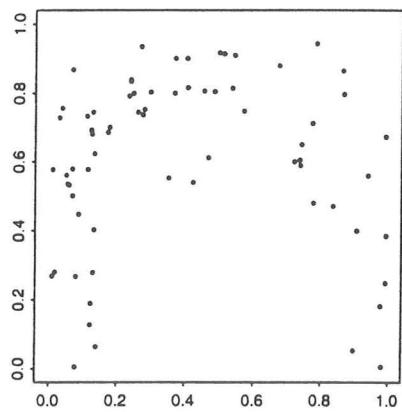
Gonfolo Rose



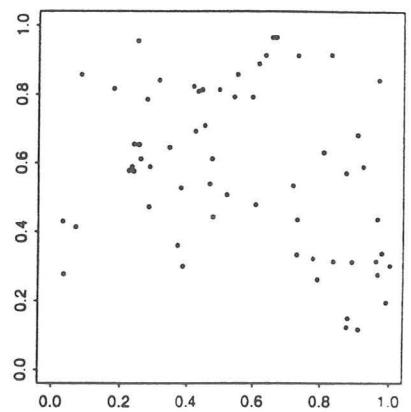
Wacapou



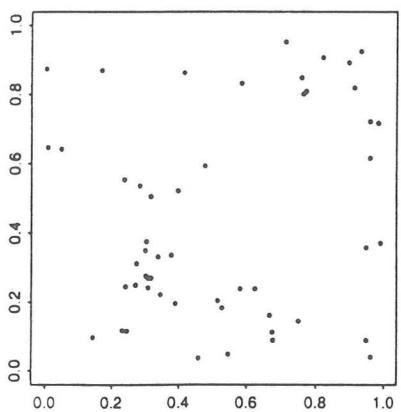
Mahot Rouge



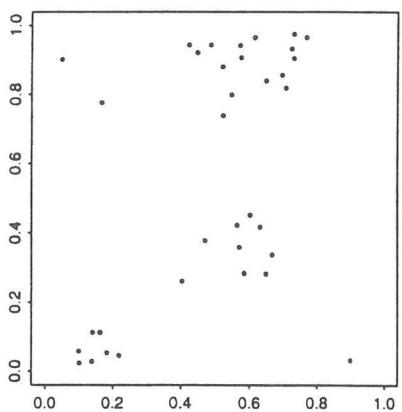
Carapa



Cedres



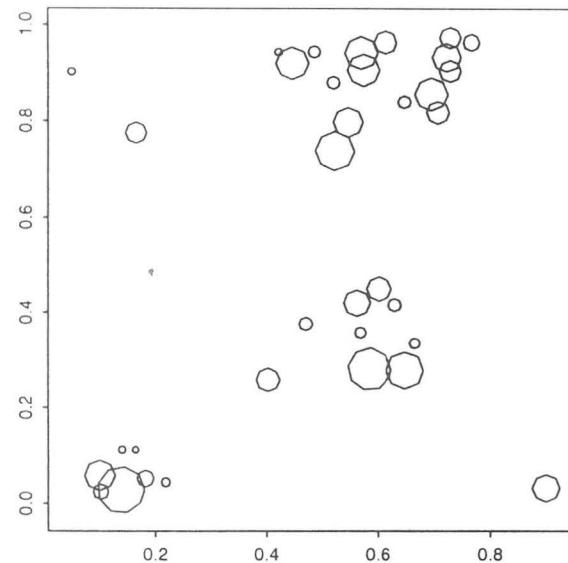
Angelique



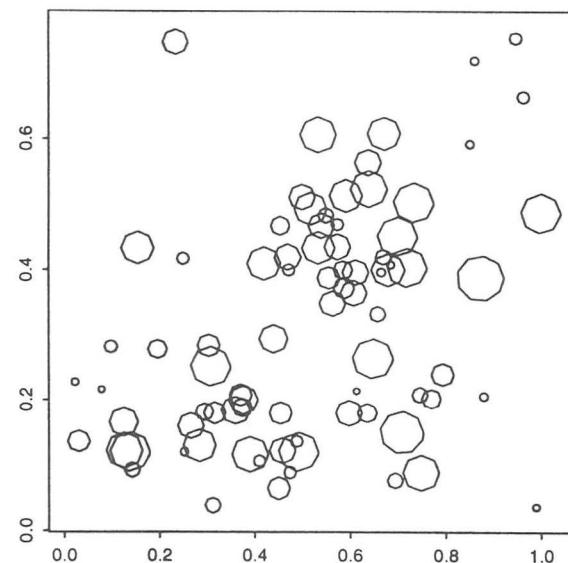
# Représentation spatialisée des circonférences

*Les cercles sont proportionnels à la taille des circonférences.*

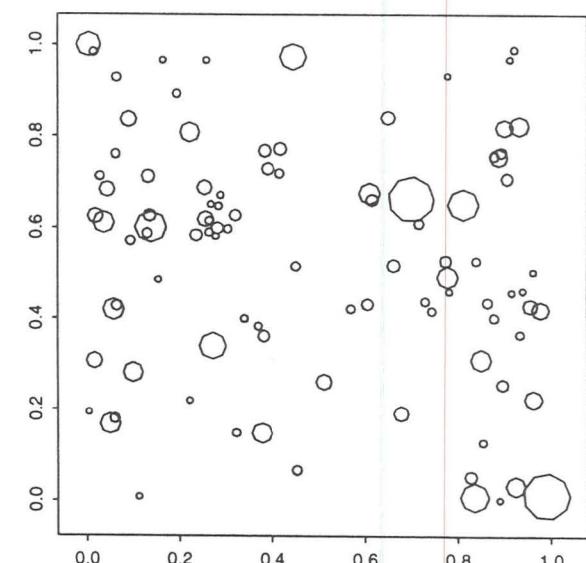
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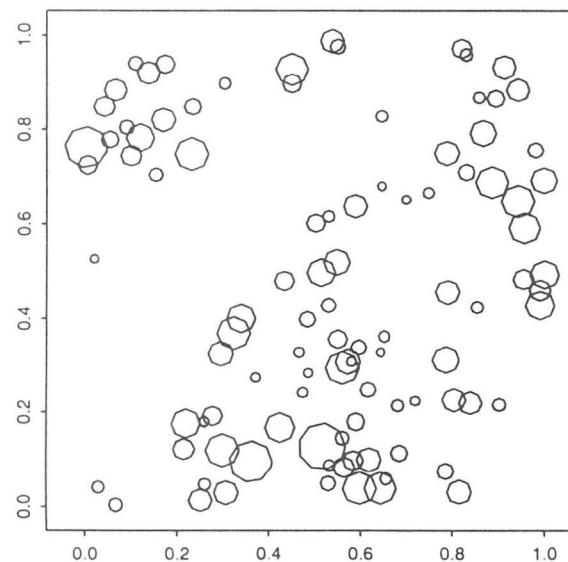
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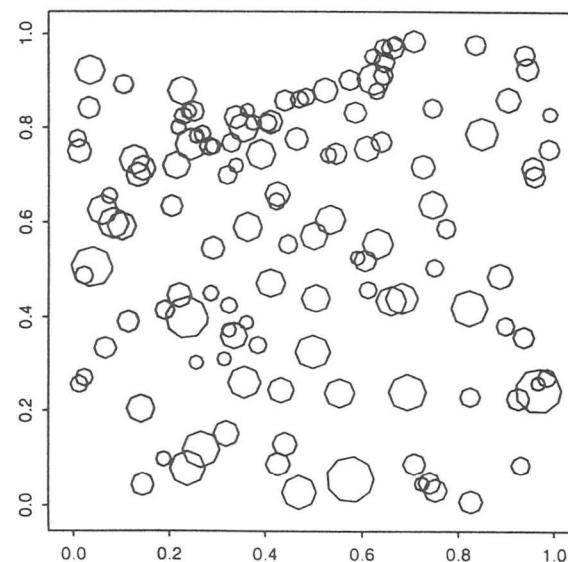
Manil marecage



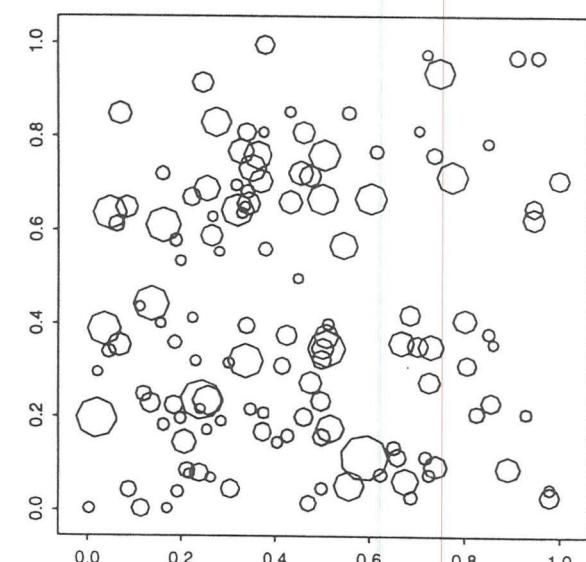
Boco



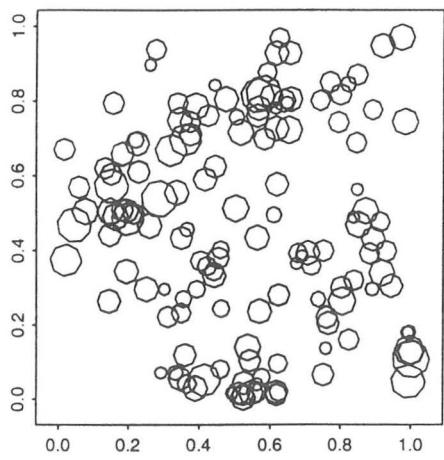
Tosso passa



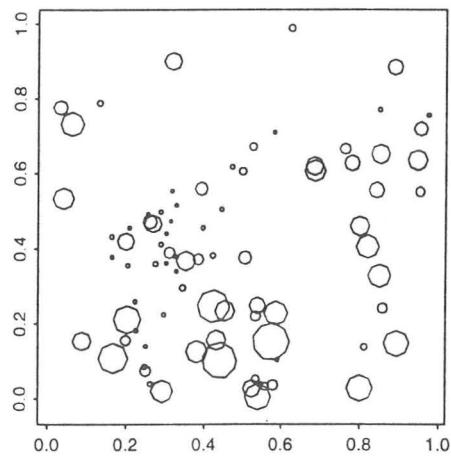
Encens



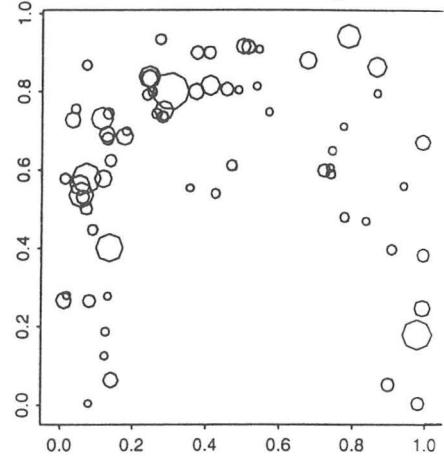
Palmiers



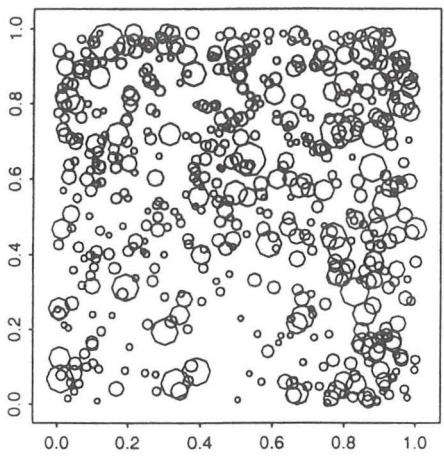
Gonfolo Rose



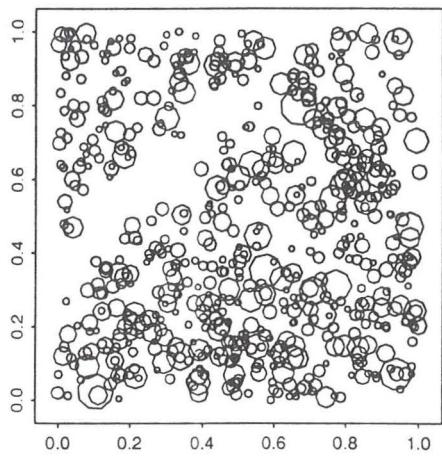
Mahot Rouge



Mahot Noir



Galette



## 2 Les QQ-plot des distances d'ordre k

### Légende

En titre des graphiques : ordre k (la distance est définie par le kième plus proche voisin)

En abscisse : quantiles “théoriques” obtenus à partir de 200 simulations de la répartition au hasard  $H_0$

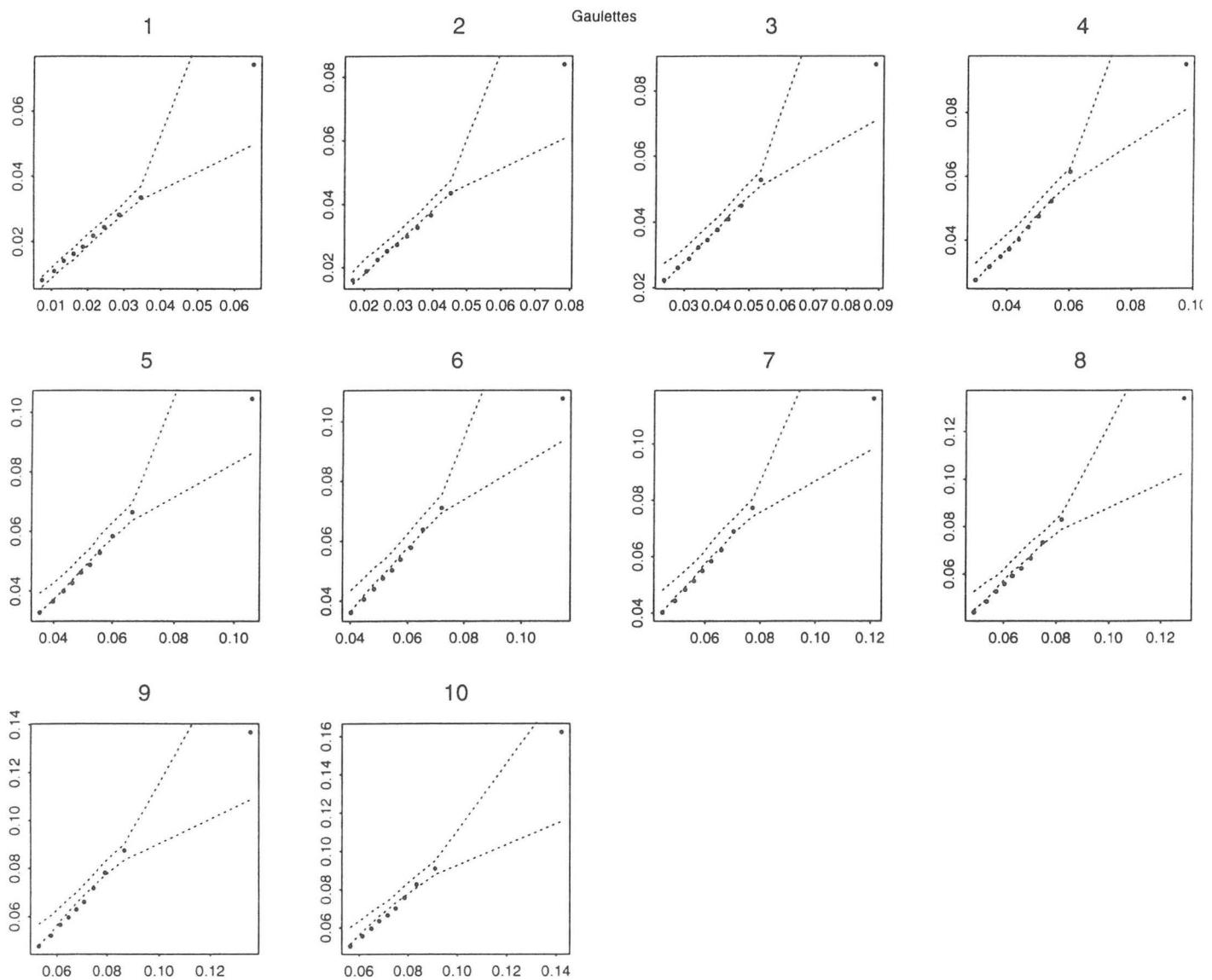
En ordonnée : quantiles “empiriques” calculés pour la répartition observée.

... : enveloppes de confiance à 95%.

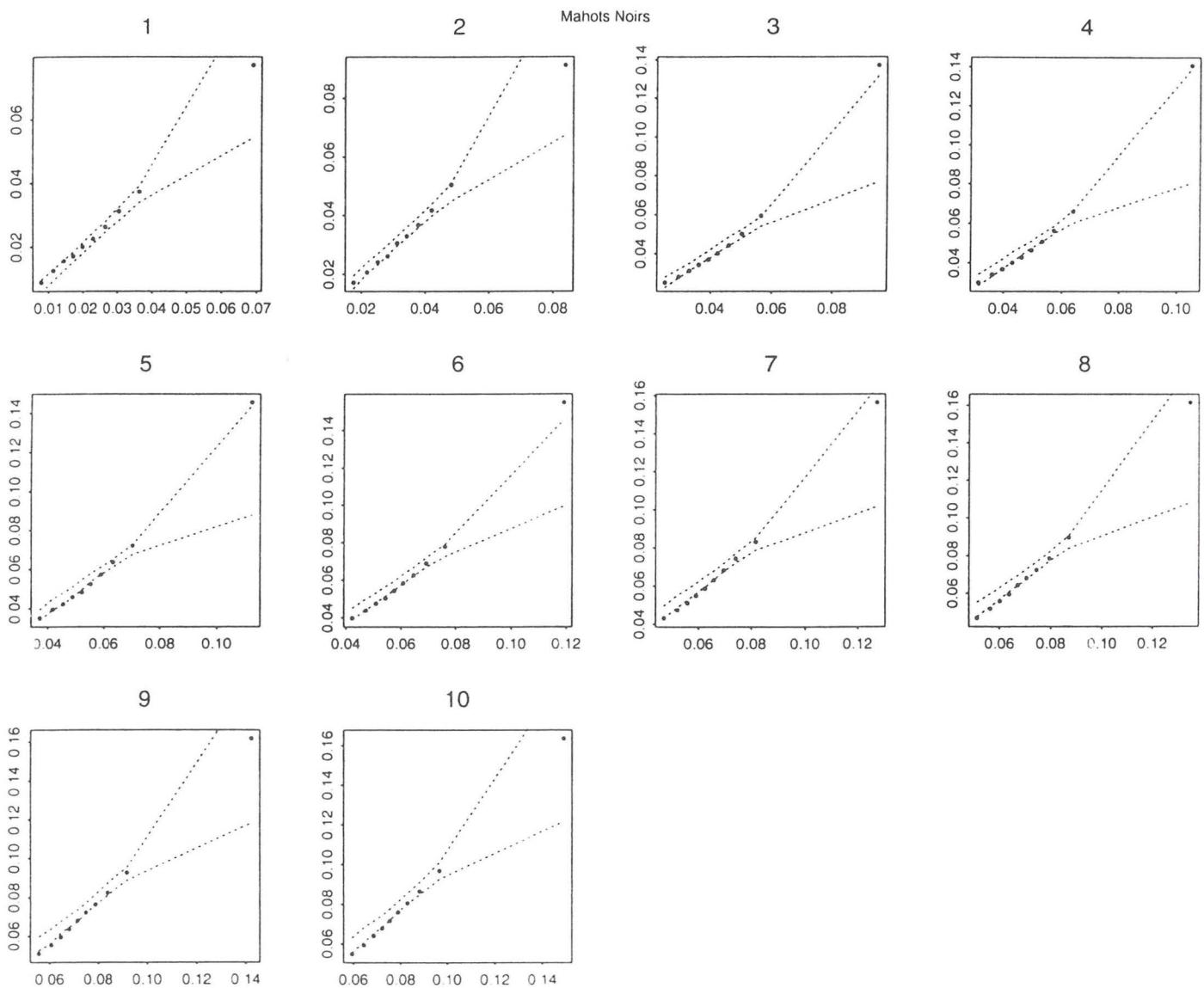
●● : quantiles “empiriques”.

(se référer au texte pp 40-49)

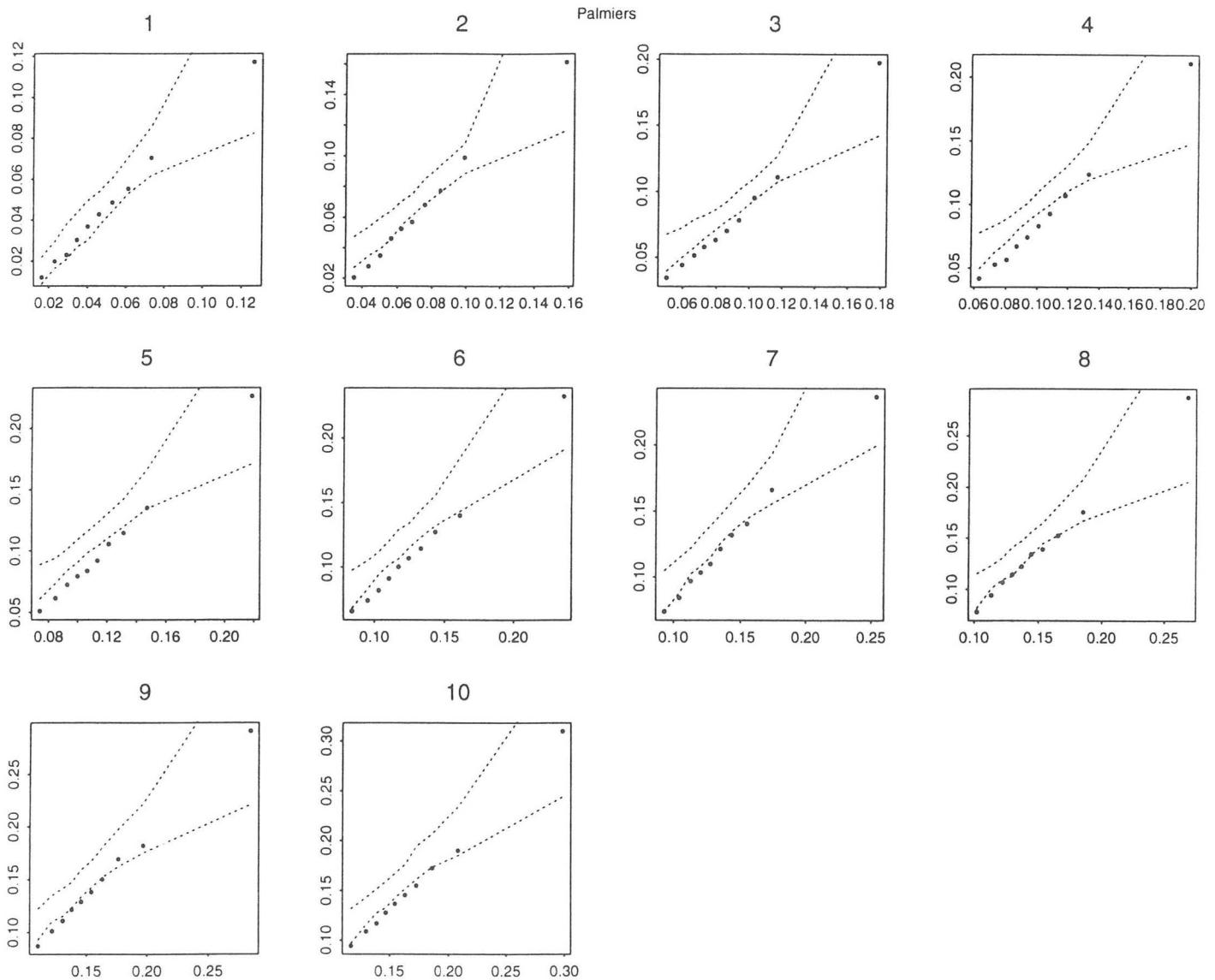
## QQ-plot des distances d'ordre k



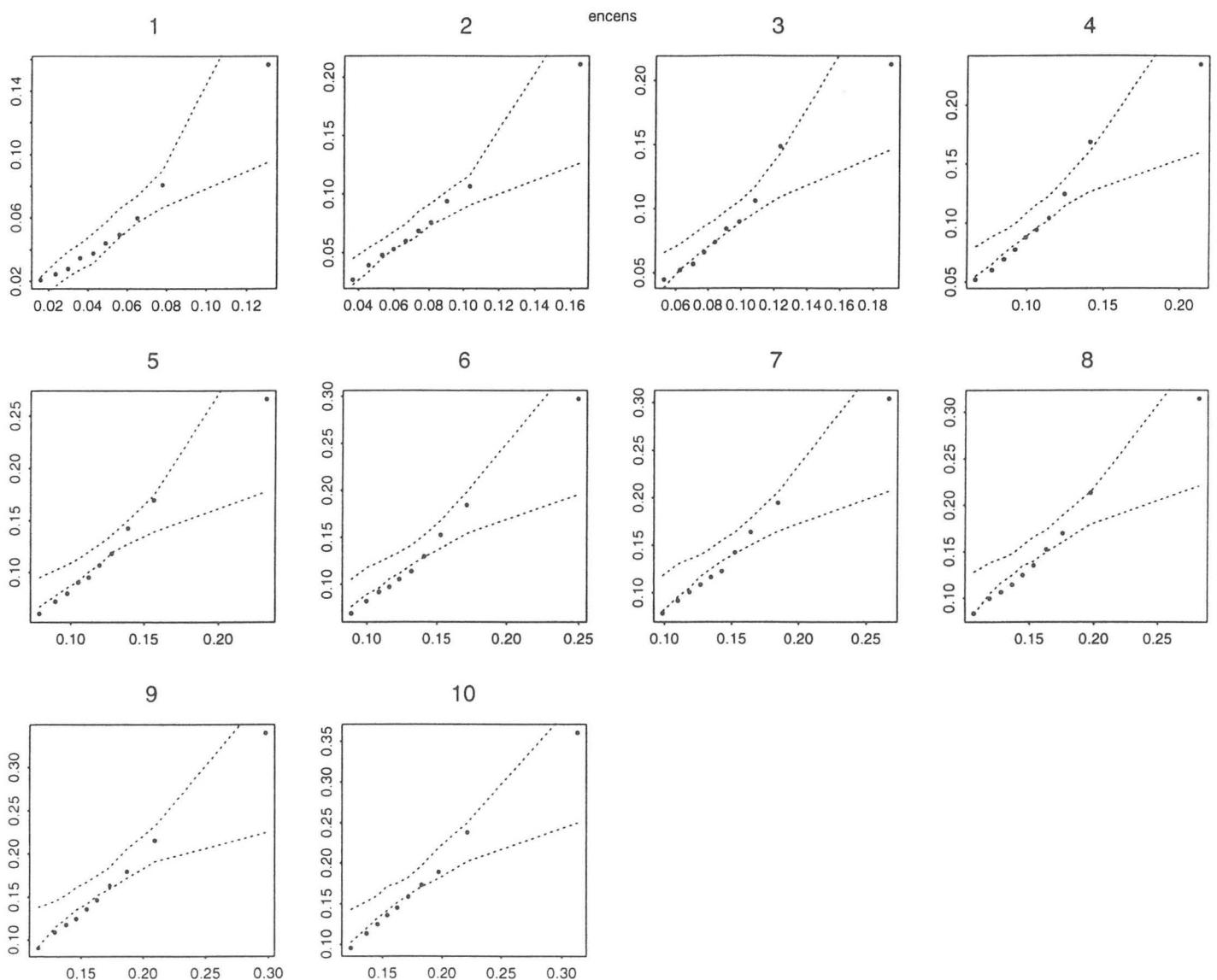
## QQ-plot des distances d'ordre k



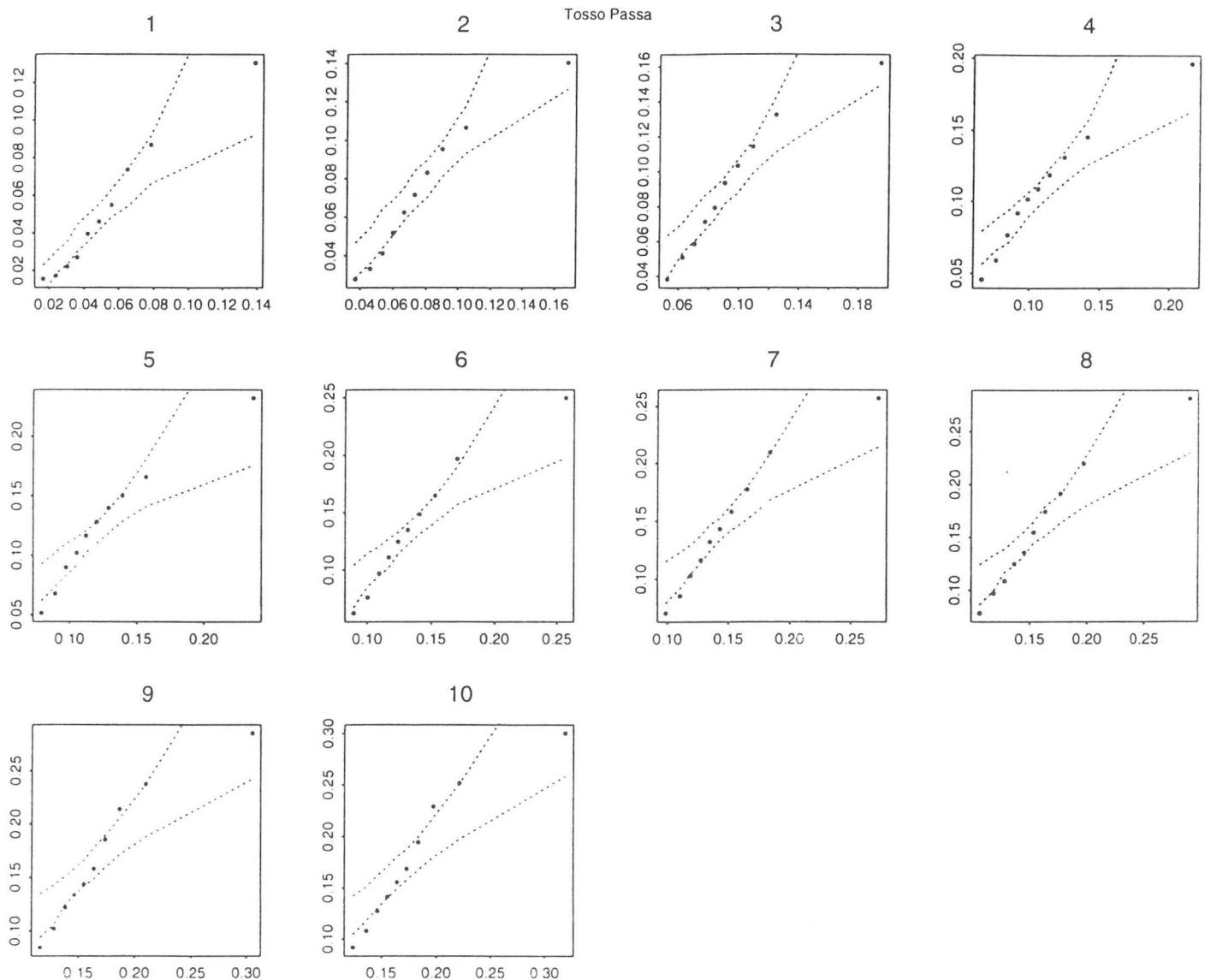
## QQ-plot des distances d'ordre k



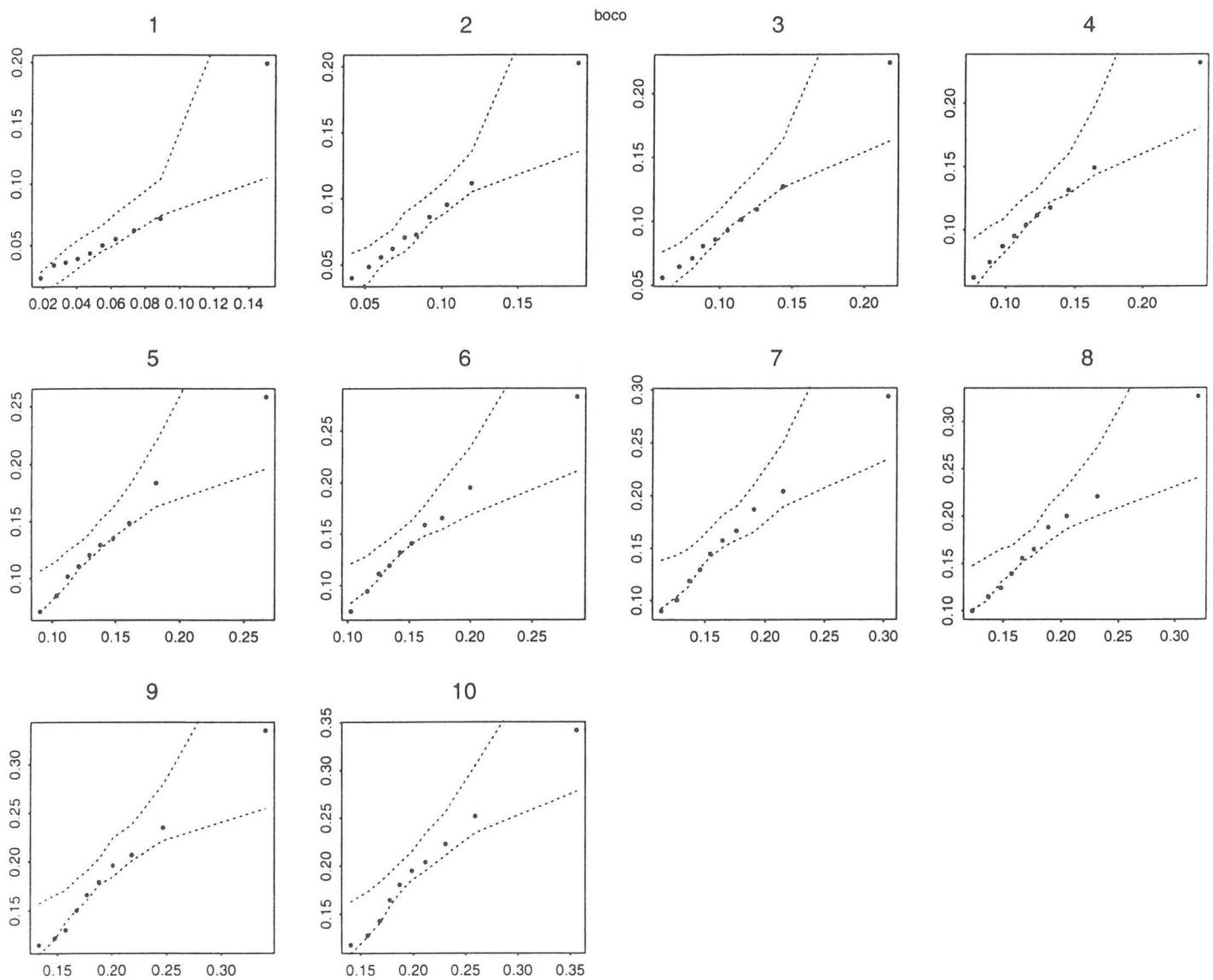
## QQ-plot des distances d'ordre k



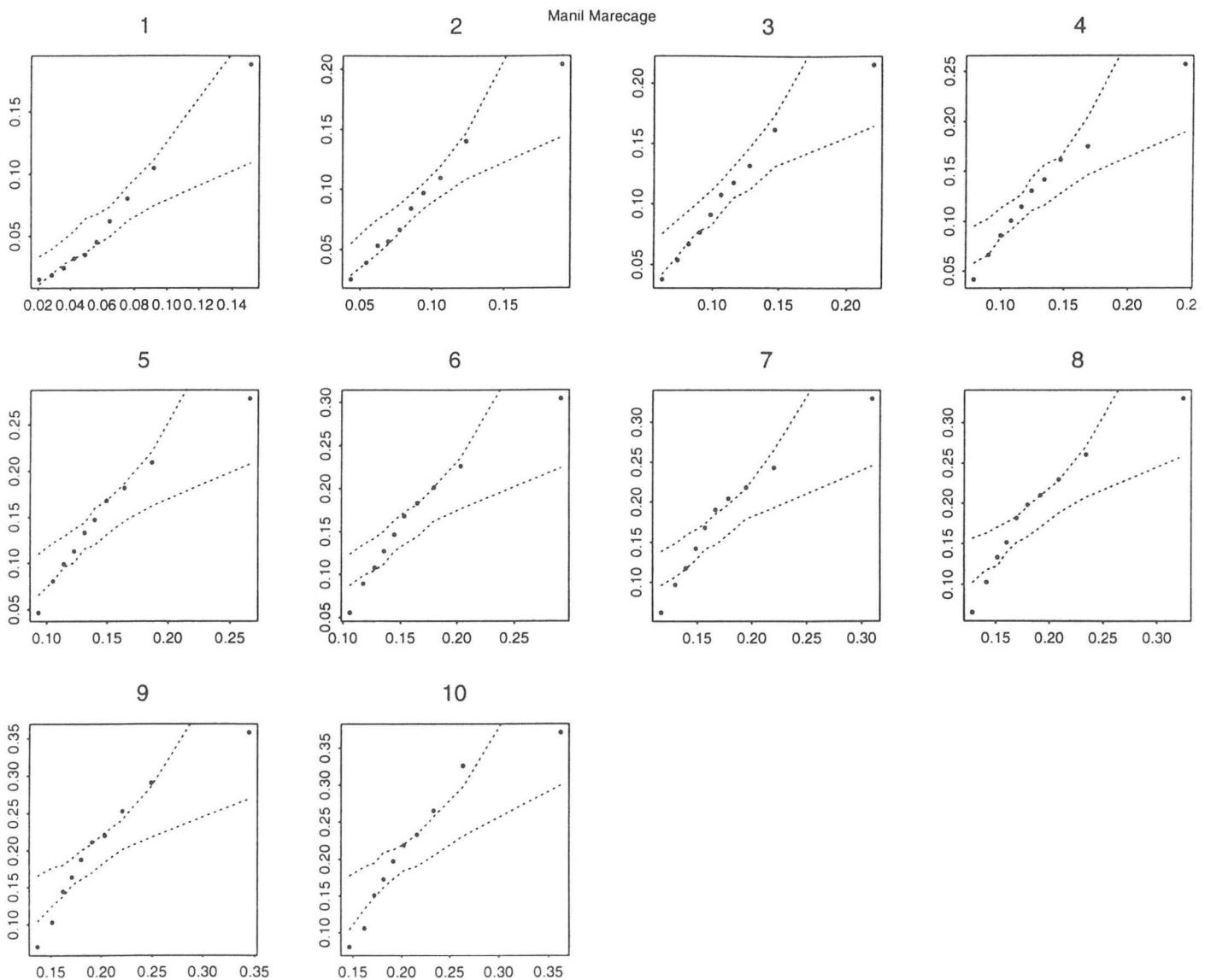
## QQ-plot des distances d'ordre k



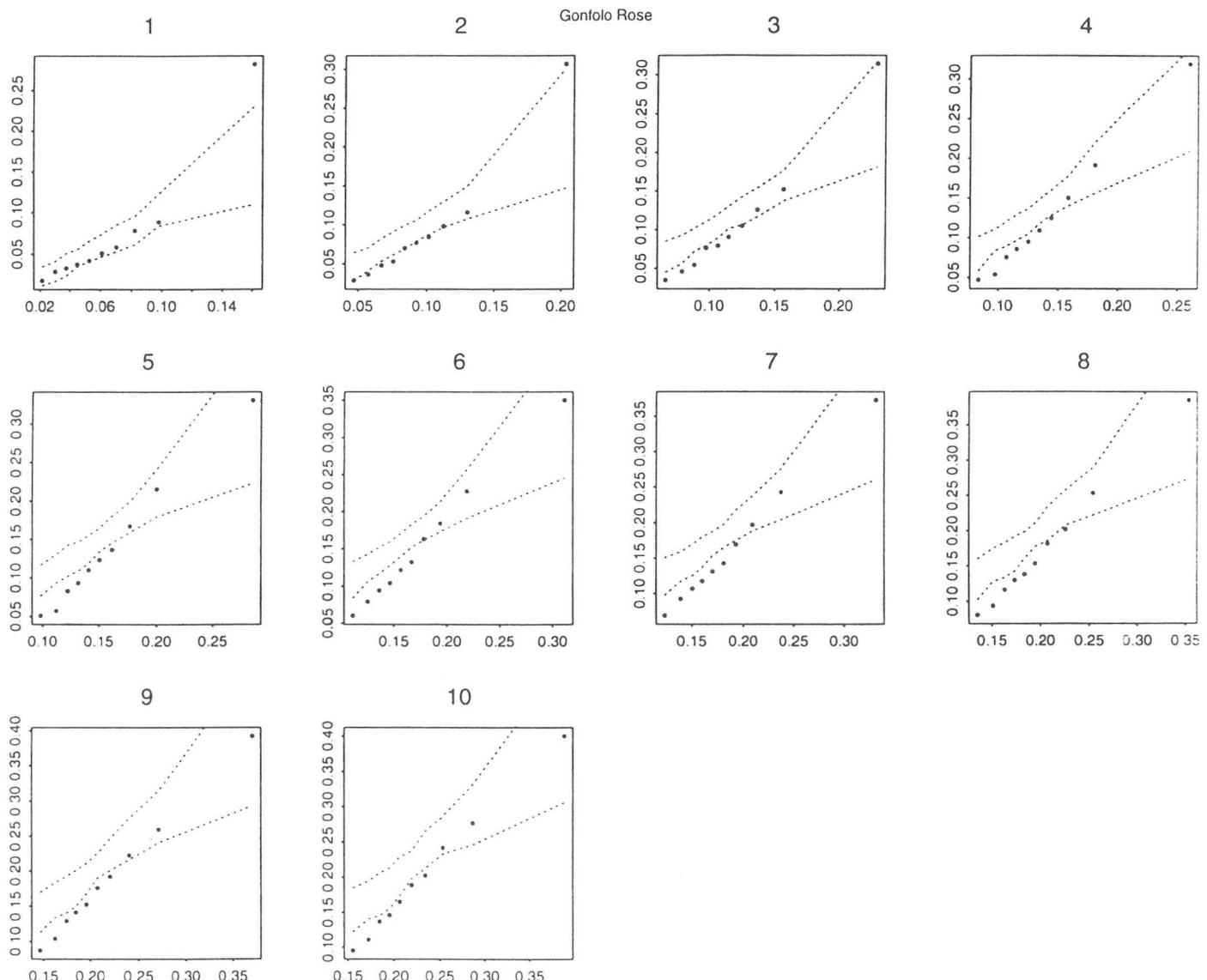
## QQ-plot des distances d'ordre k



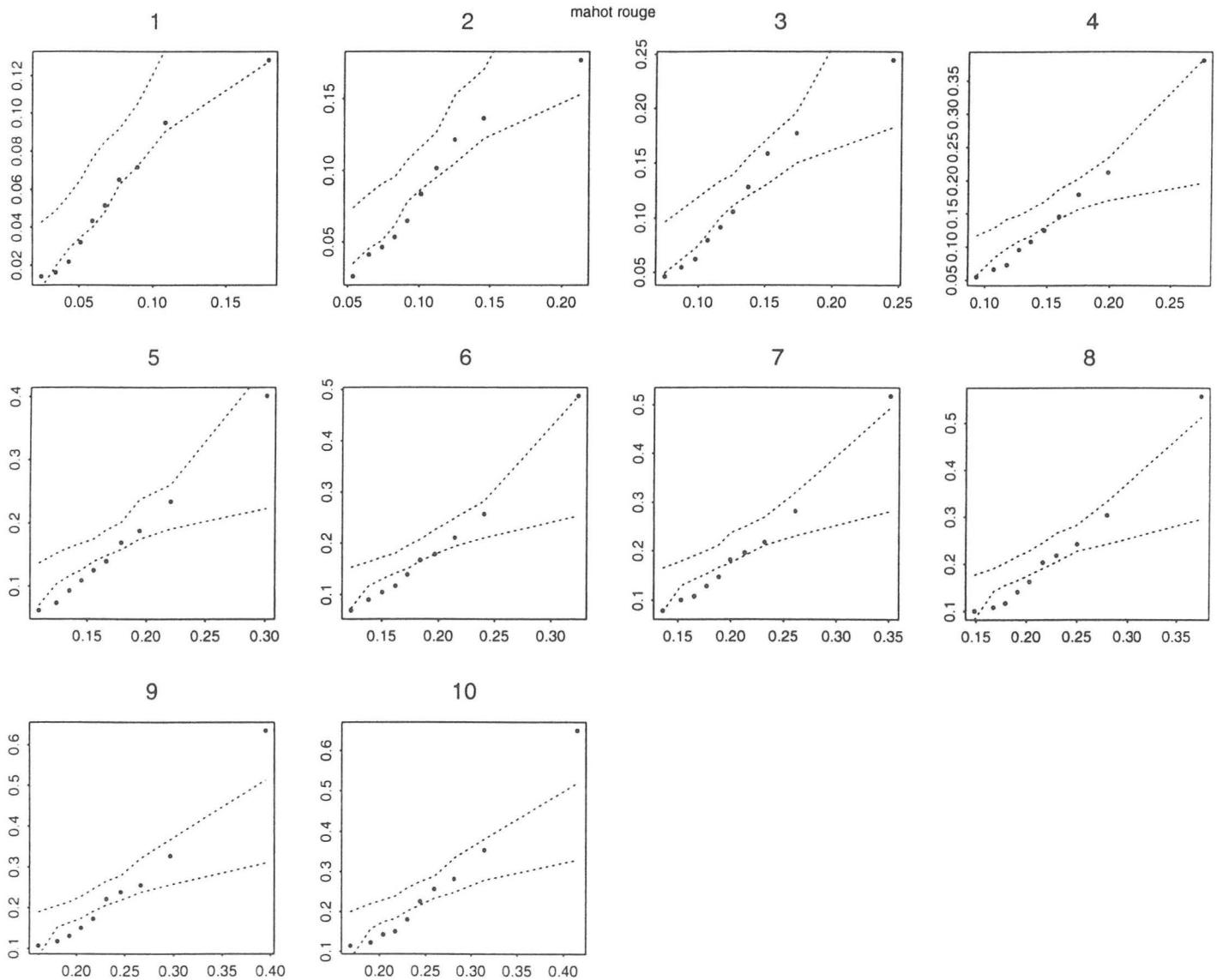
## QQ-plot des distances d'ordre k



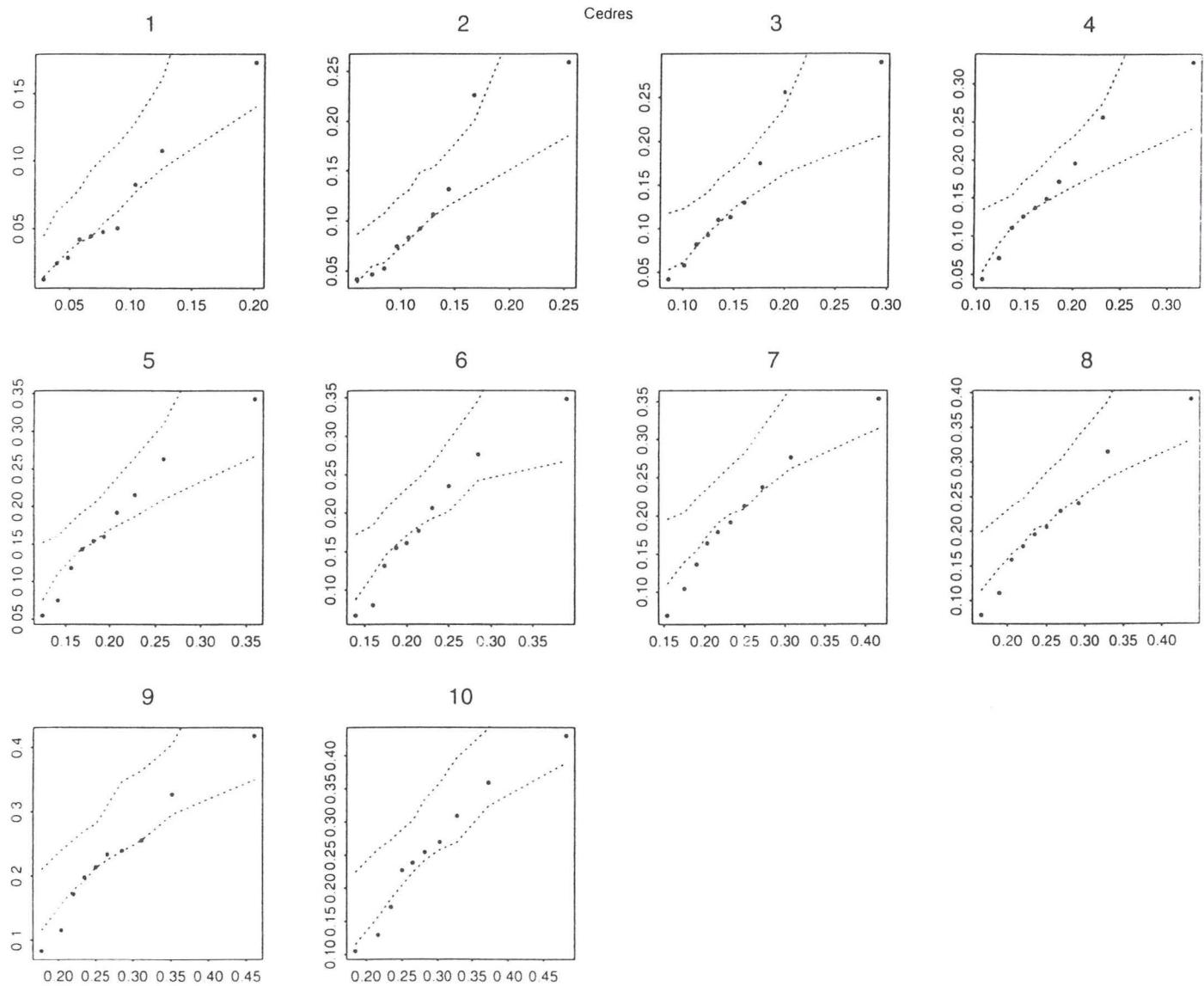
## QQ-plot des distances d'ordre k



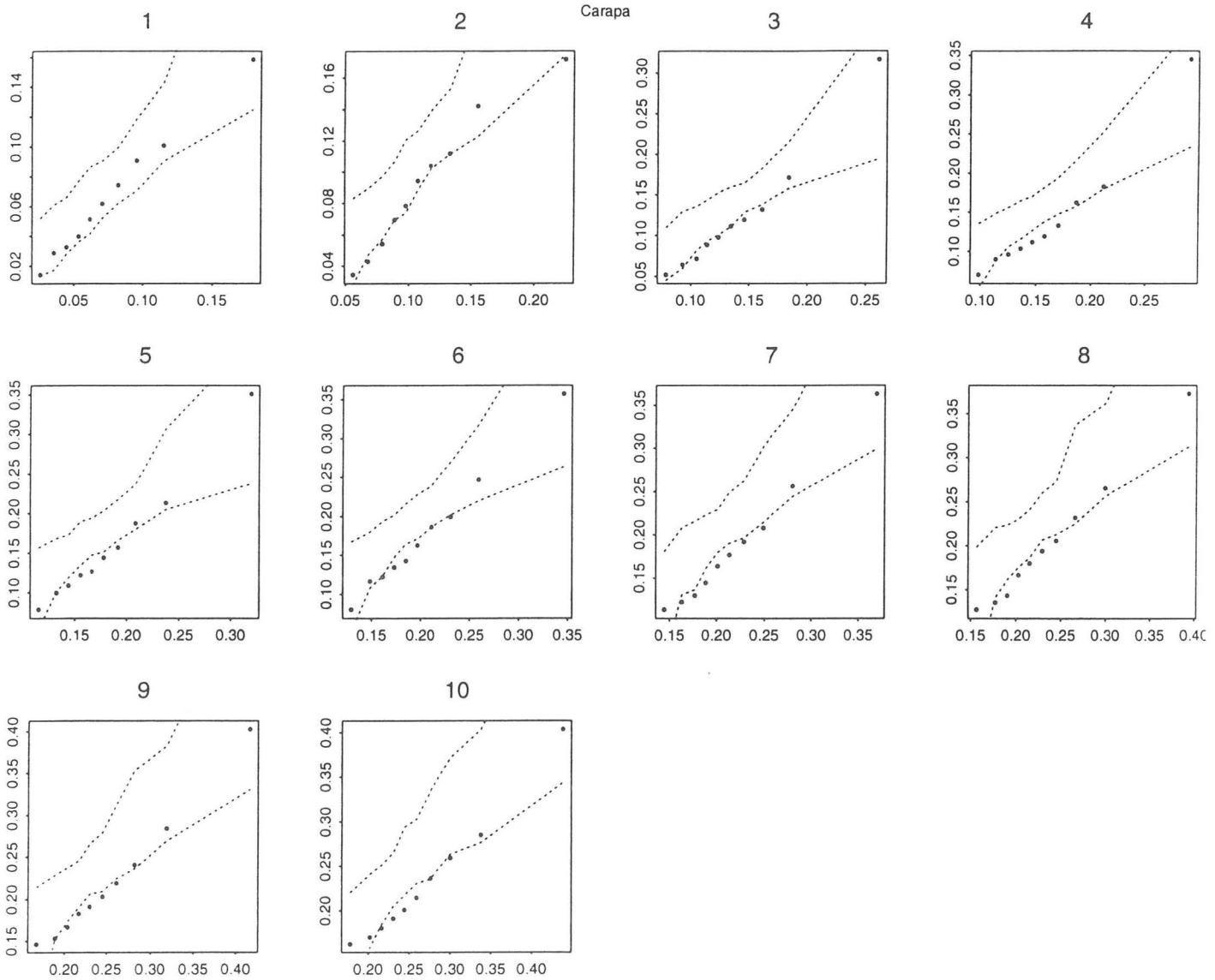
## QQ-plot des distances d'ordre k



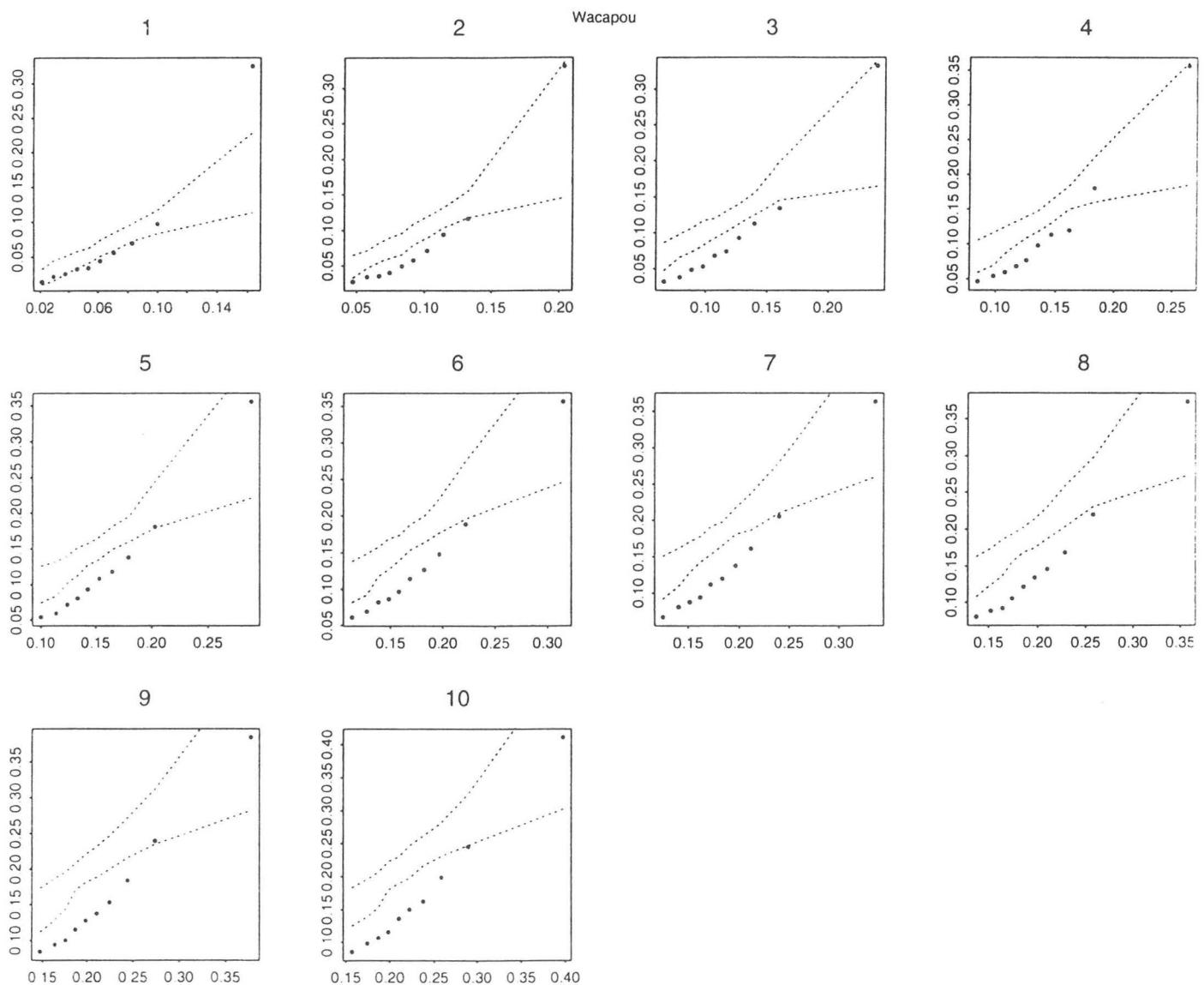
## QQ-plot des distances d'ordre k



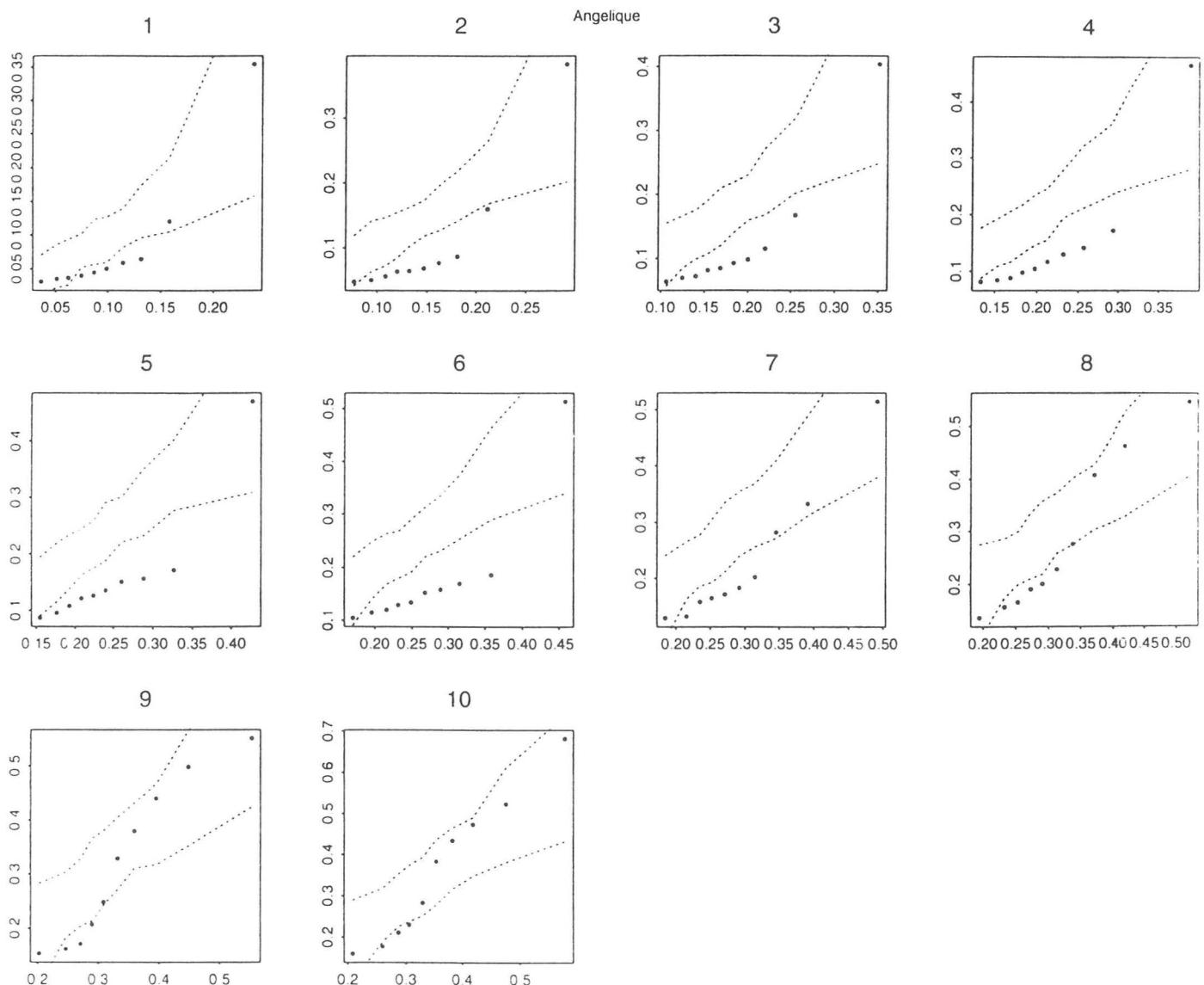
## QQ-plot des distances d'ordre k



## QQ-plot des distances d'ordre k



## QQ-plot des distances d'ordre k



### 3 Tests de Greig-Smith

#### Légende :

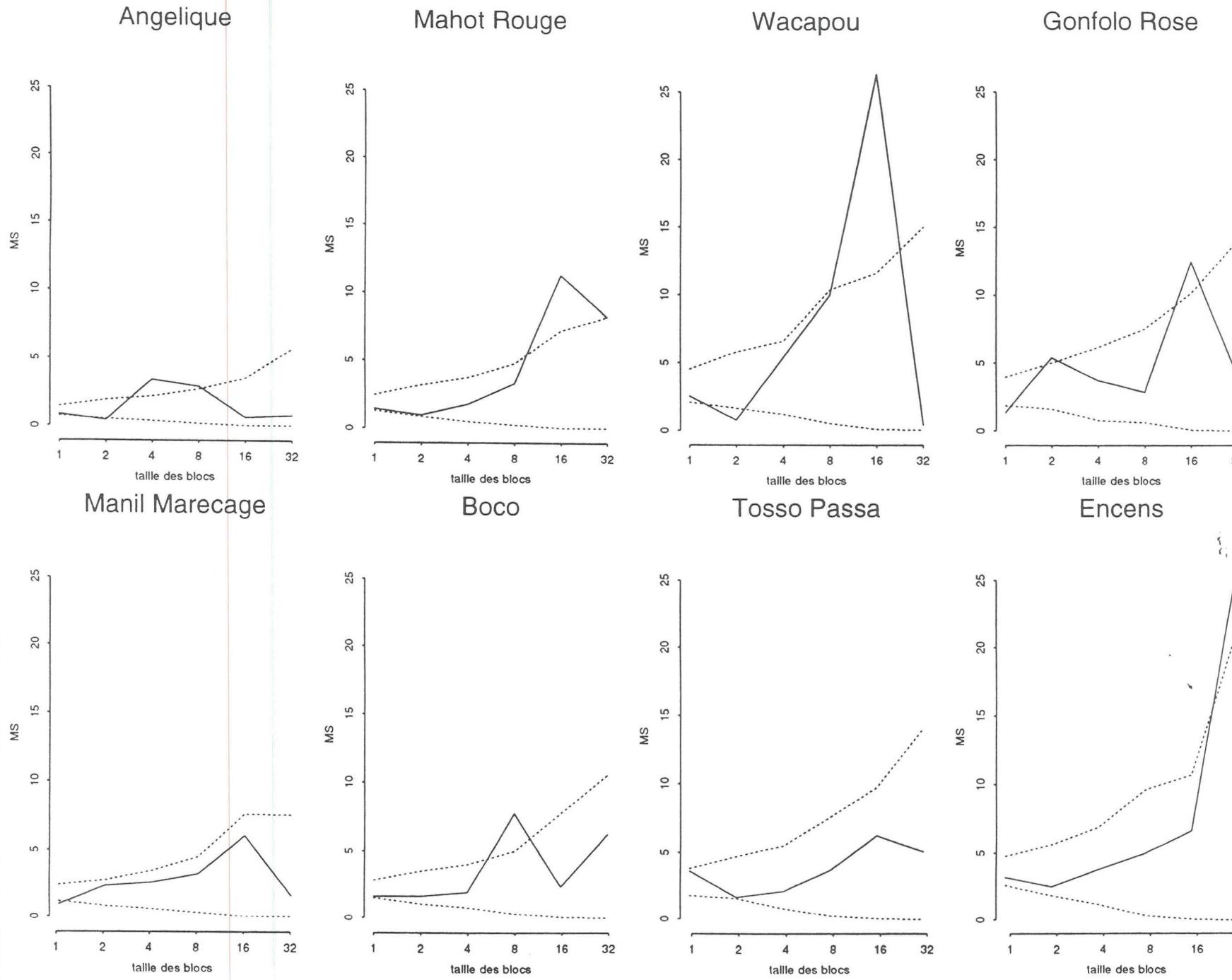
En abscisse : taille  $r$  des blocs de quadrats

En ordonnée :  $MS_r$  fonction de  $r$  (noté  $MS_r$  dans le texte) est la moyenne des différences au carré des sous-blocs de taille  $r$  sur l'ensemble des blocs de taille  $2r$ .

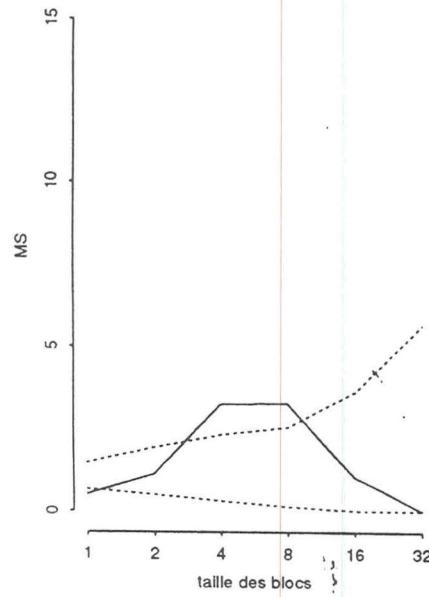
... : enveloppes de confiance à 95% de  $MS_r$  obtenues à partir de 200 randomisations des quadrats élémentaires

- :  $MS_r$  calculées pour les partitions de taille  $r$  observées.

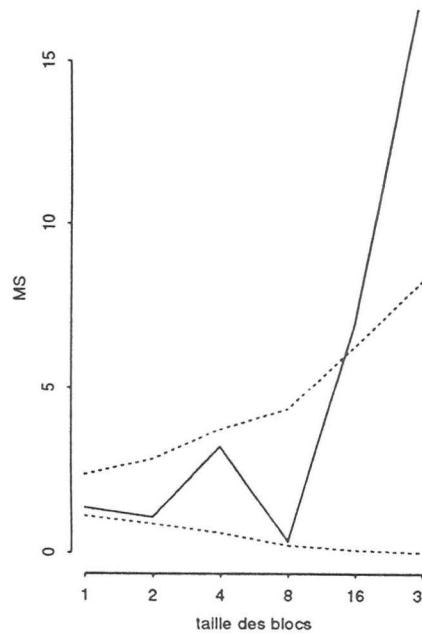
(Se référer au texte pp 49-56)



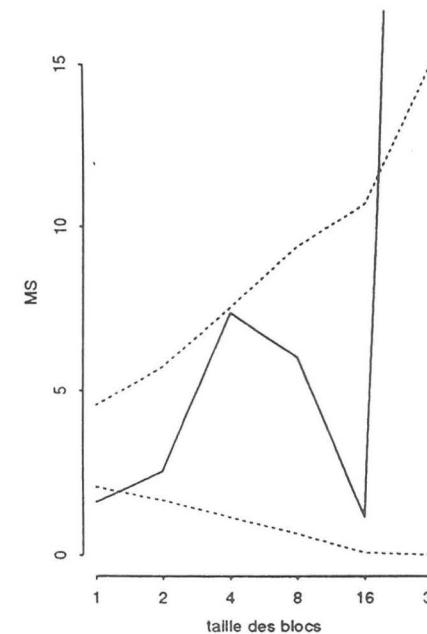
Angelique



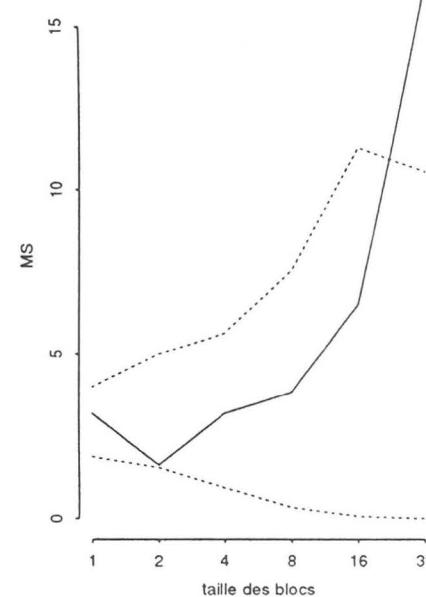
Mahot Rouge



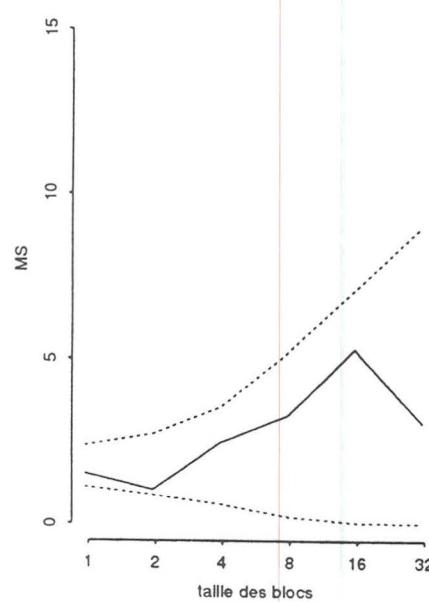
Wacapou



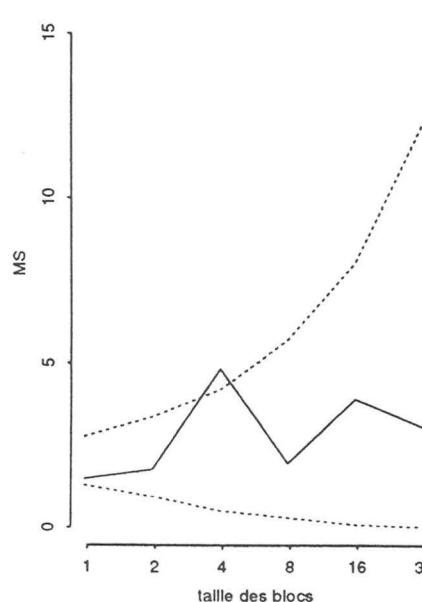
Gonfolo Rose



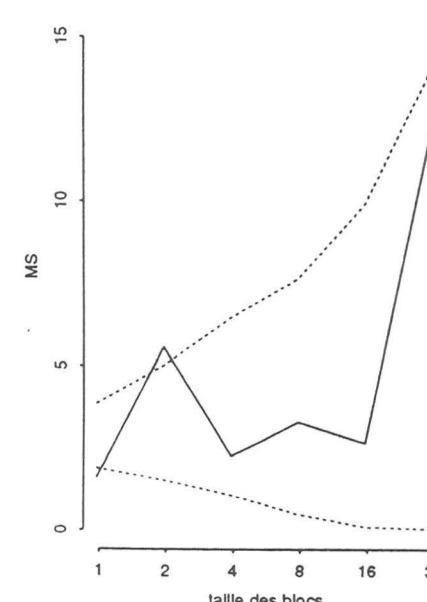
Manil Marecage



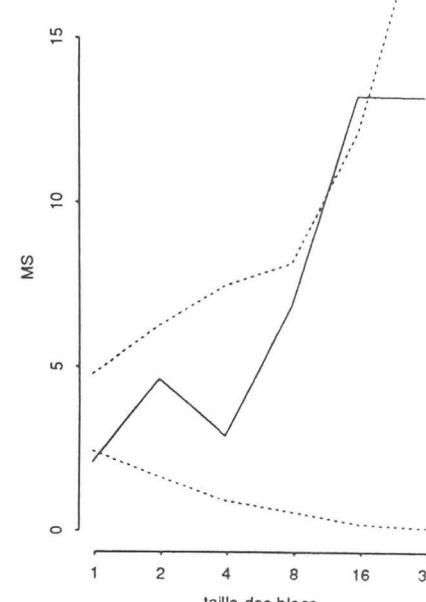
Boco

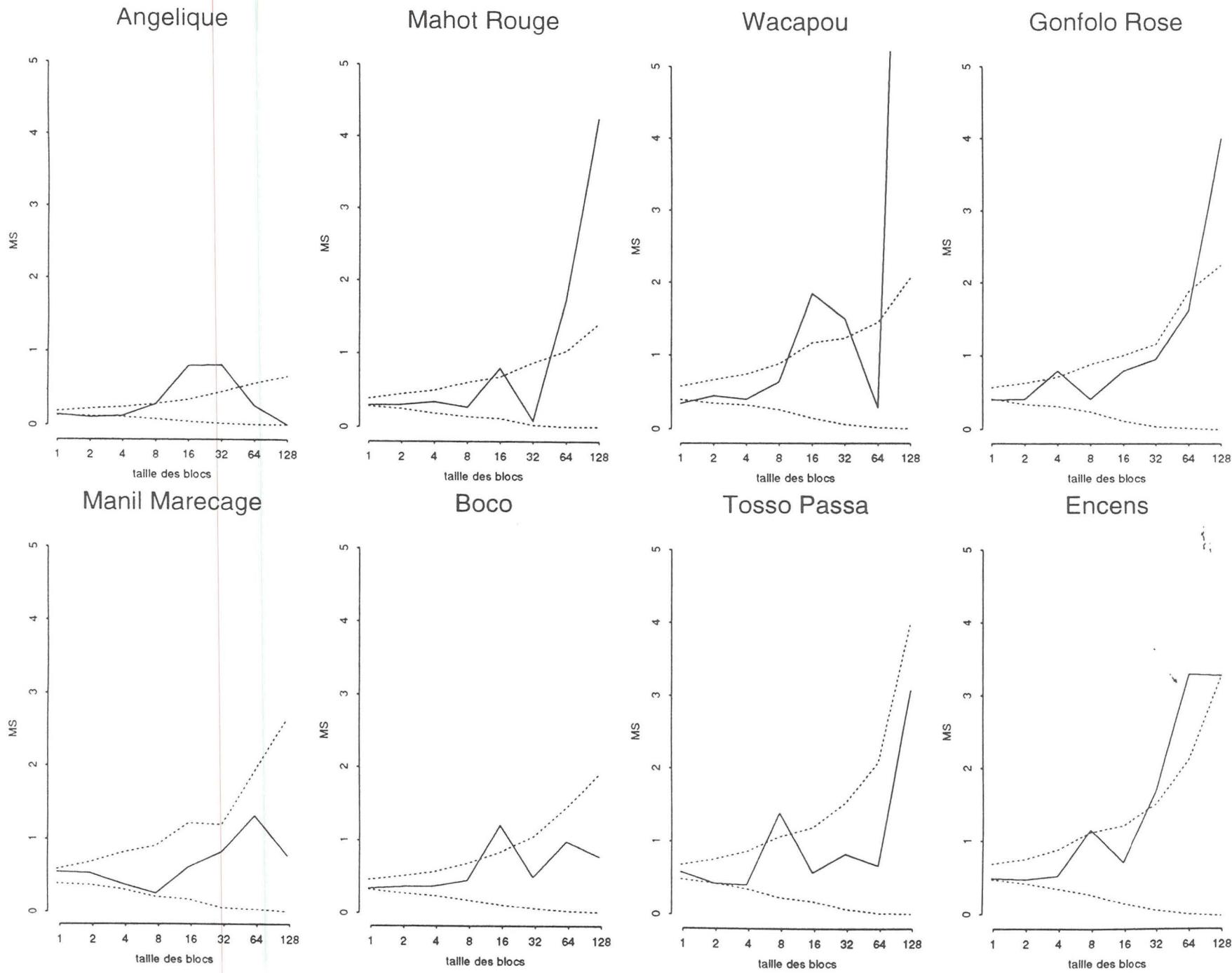


Tosso Passa



Encens





## 4 Processus Ponctuels non-marqués

Distribution au plus proche voisin  $D(r)$  et Fonction de contact  $F(r)$

Légende

En abscisse : Distribution “théorique” obtenue sur la moyenne de 99 simulations de la répartition au hasard  $H_o$ .

En ordonnée : Distribution empirique calculée sur la répartition observée.

... : enveloppes de confiance à 95%

- : Fonction observée

Fonction  $L(r)$  et  $g(r)$

Légende

En abscisse : distance r.

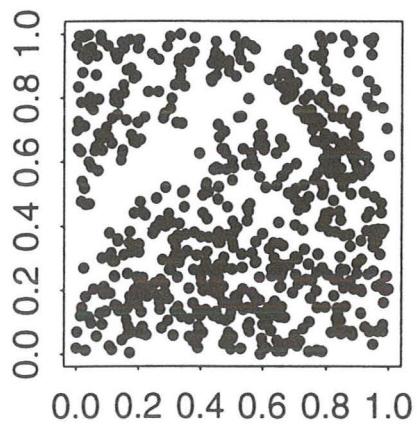
En ordonnée : Fonction  $L(r)$  ou  $g(r)$

... : enveloppes de confiance à 95% de  $L(r)$  obtenues à partir de 99 simulations de la répartition au hasard  $H_o$ .

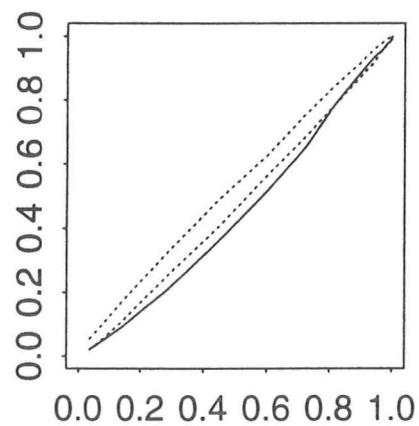
(Se référer au texte pp 70-84)

## Fonctions $D(r)$ et $F(r)$

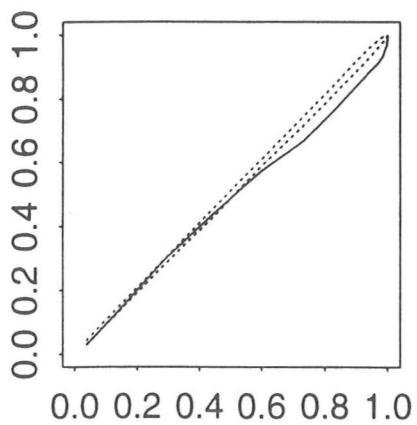
Gaulettes



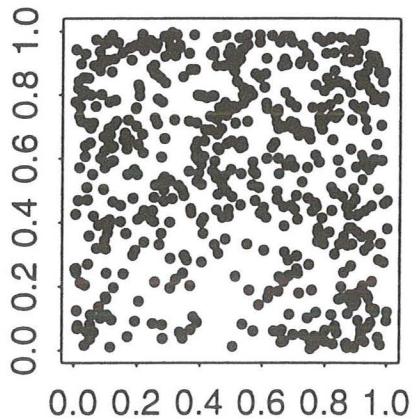
Distribution Distance Plus Proche Voisin



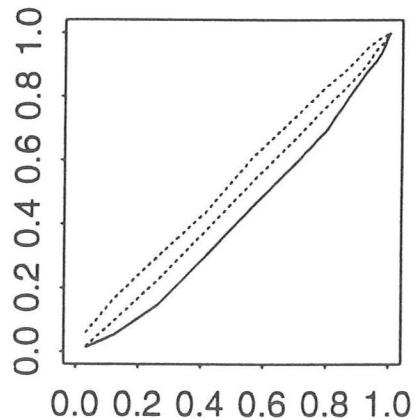
Fonction de Contact



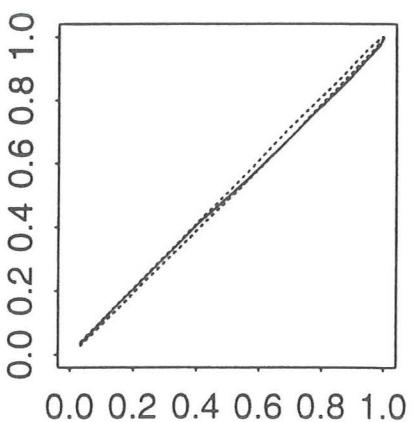
Mahots Noirs



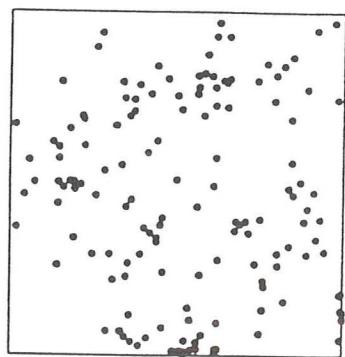
Distribution Distance Plus Proche Voisin



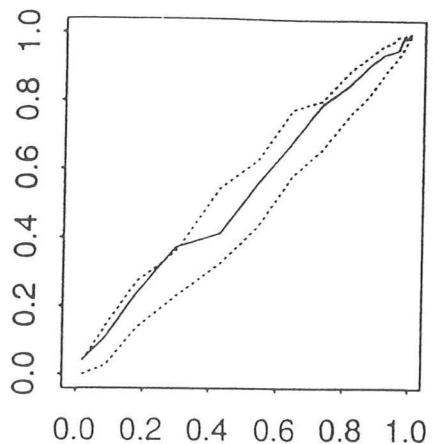
Fonction de Contact



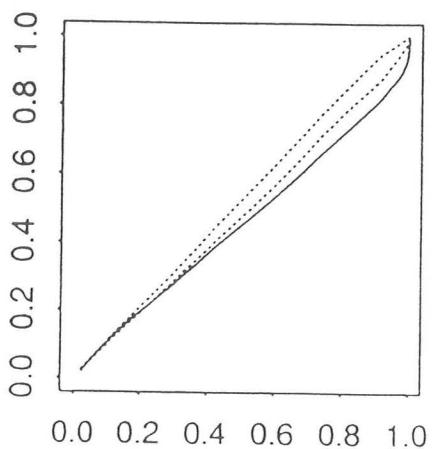
Palmiers



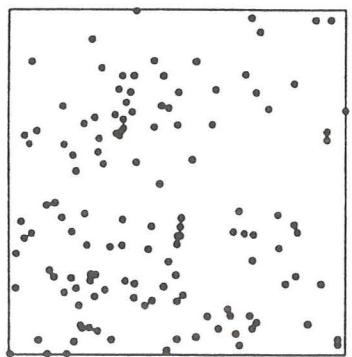
Distribution Distance Plus Proche Voisin



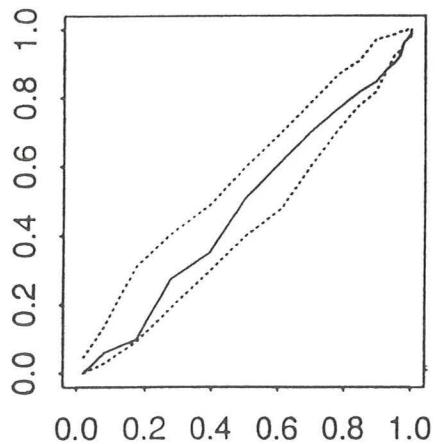
Fonction de Contact



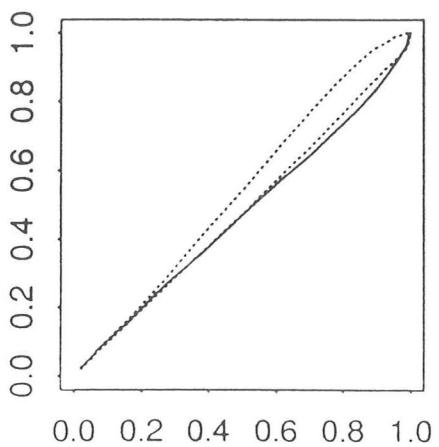
## Encens



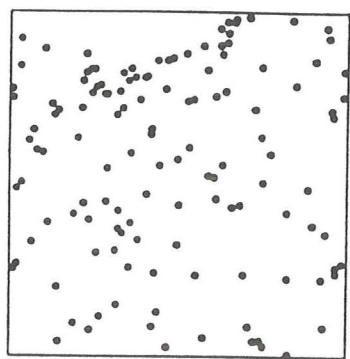
Distribution Distance Plus Proche Voisin



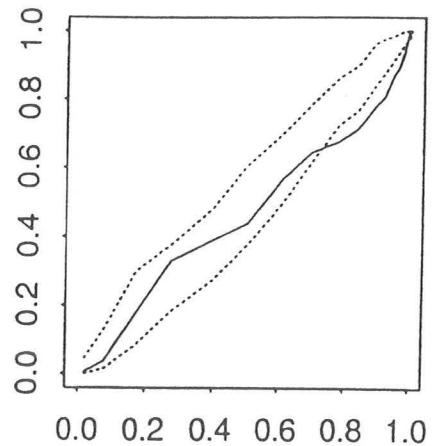
Fonction de Contact



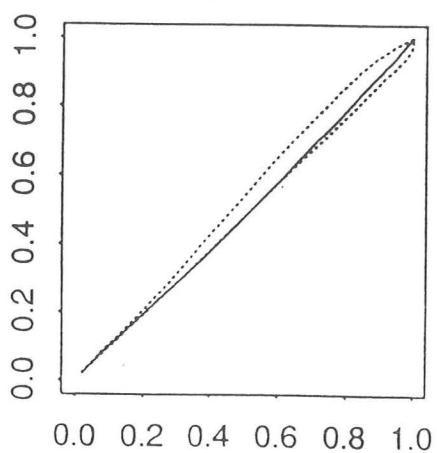
Tosso passa



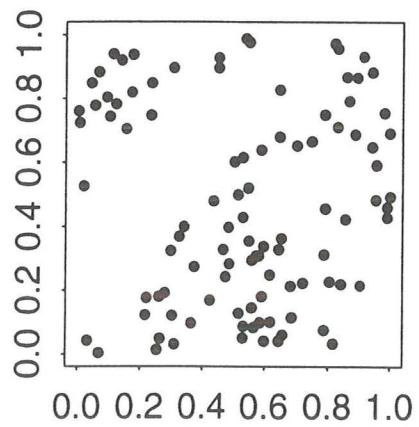
Distribution Distance Plus Proche Voisin



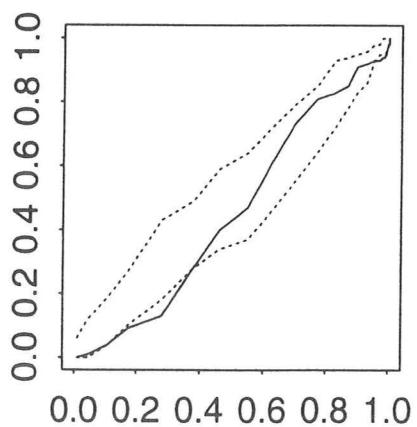
Fonction de Contact



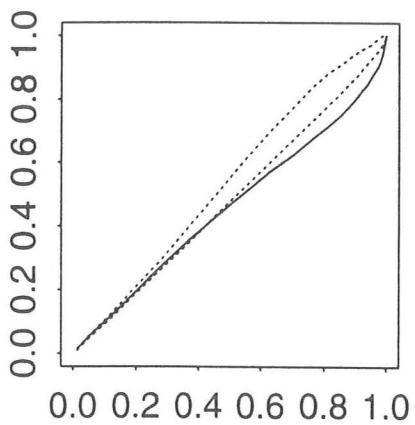
Boco



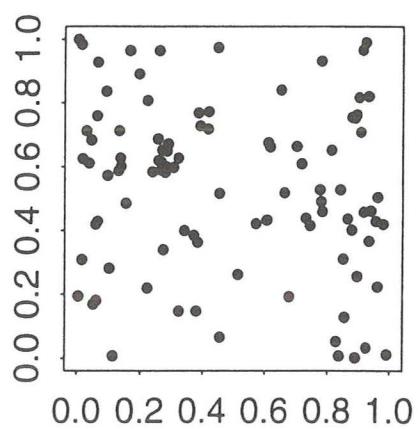
Distribution Distance Plus Proche Voisin



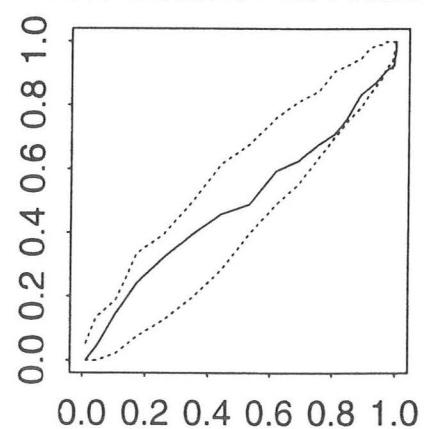
Fonction de Contact



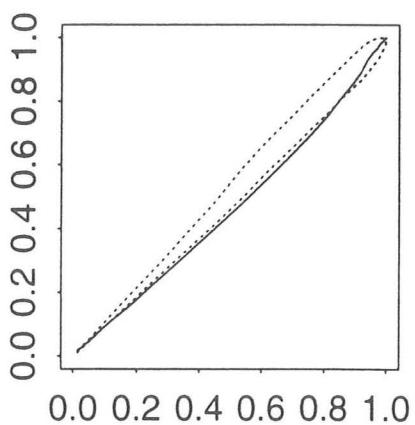
Manil Marecage



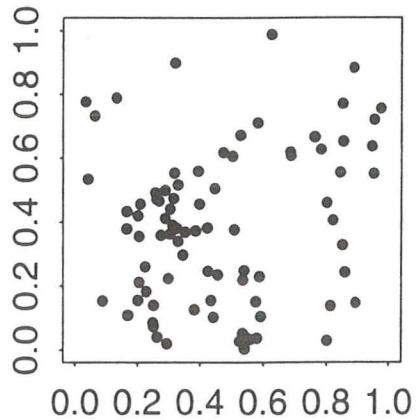
Distribution Distance Plus Proche Voisin



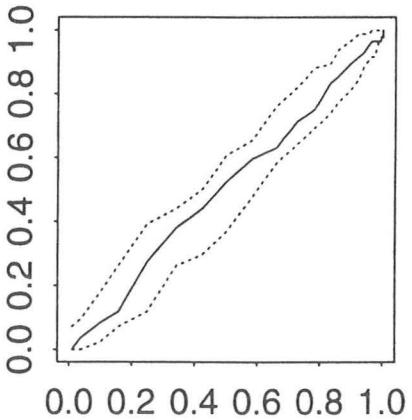
Fonction de Contact



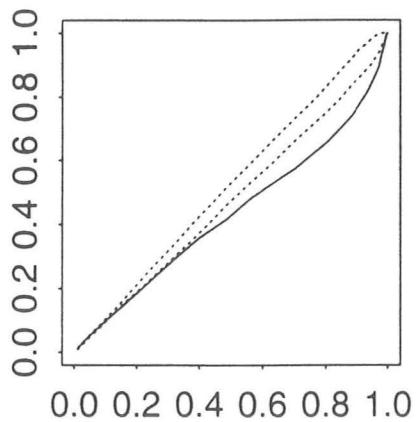
Gonfolo Rose



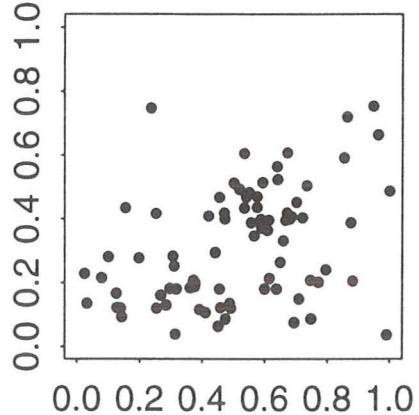
Distribution Distance Plus Proche Voisin



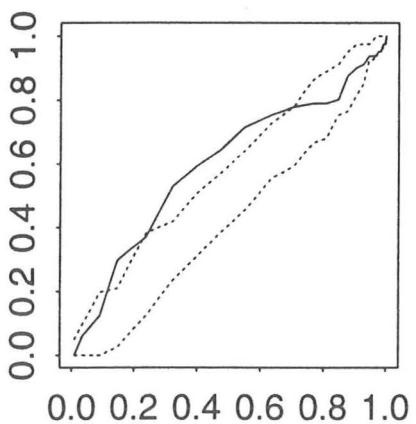
Fonction de Contact



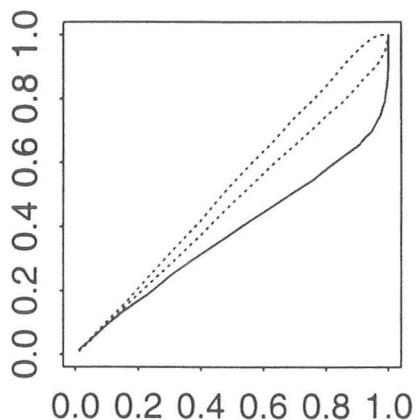
Wacapou



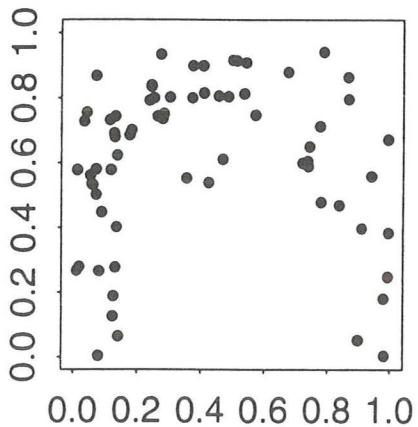
Distribution Distance Plus Proche Voisin



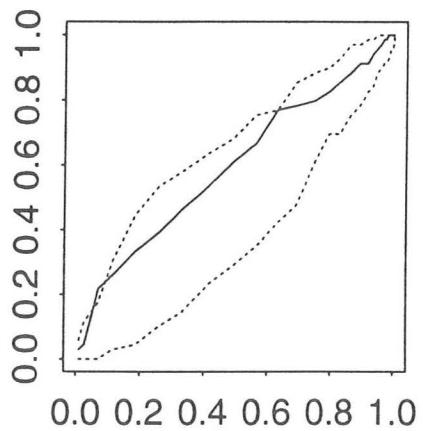
Fonction de Contact



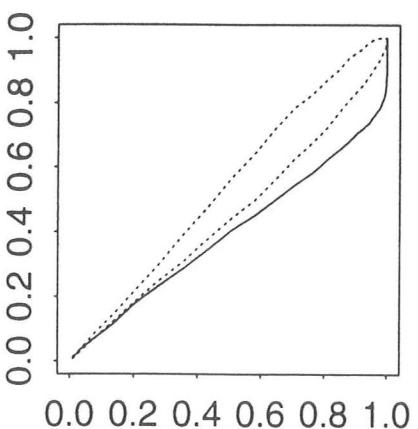
Mahot Rouge



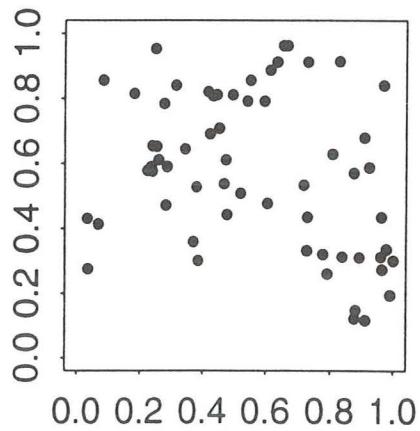
Distribution Distance Plus Proche Voisin



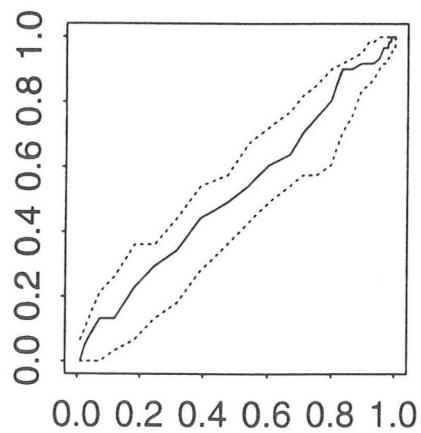
Fonction de Contact



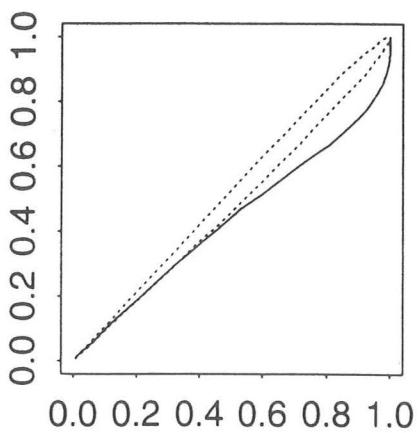
Carapa



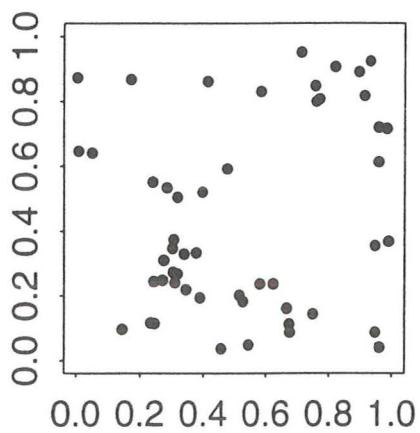
Distribution Distance Plus Proche Voisin



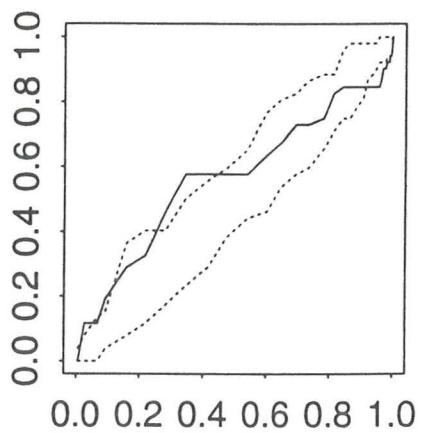
Fonction de Contact



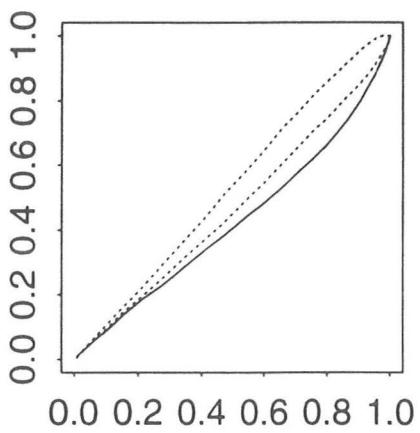
Cedres



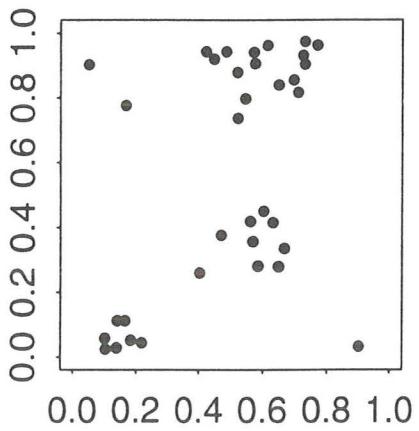
Distribution Distance Plus Proche Voisin



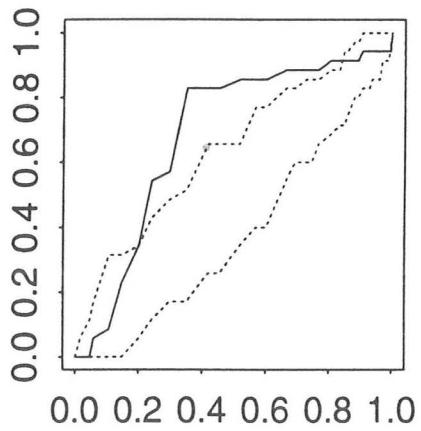
Fonction de Contact



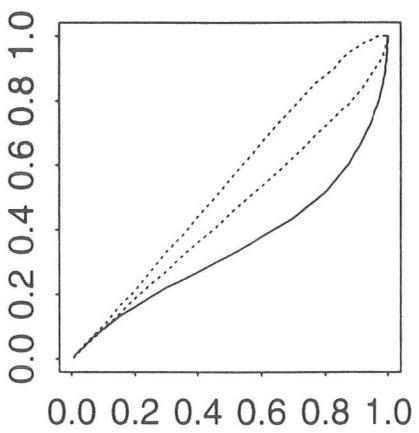
Angelique



Distribution Distance Plus Proche Voisin

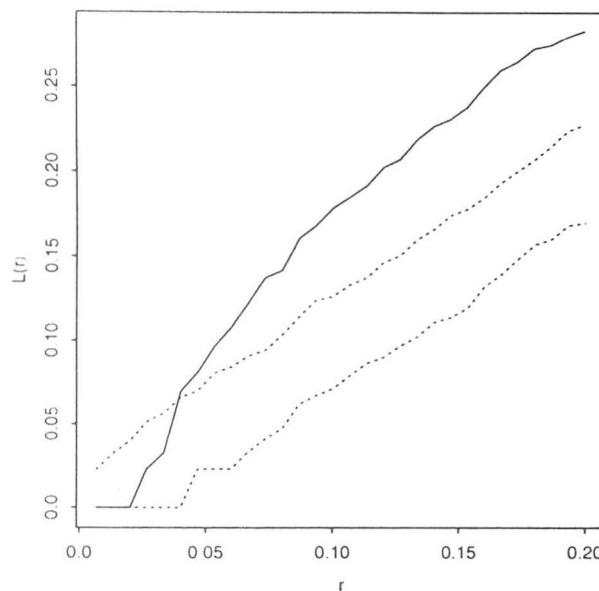


Fonction de Contact

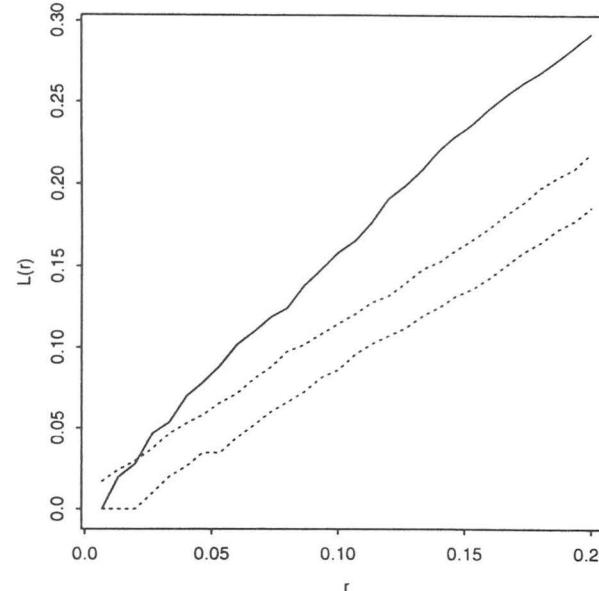


## Fonctions $L(r)$ et $g(r)$

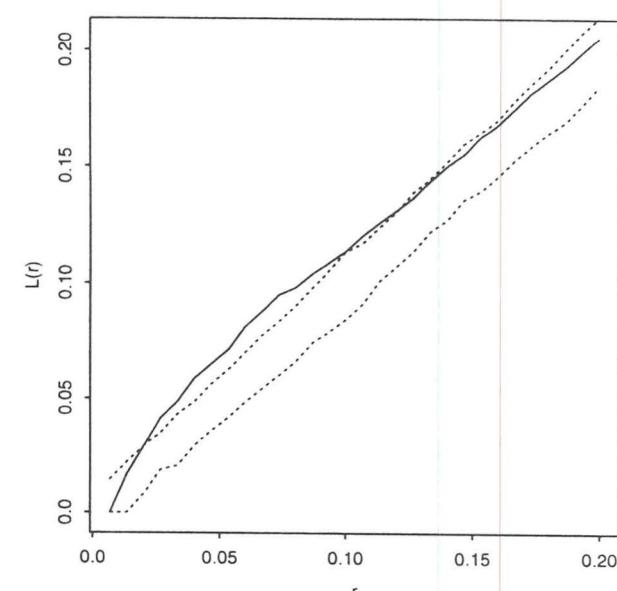
Angelique



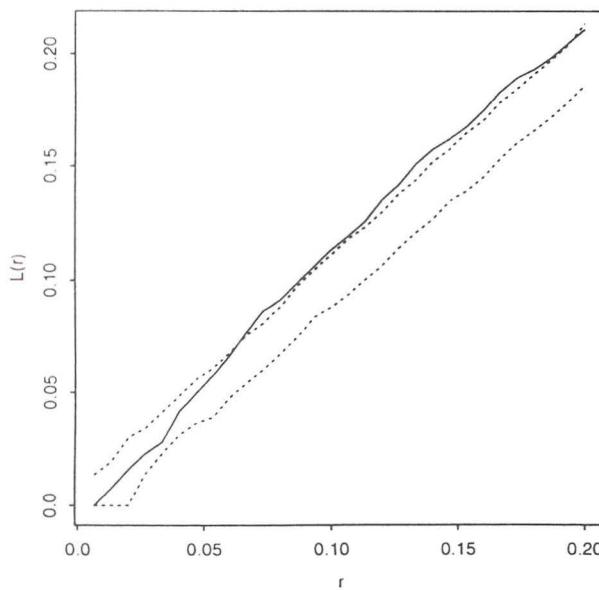
Wacapou



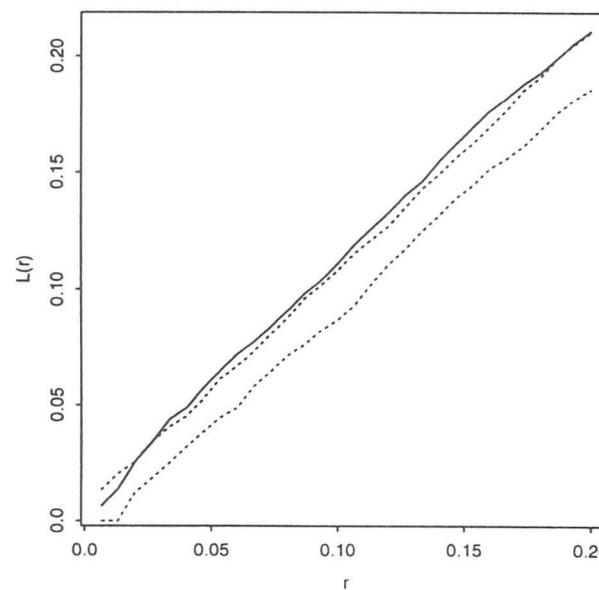
Manil marecage



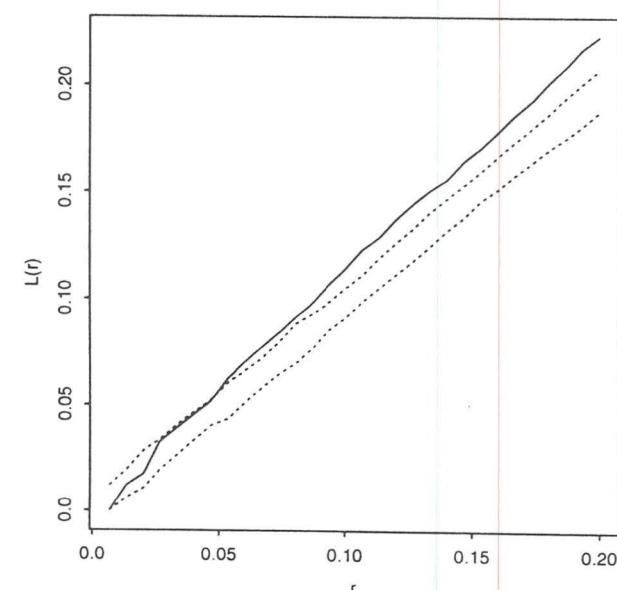
Boco



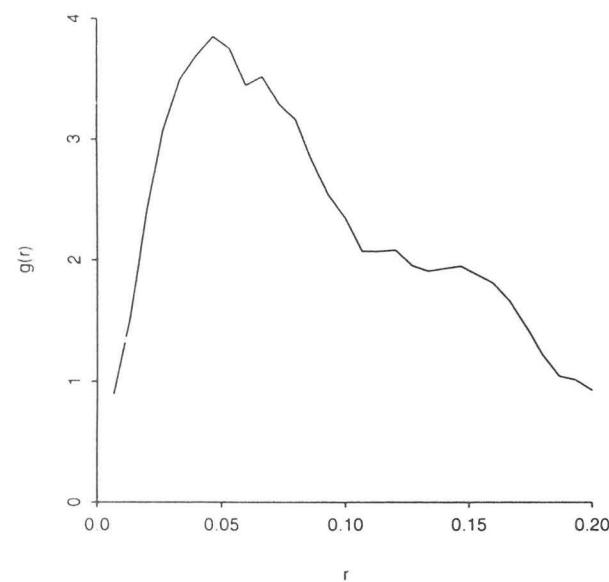
Tosso passa



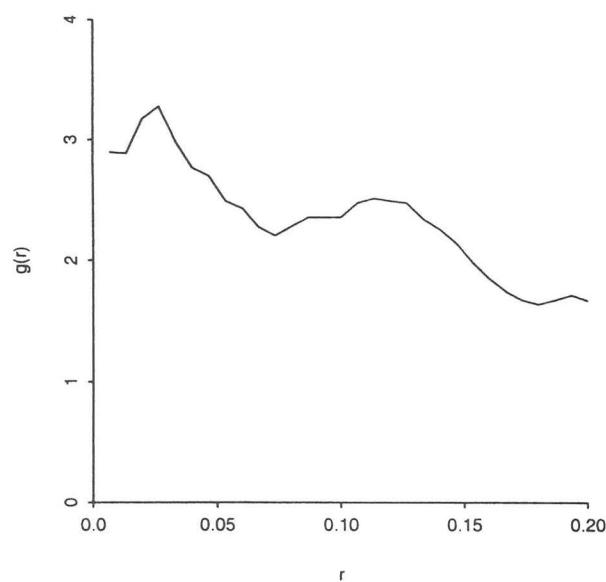
Encens



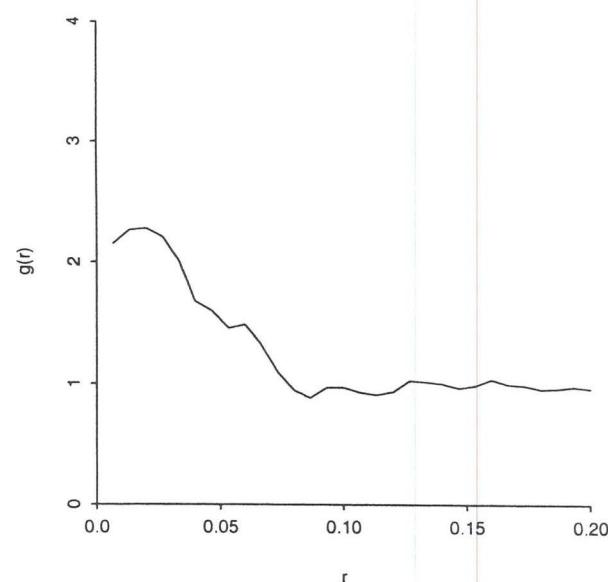
Angelique



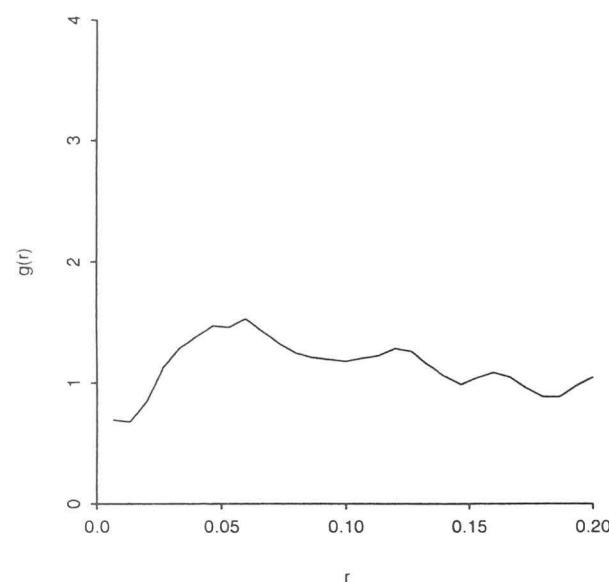
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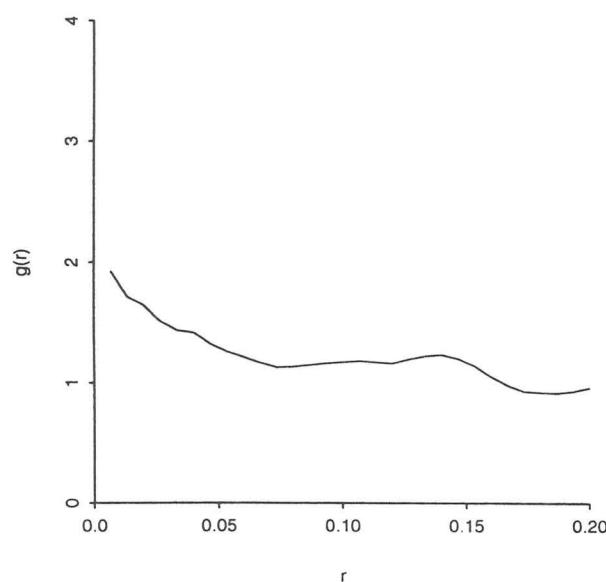
Manil marecage



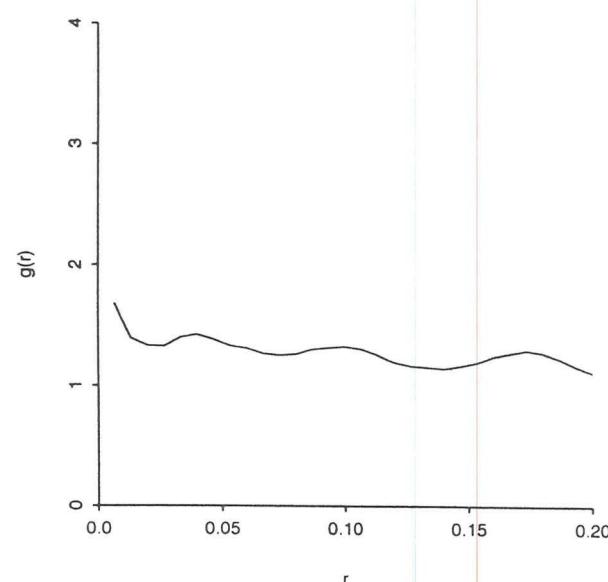
Boco

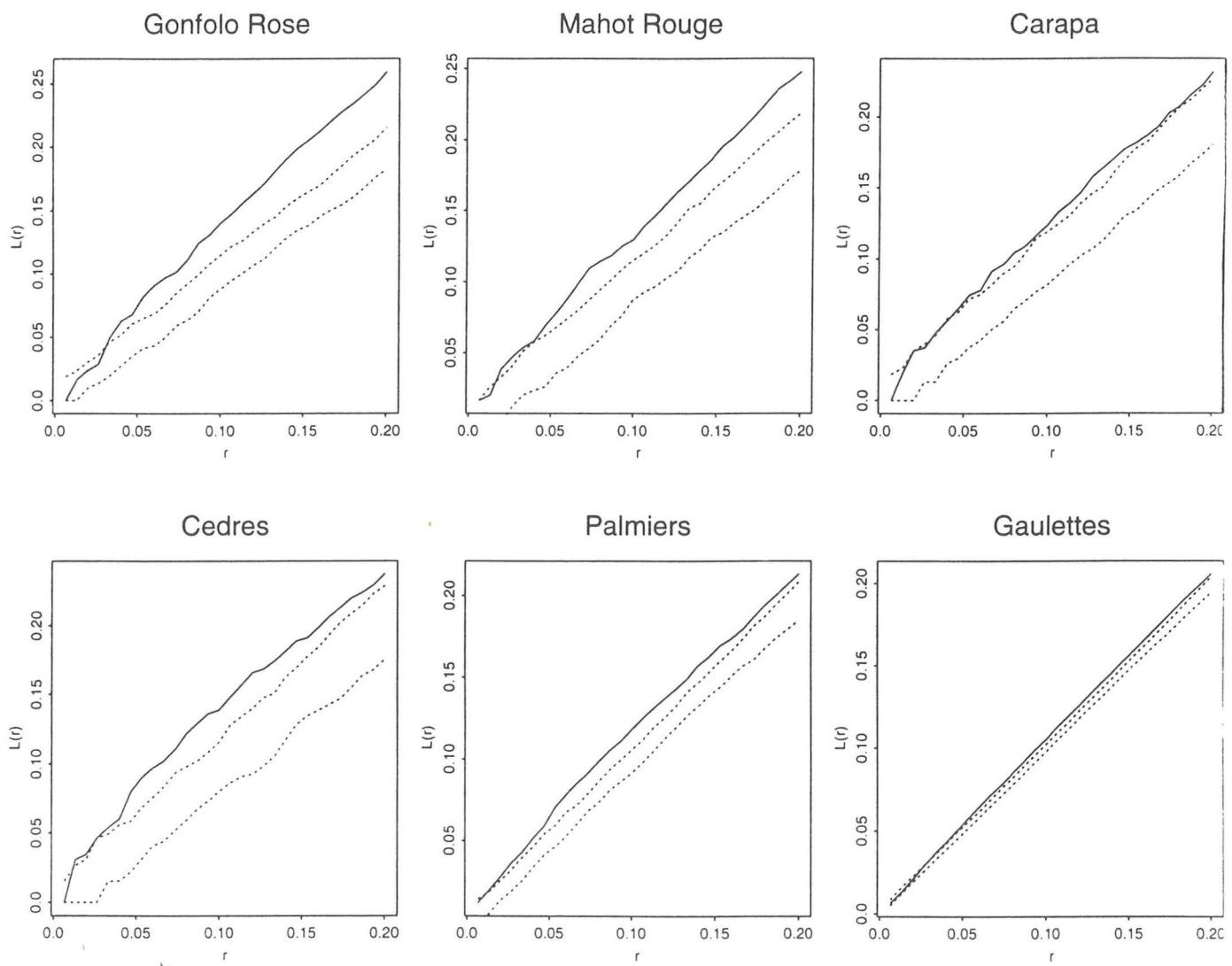


Tosso passa

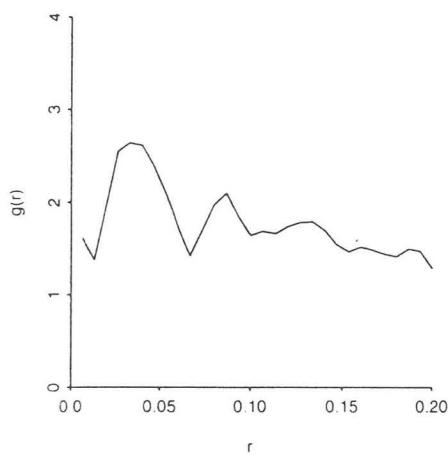


Encens

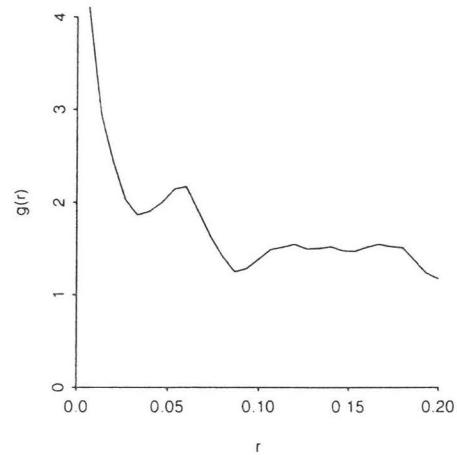




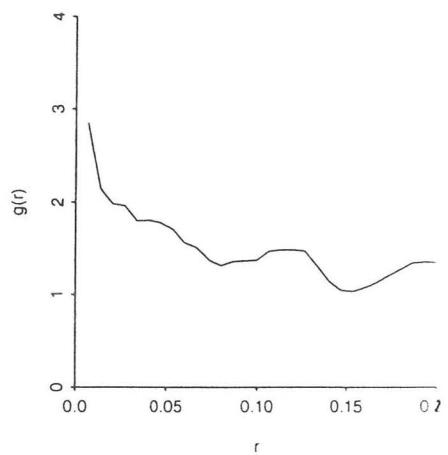
Gonfolo Rose



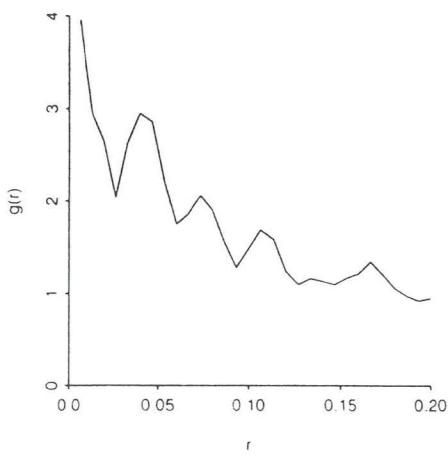
Mahot Rouge



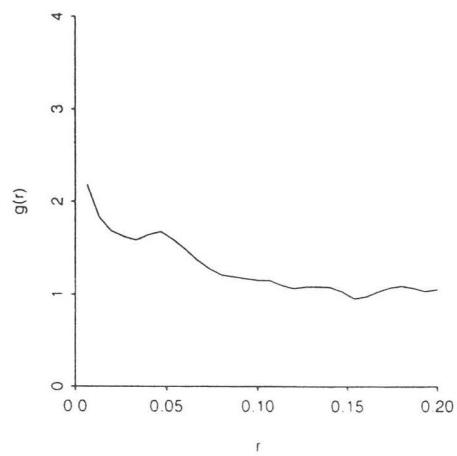
Carapa



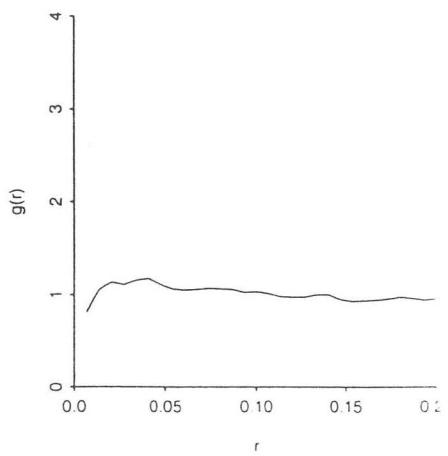
Cedres



Palmiers



Gaulettes



## 5 Processus Ponctuels marqués

**Etude bivariée :**  $L_{ij}(r)$  et  $g_{ij}(r)$

**Etude des circonférences :**

**intraspécifique**  $L_{mm}(r)$

**interspécifique**  $L_{m^im^j}(r)$

### Légende

Les titres des graphiques indiquent quelles sont la ou les deux espèces  $i$  et  $j$  dont la corrélation est étudiée.

En abscisse : distance r.

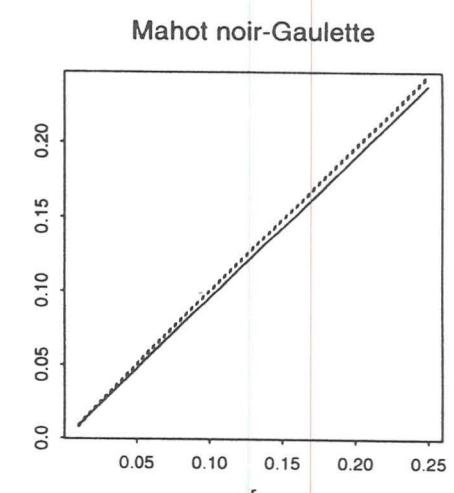
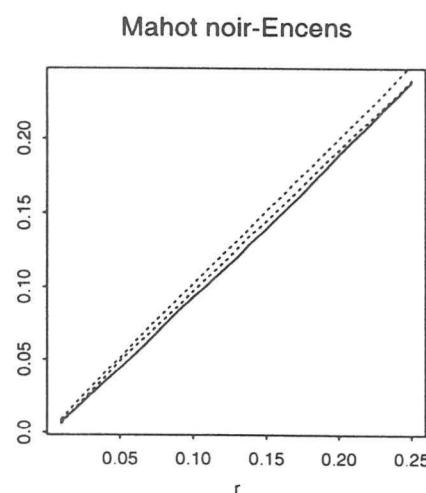
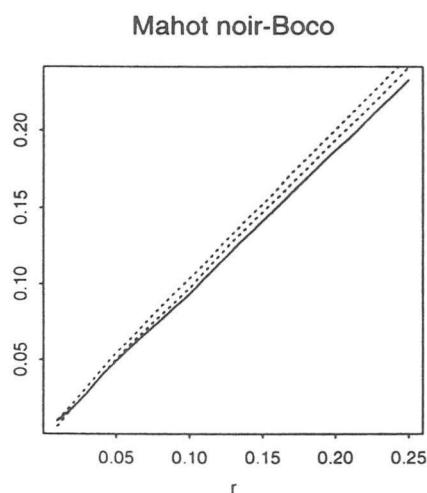
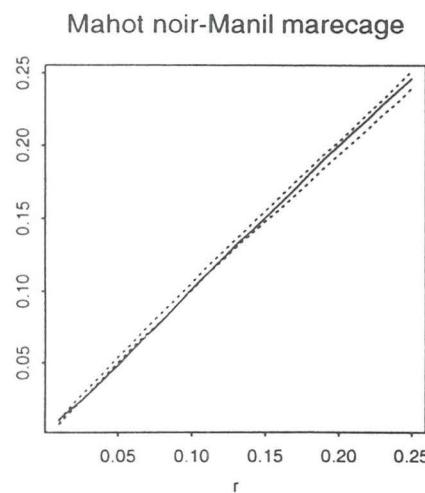
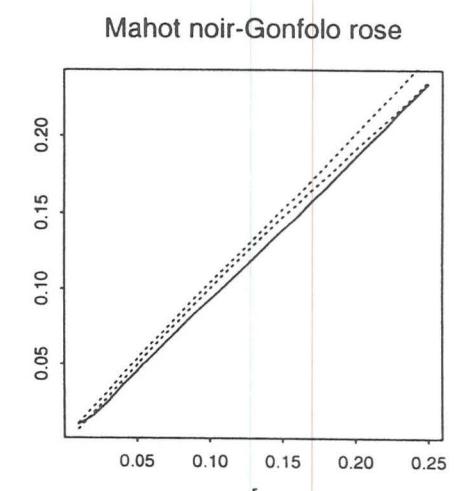
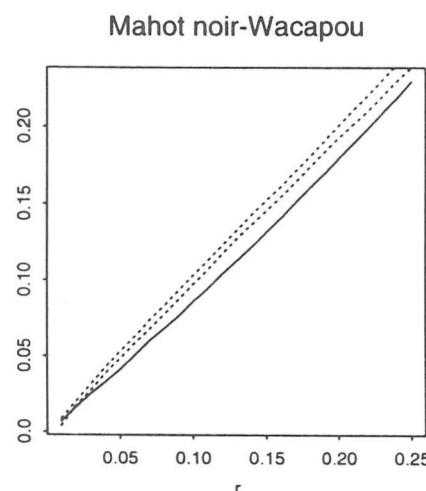
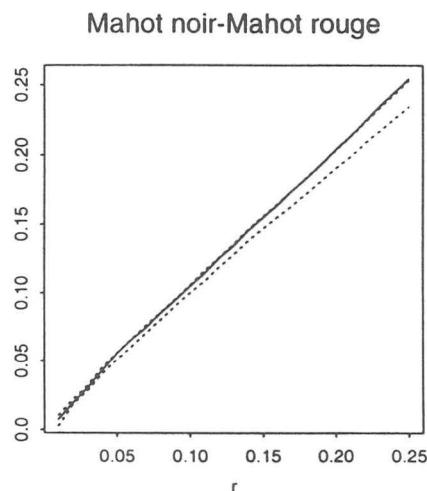
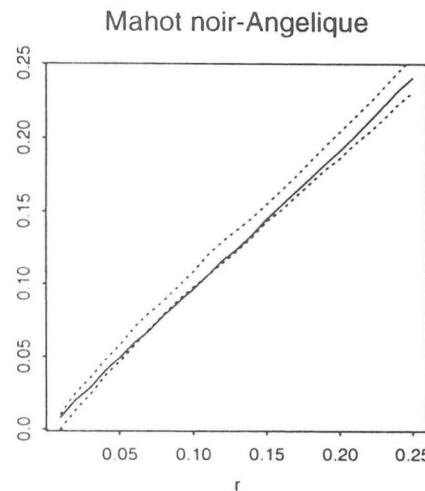
En ordonnée : Fonctions  $L_{ij}(r)$ ,  $L_{mm}(r)$ ,  $L_{m^im^j}(r)$  ou  $g_{ij}(r)$

... : enveloppes de confiance à 95% de  $L_{...}(r)$  obtenues à partir de 99 réaffections aléatoires des types ou des circonférences conditionnellement à la configuration de points observée et à la ou les distributions empiriques des marques.

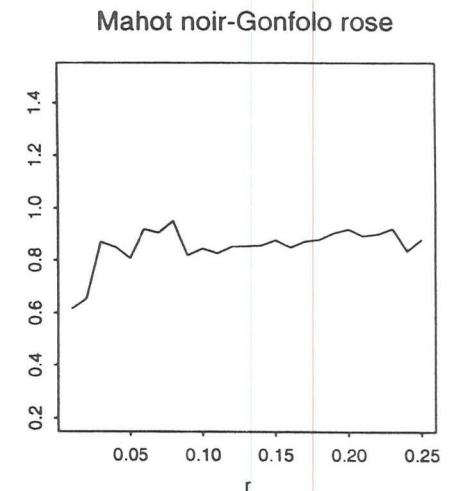
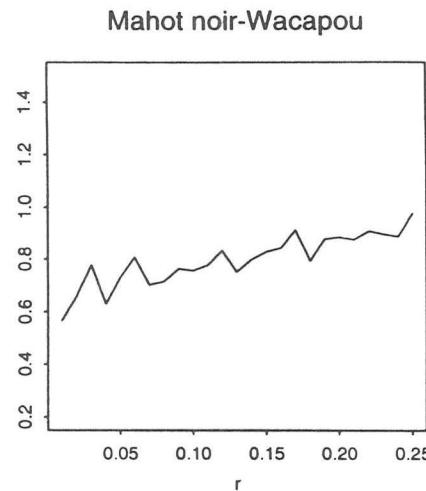
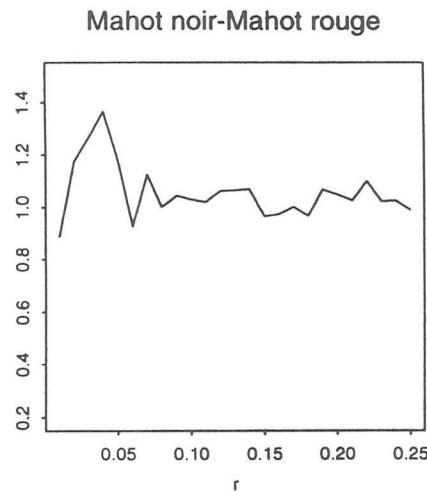
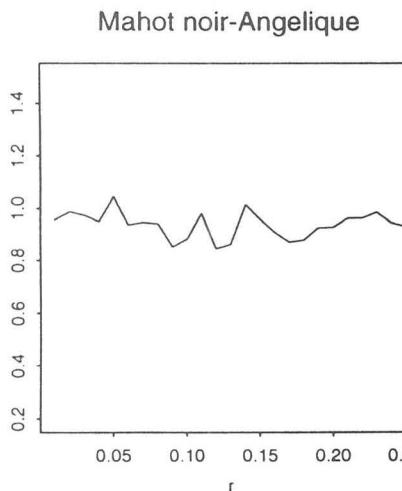
(Se référer au texte pp 96-104)

## Fonctions $L_{ij}(r)$ et $g_{ij}(r)$

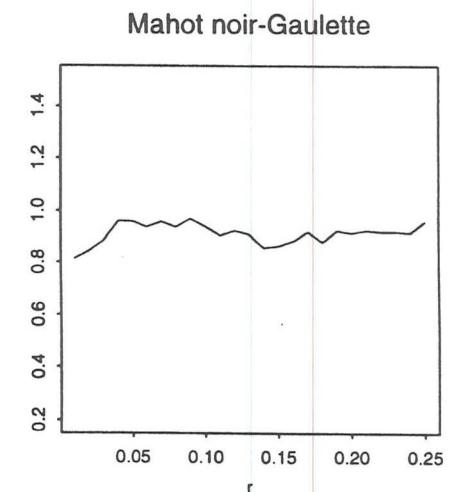
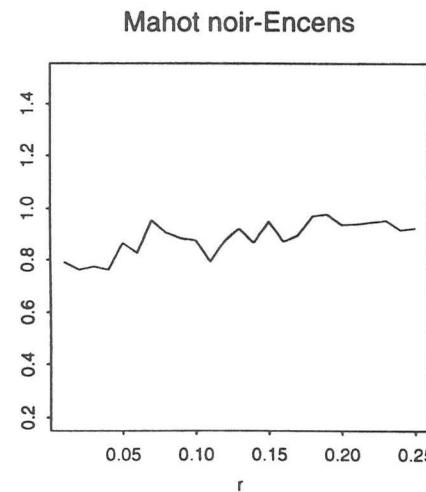
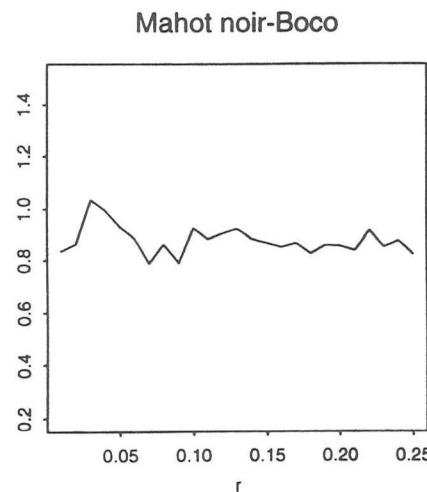
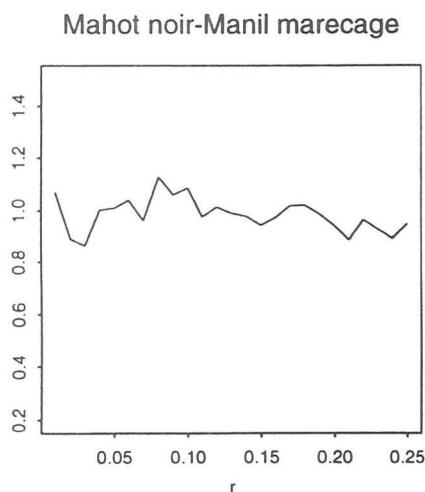
Fonction  $L(r)$  bivariee



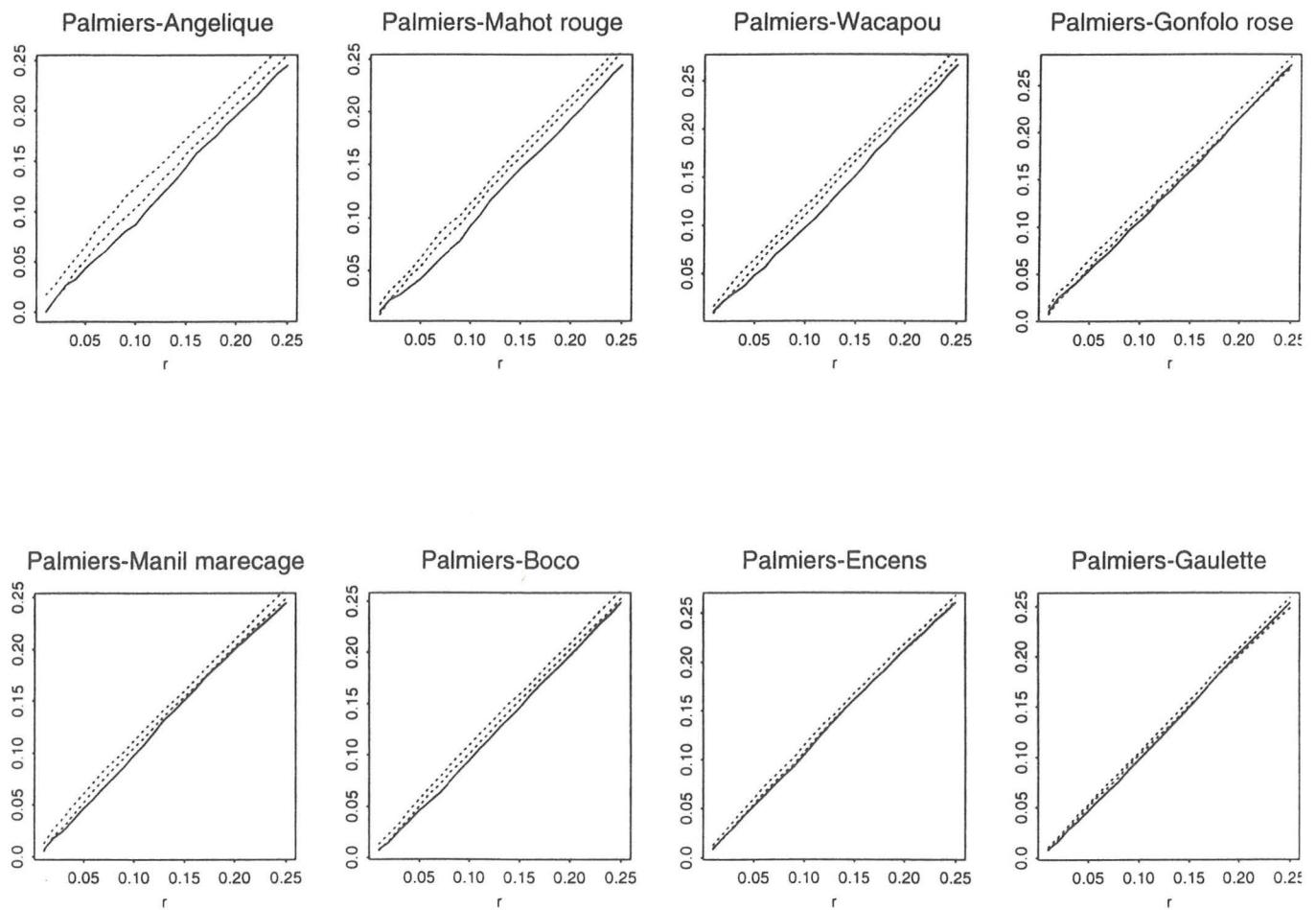
Fonction  $g(r)$  bivariee



§†

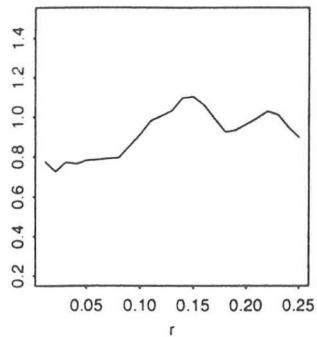


Fonction  $L(r)$  bivariee

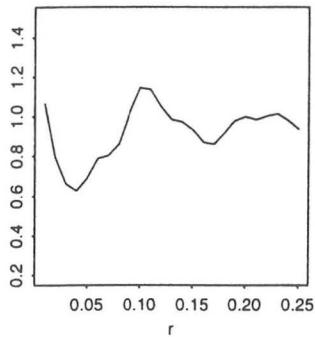


Fonction  $g(r)$  bivariee

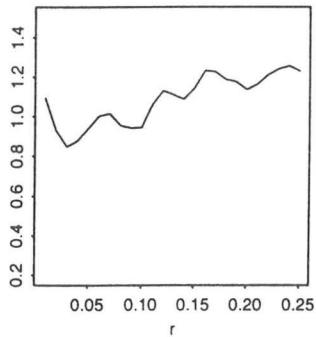
Palmiers-Angelique



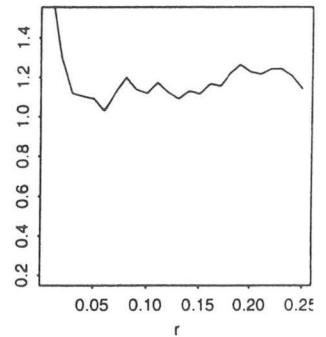
Palmiers-Mahot rouge



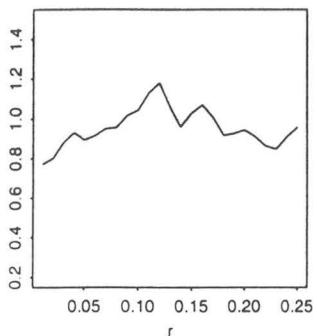
Palmiers-Wacapou



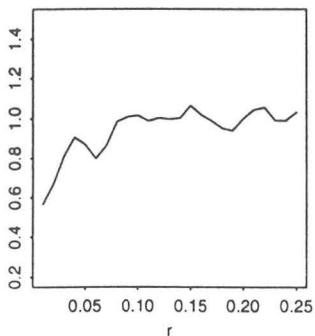
Palmiers-Gonfolo rose



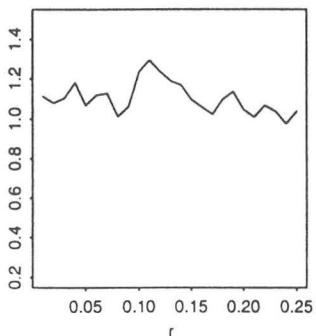
Palmiers-Manil marecage



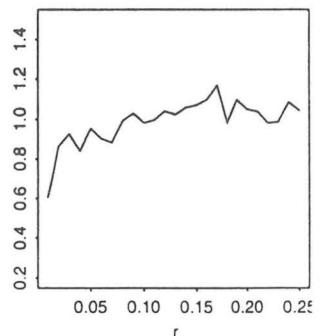
Palmiers-Boco



Palmiers-Encens

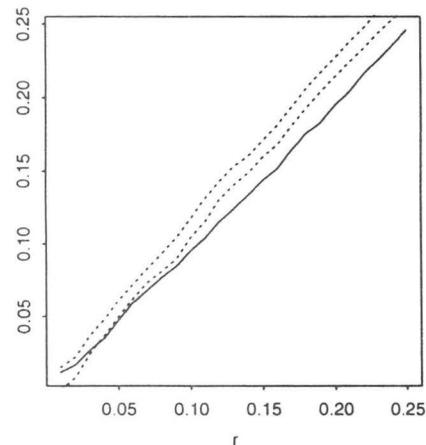


Palmiers-Gaulette

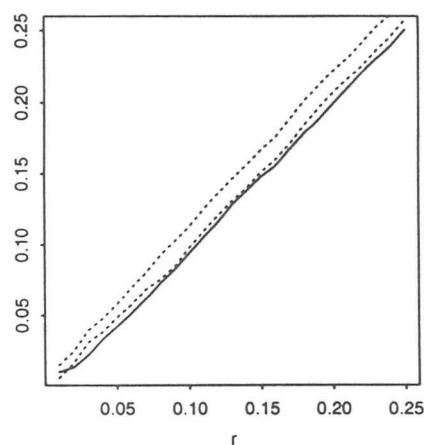


Fonction  $L(r)$  bivariee

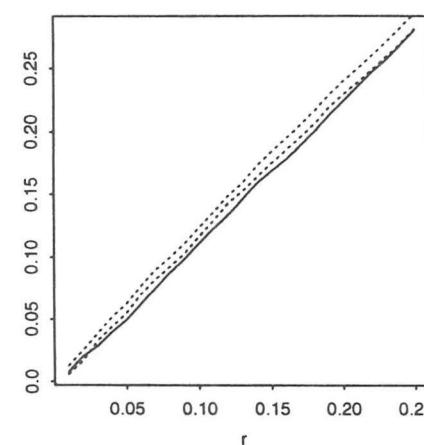
Encens-Angelique



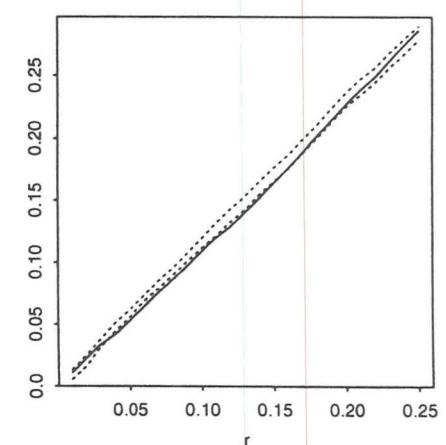
Encens-Mahot rouge



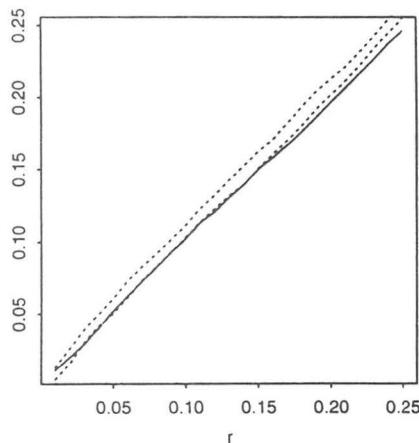
Encens-Wacapou



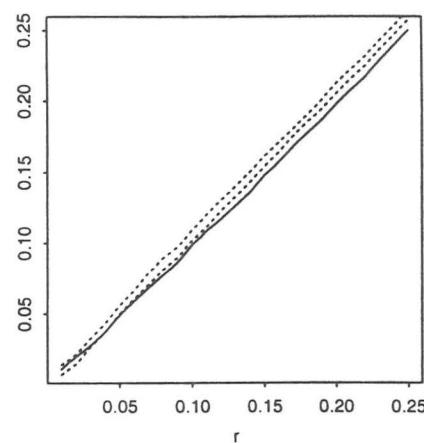
Encens-Gonfolo rose



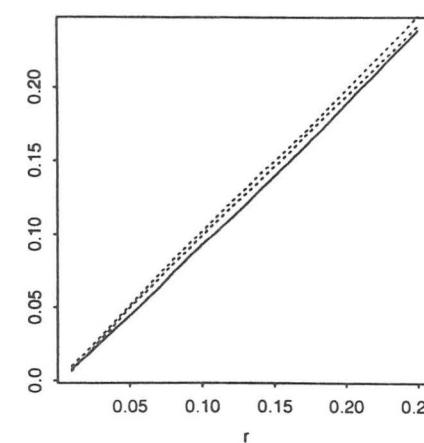
Encens-Manil marecage



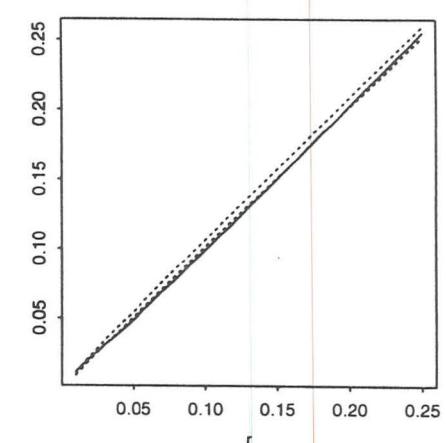
Encens-Boco



Encens-Mahot noir

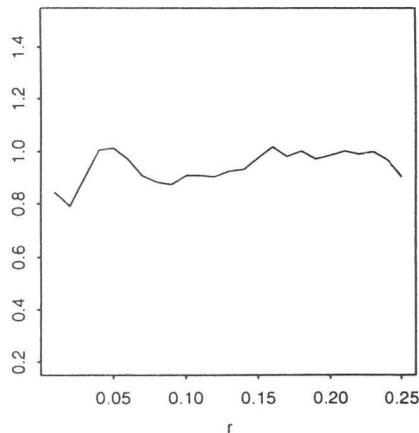


Encens-Gaulette

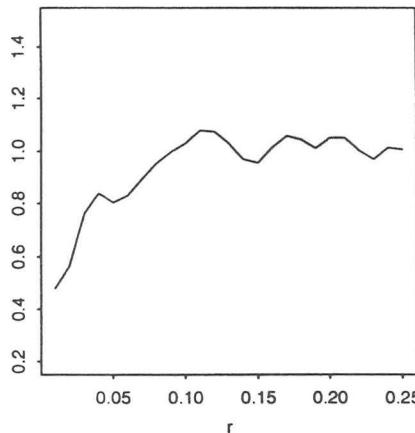


Fonction  $g(r)$  bivariee

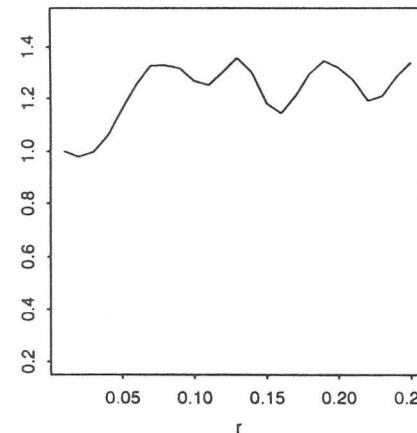
Encens-Angelique



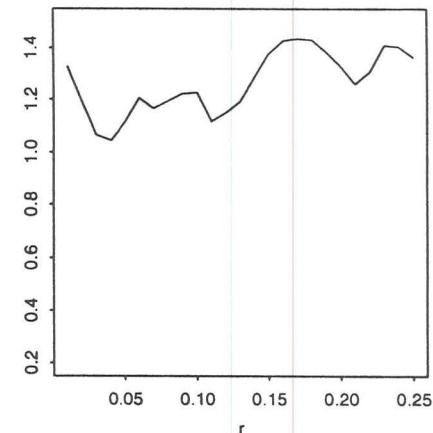
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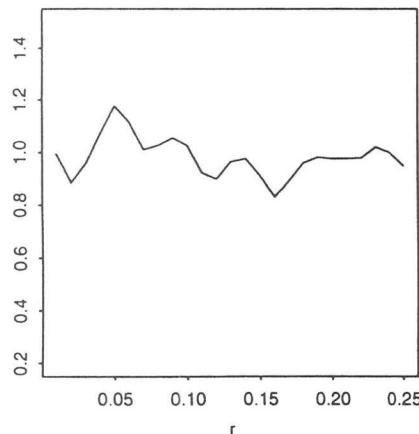
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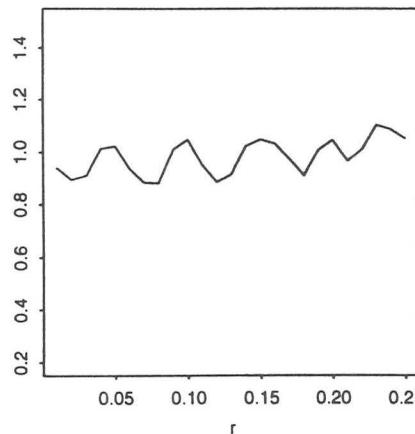
Encens-Gonfolo rose



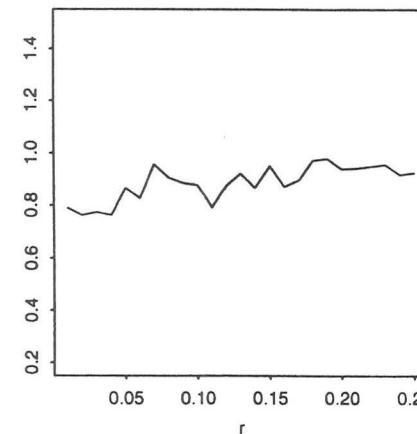
Encens-Manil marecage



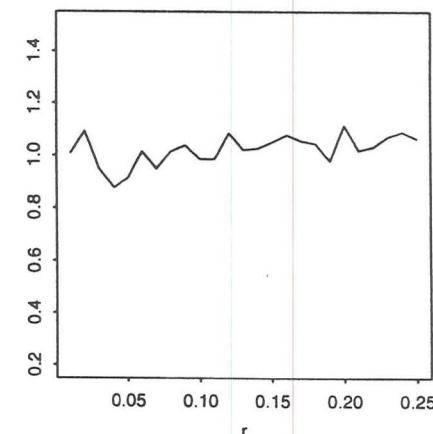
Encens-Boco



Encens-Mahot noir

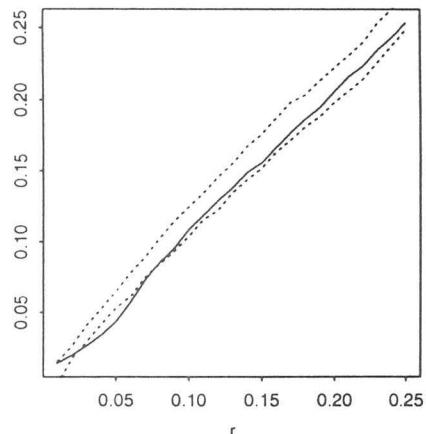


Encens-Gaulette

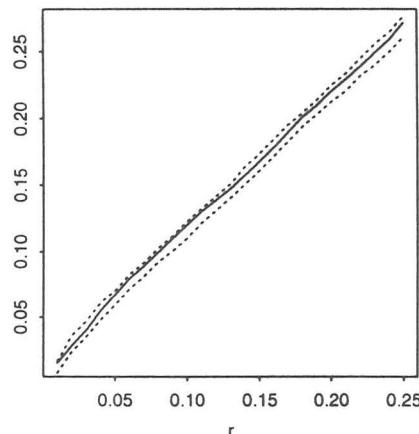


Fonction L(r) bivariee

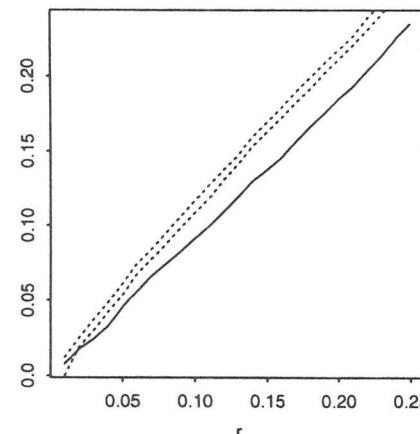
Tosso passa-Angelique



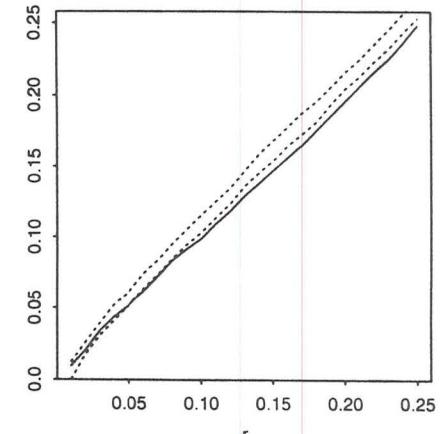
Tosso passa-Mahot rouge



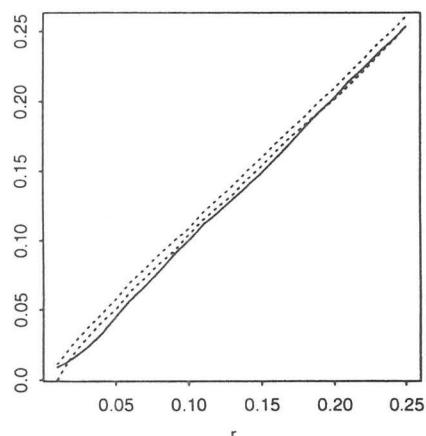
Tosso passa-Wacapou



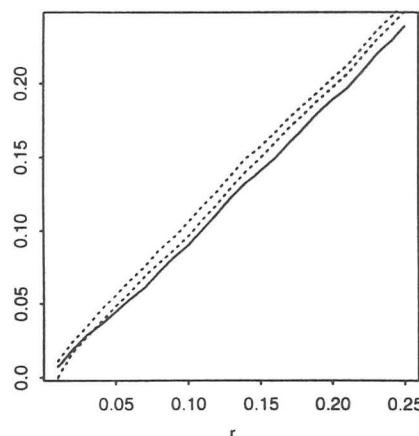
Tosso passa-Gonfolo rose



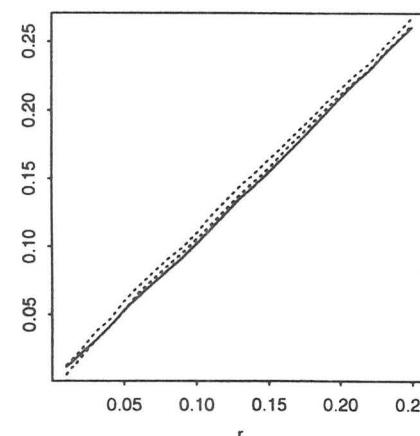
Tosso passa-Manil marecage



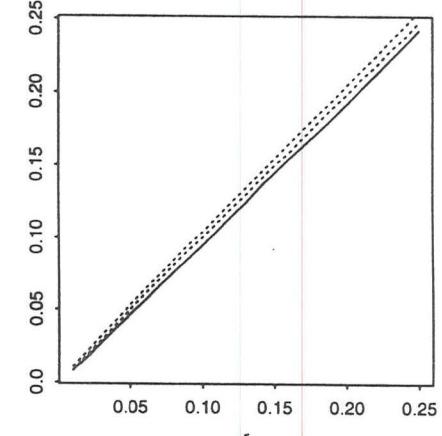
Tosso passa-Boco



Tosso passa-Encens

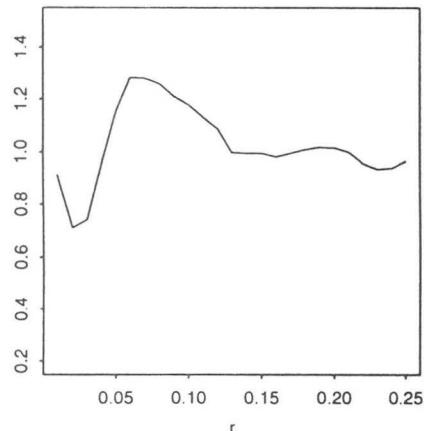


Tosso passa-Gaulette

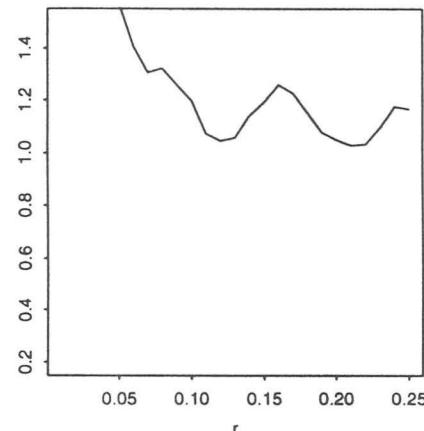


Fonction  $g(r)$  bivariee

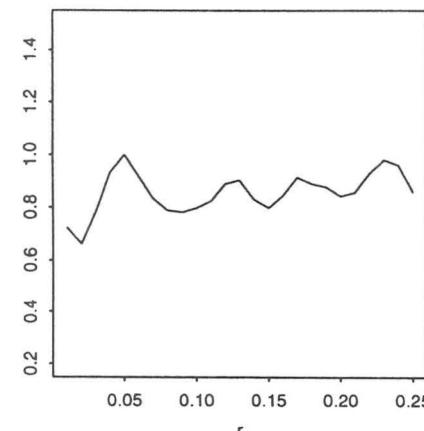
Tosso passa-Angelique



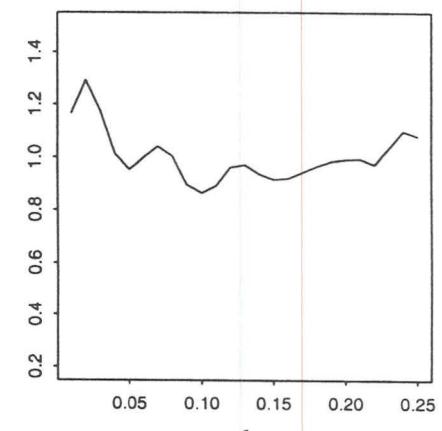
Tosso passa-Mahot rouge



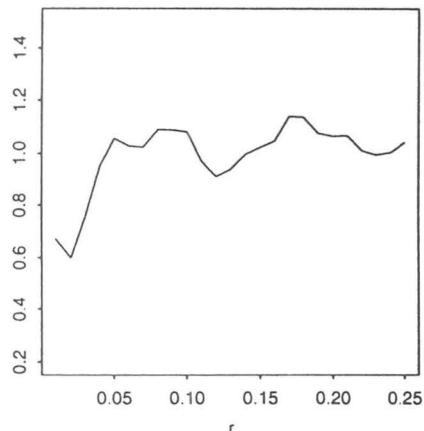
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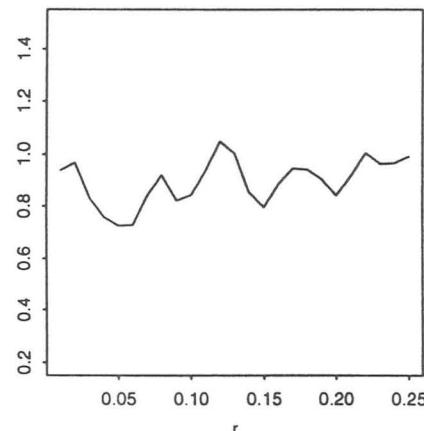
Tosso passa-Gonfolo rose



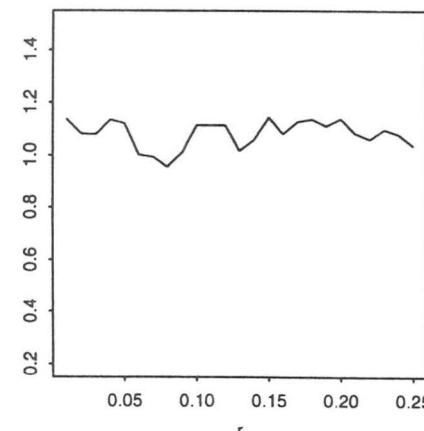
Tosso passa-Manil marecage



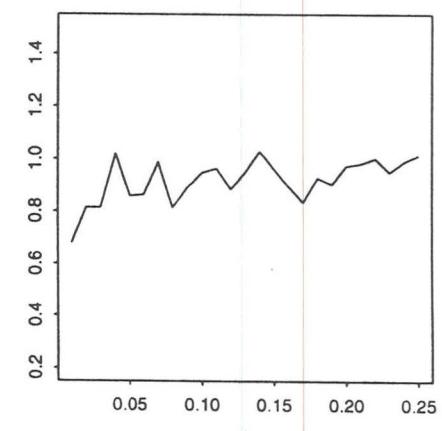
Tosso passa-Boco



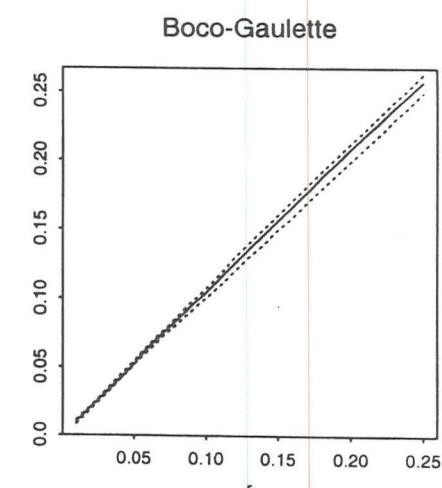
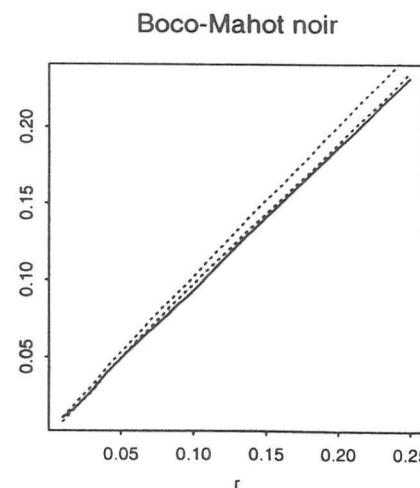
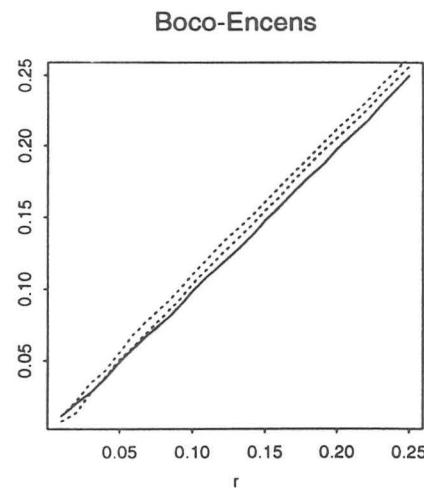
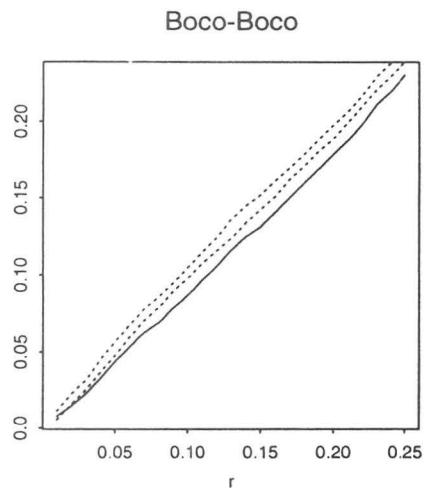
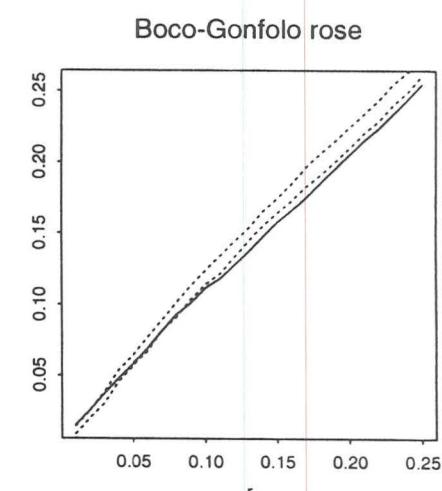
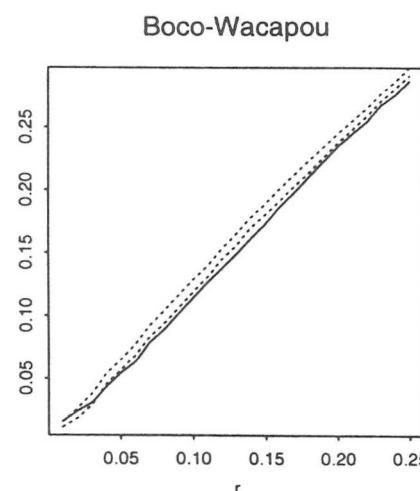
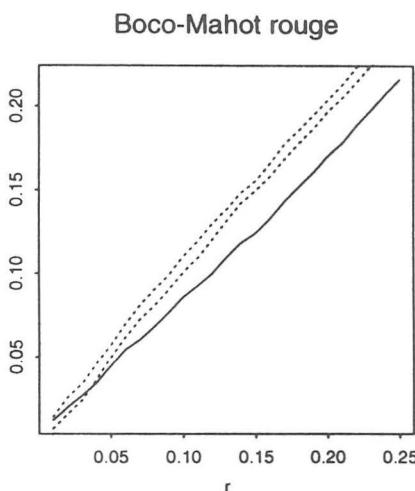
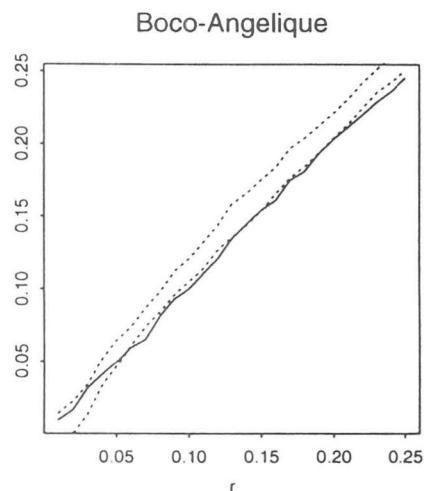
Tosso passa-Encens



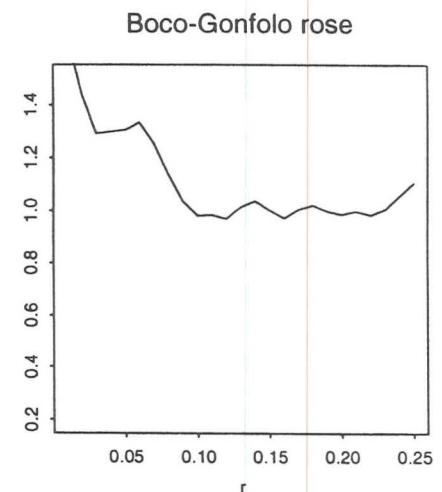
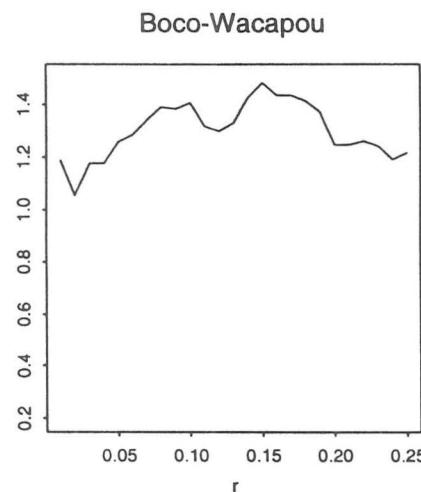
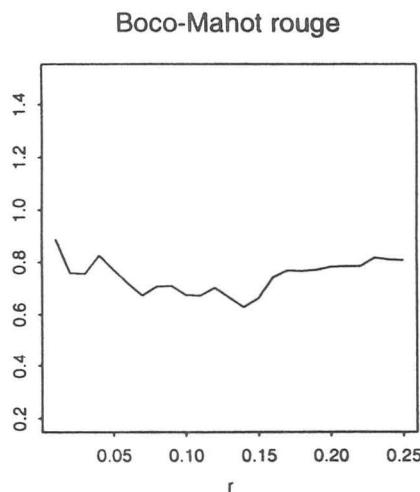
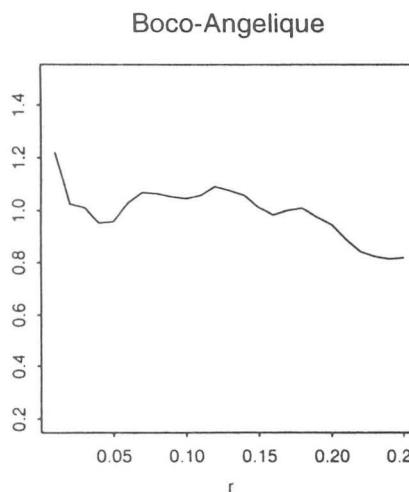
Tosso passa-Gaulette



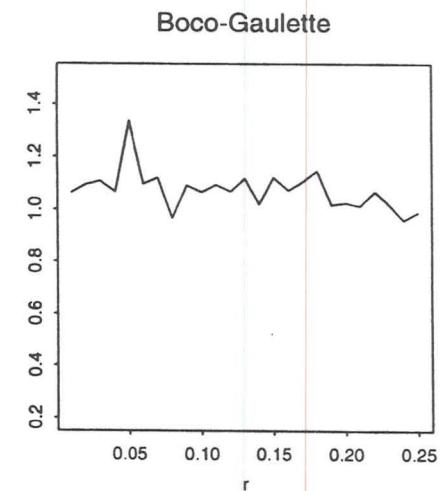
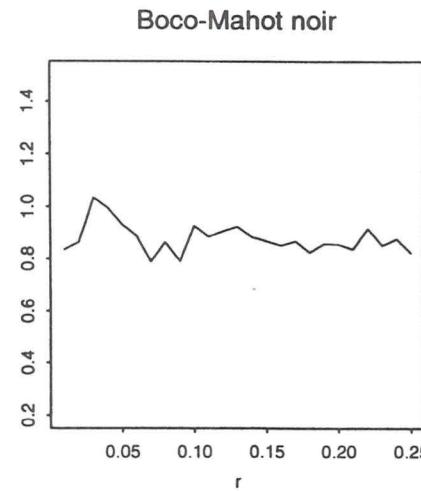
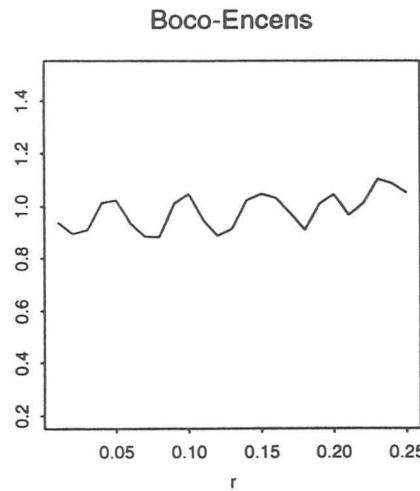
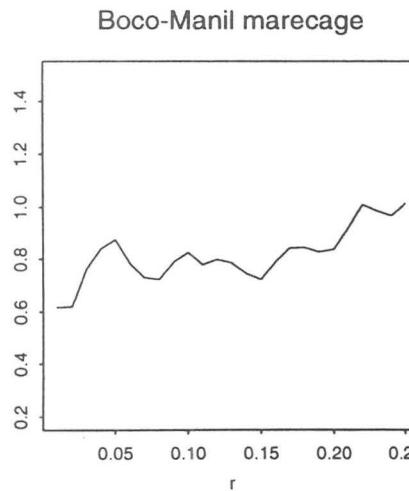
Fonction  $L(r)$  bivariee



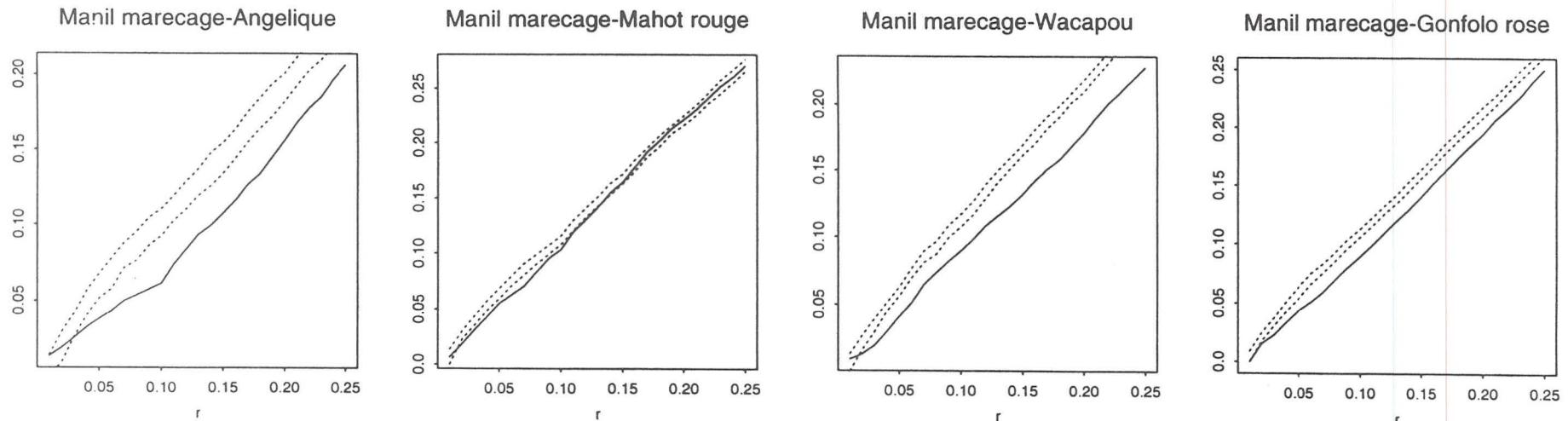
Fonction  $g(r)$  bivariee



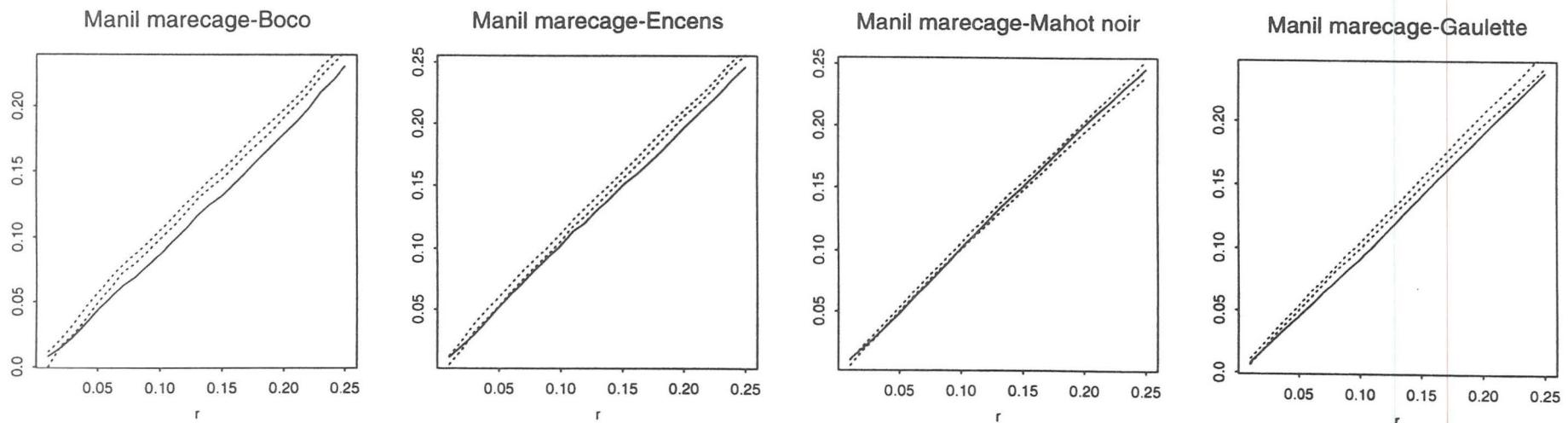
$g(r)$



Fonction L(r) bivariee

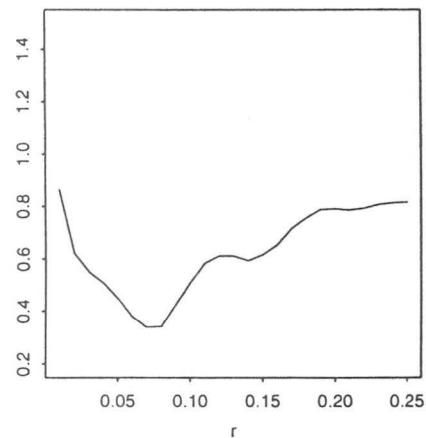


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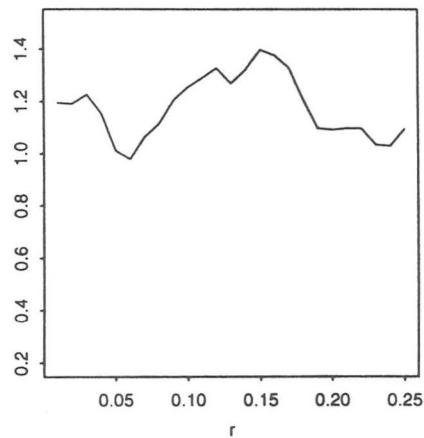


Fonction  $g(r)$  bivariee

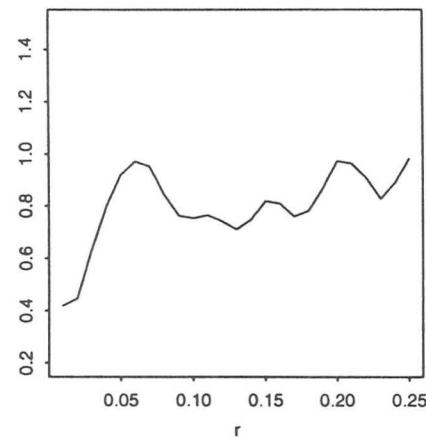
Manil marecage-Angelique



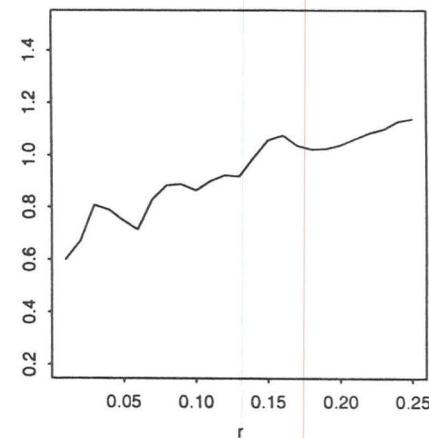
Manil marecage-Mahot rouge



Manil marecage-Wacapou

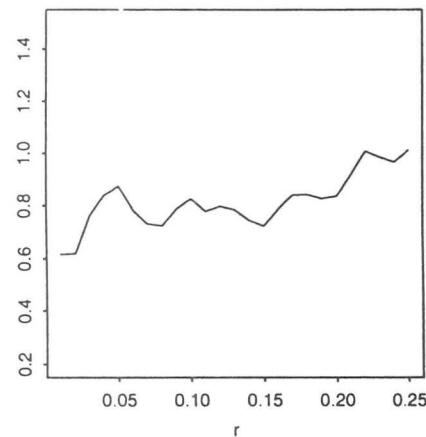


Manil marecage-Gonfolo rose

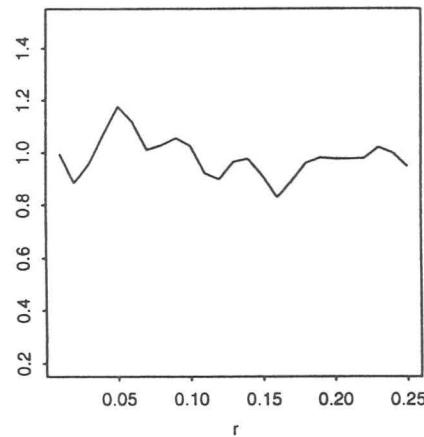


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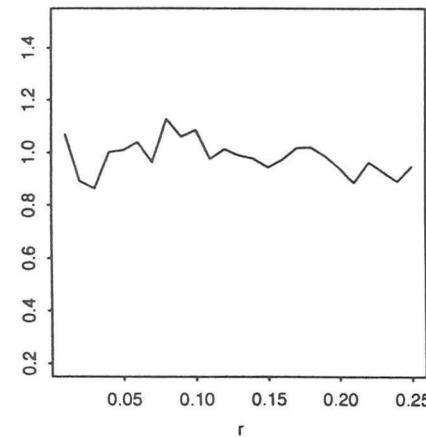
Manil marecage-Boco



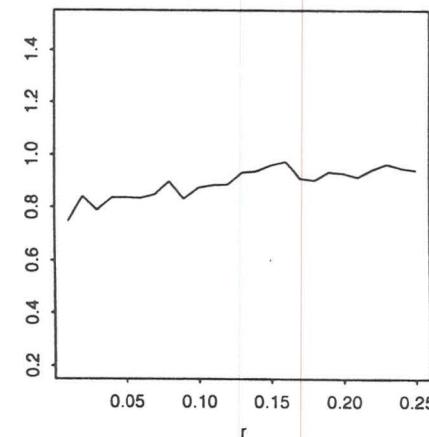
Manil marecage-Encens



Manil marecage-Mahot noir

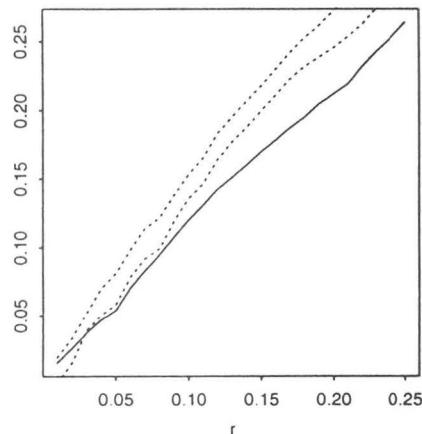


Manil marecage-Gaulette

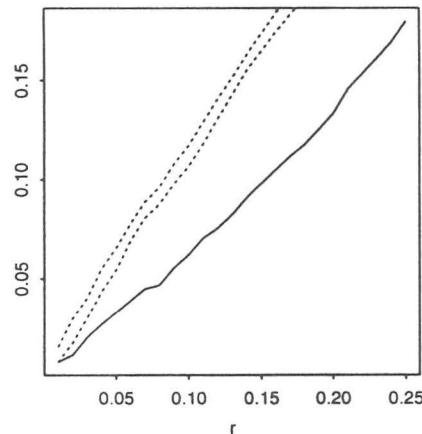


Fonction  $L(r)$  bivariee

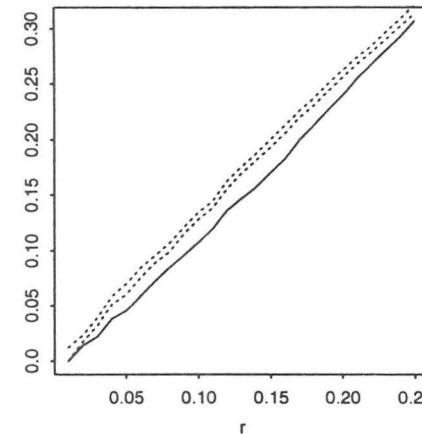
Wacapou-Angelique



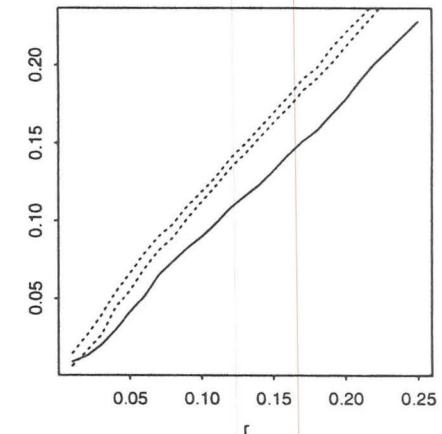
Wacapou-Mahot rouge



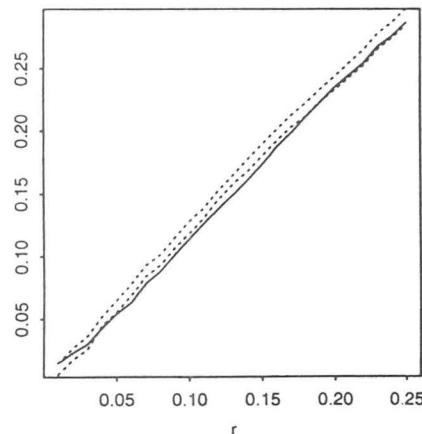
Wacapou-Gonfolo rose



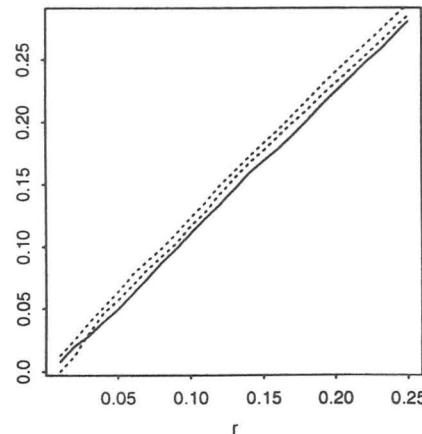
Wacapou-Manil marecage



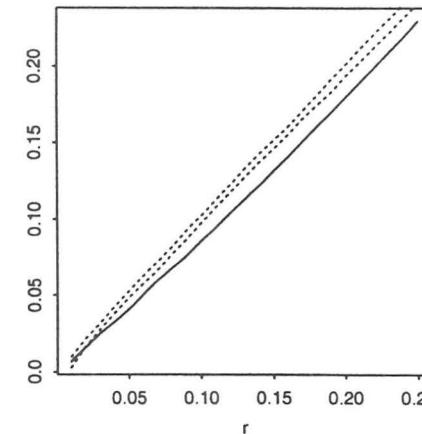
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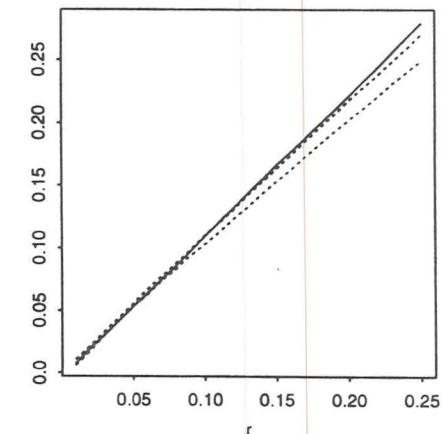
Wacapou-Encens



Wacapou-Mahot noir



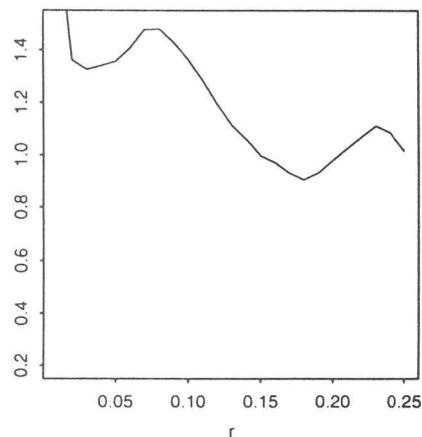
Wacapou-Galette



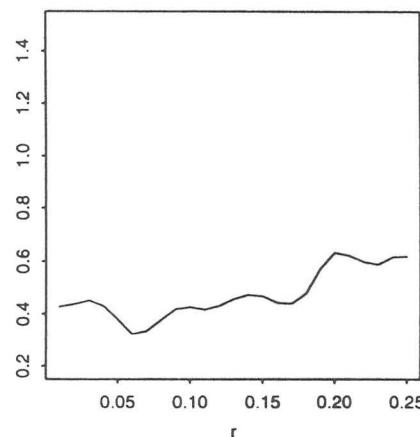
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Fonction  $g(r)$  bivariee

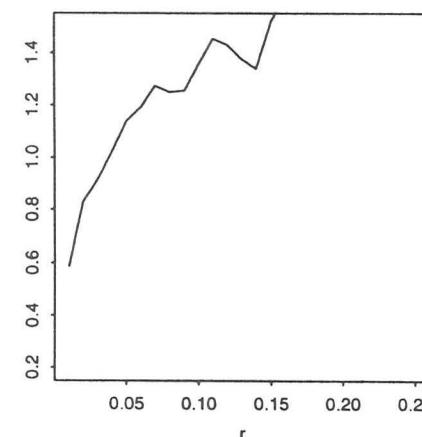
Wacapou-Angelique



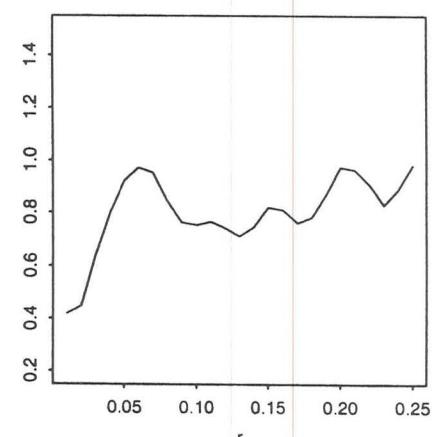
Wacapou-Mahot rouge



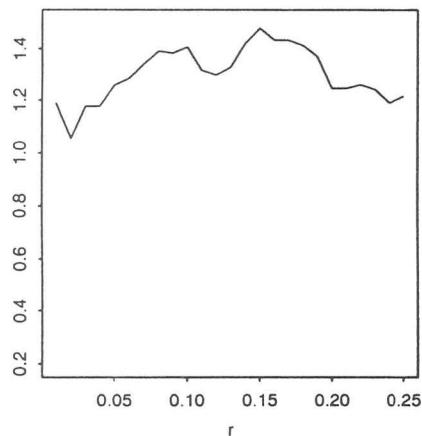
Wacapou-Gonfolo rose



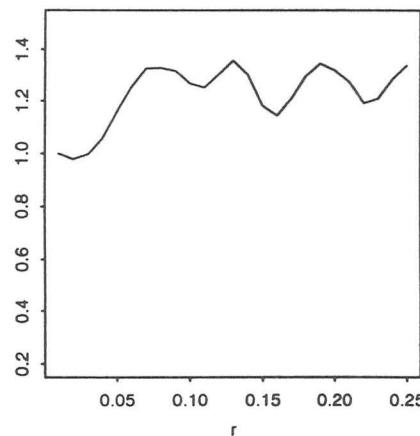
Wacapou-Manil marecage



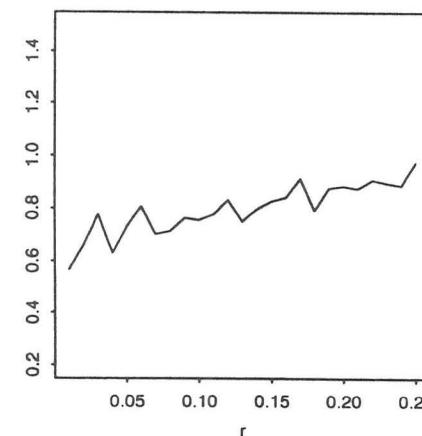
Wacapou-Boco



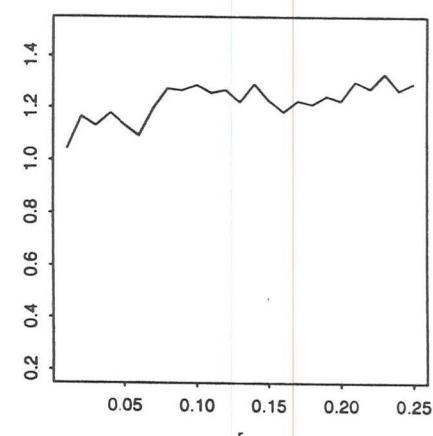
Wacapou-Encens



Wacapou-Mahot noir

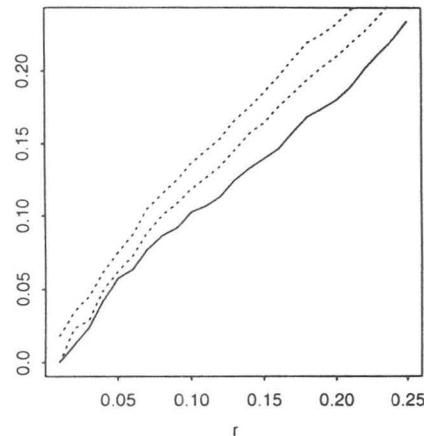


Wacapou-Gaulette

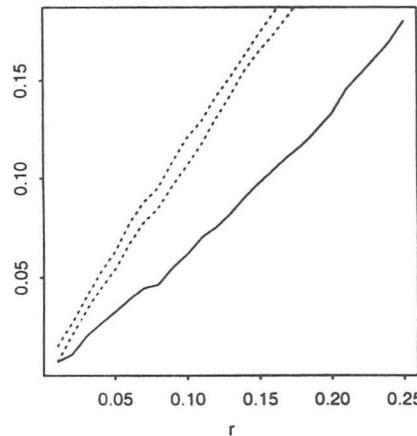


Fonction  $L(r)$  bivariee

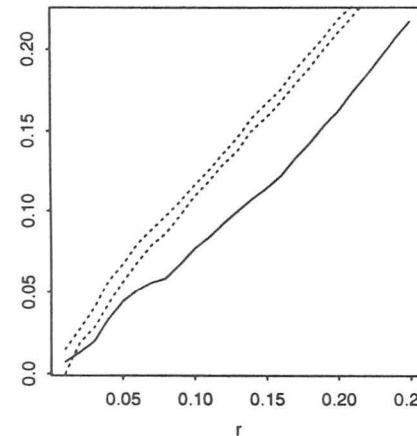
Mahot rouge-Angelique



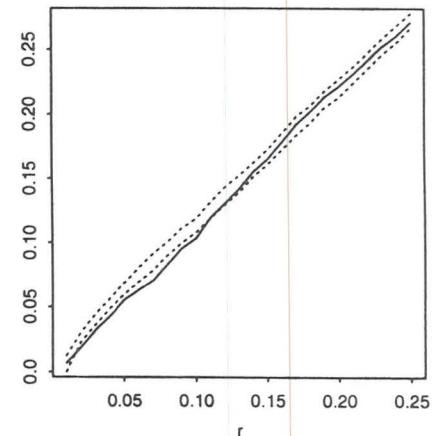
Mahot rouge-Wacapou



Mahot rouge-Gonfolo rose

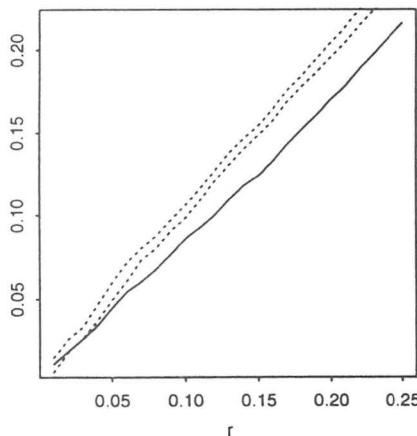


Mahot rouge-Manil marecage

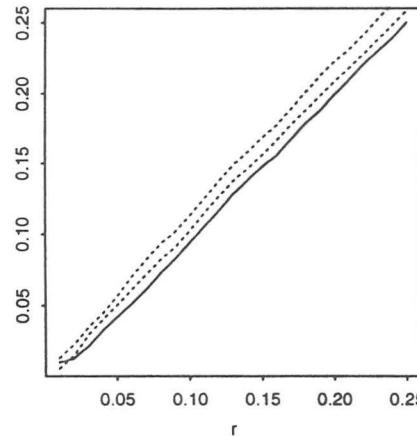


$L(r)$

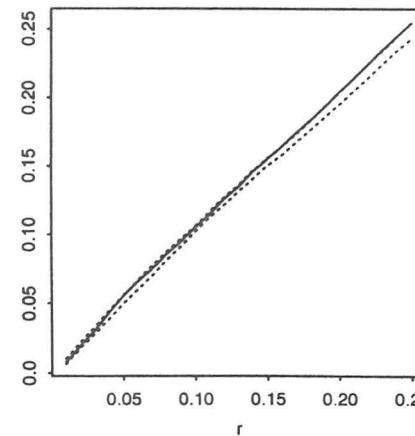
Mahot rouge-Boco



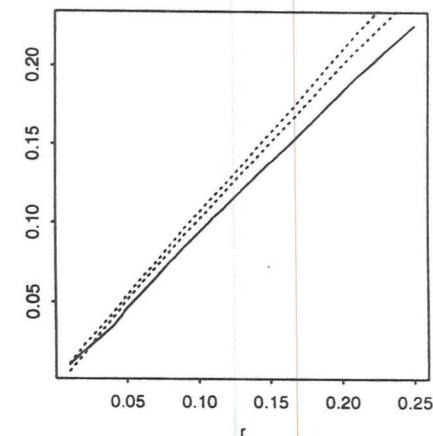
Mahot rouge-Encens



Mahot rouge-Mahot noir

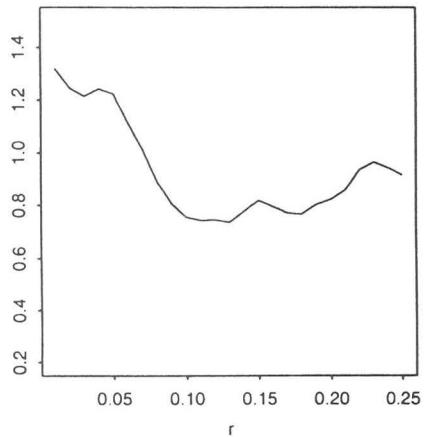


Mahot rouge-Gaulette

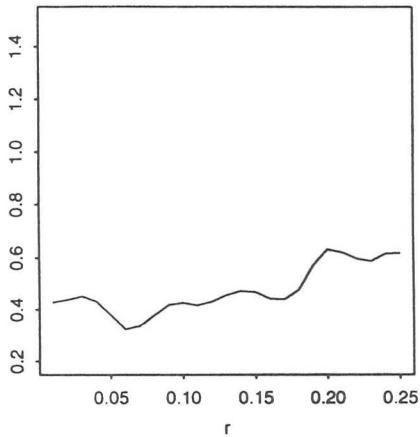


Fonction  $g(r)$  bivariee

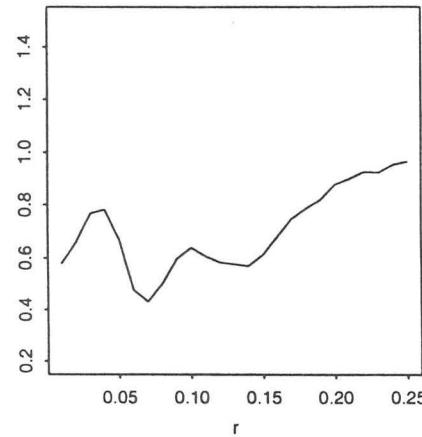
Mahot rouge-Angelique



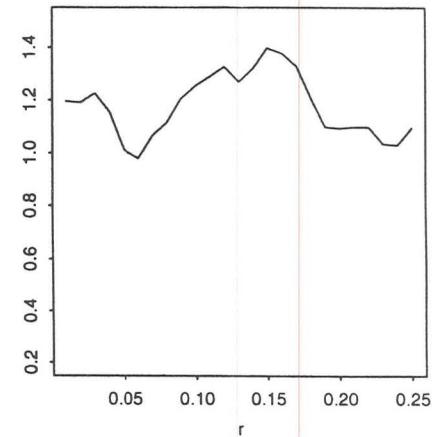
Mahot rouge-Wacapou



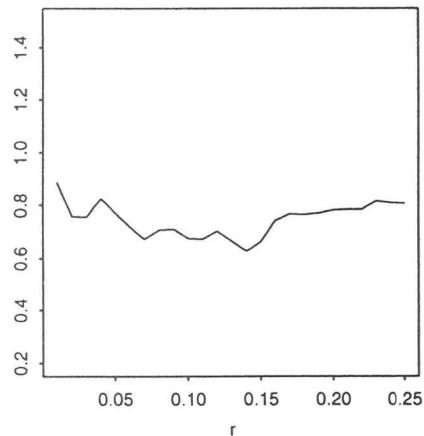
Mahot rouge-Gonfolo rose



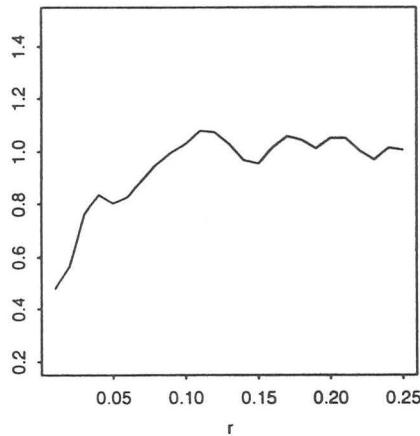
Mahot rouge-Manil marecage



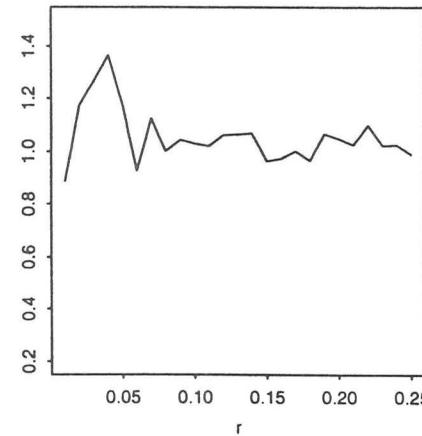
Mahot rouge-Boco



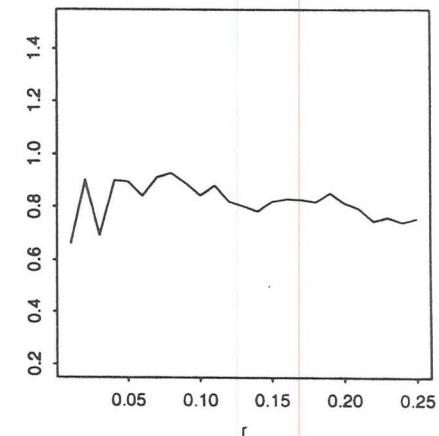
Mahot rouge-Encens



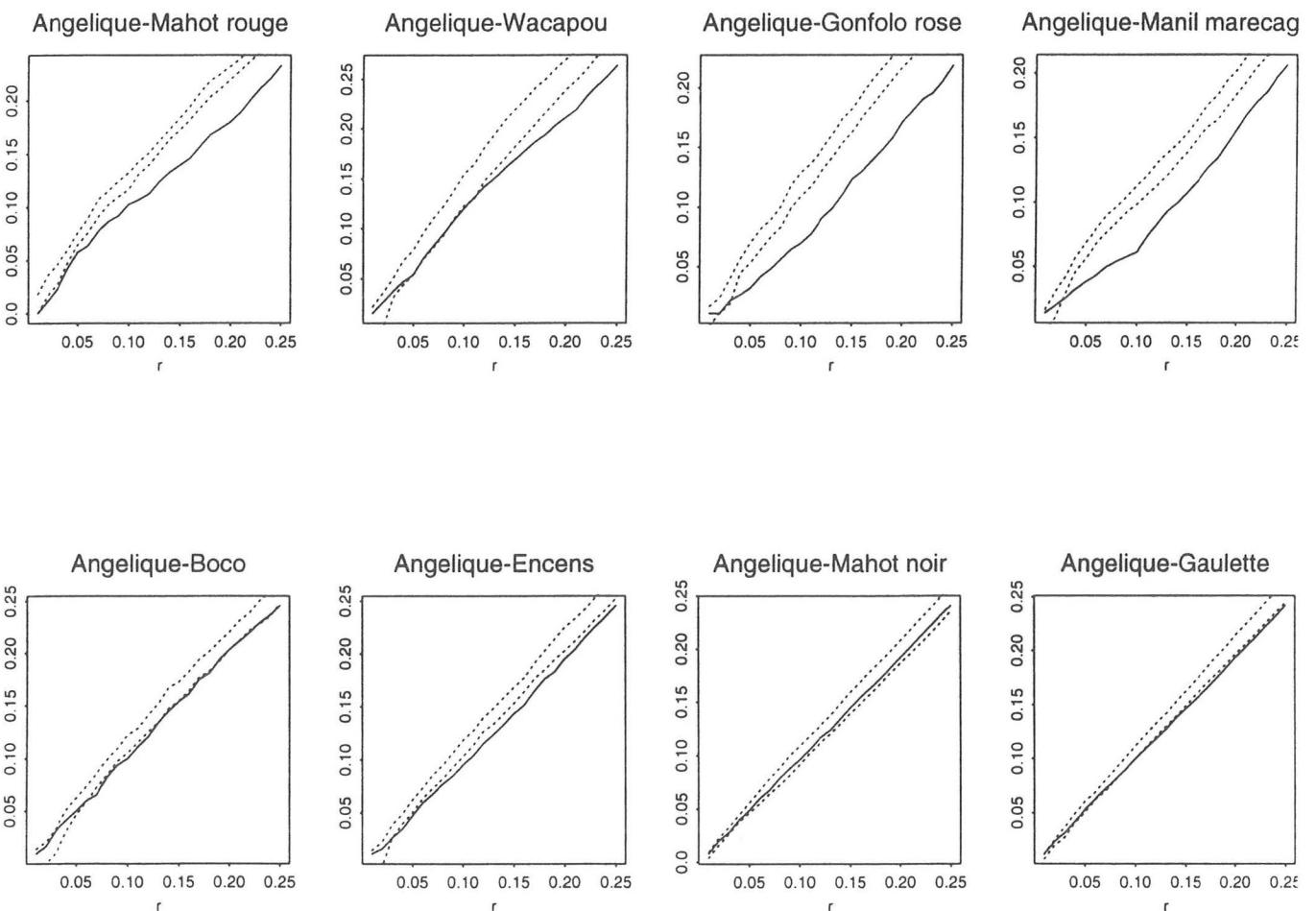
Mahot rouge-Mahot noir



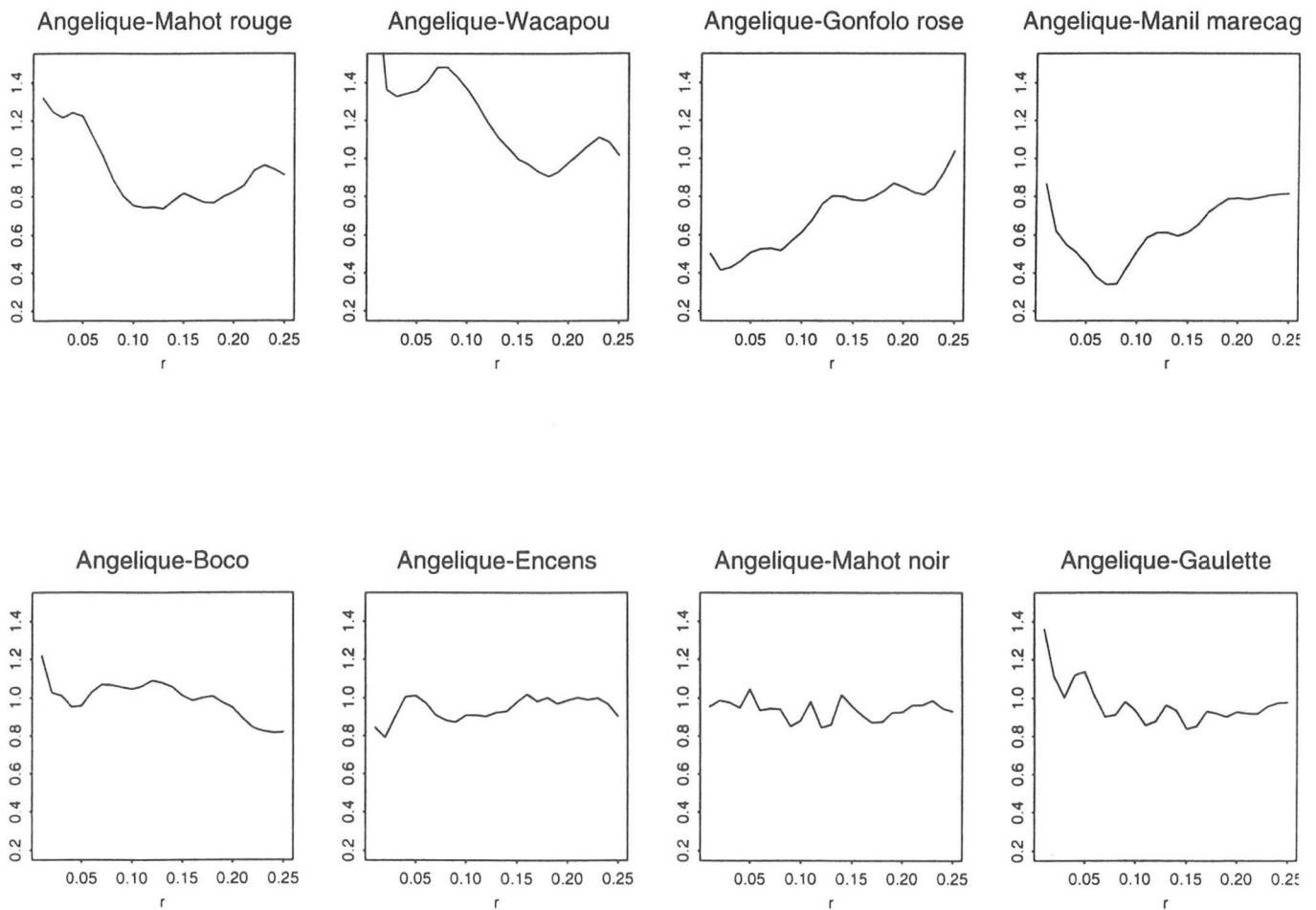
Mahot rouge-Gaulette



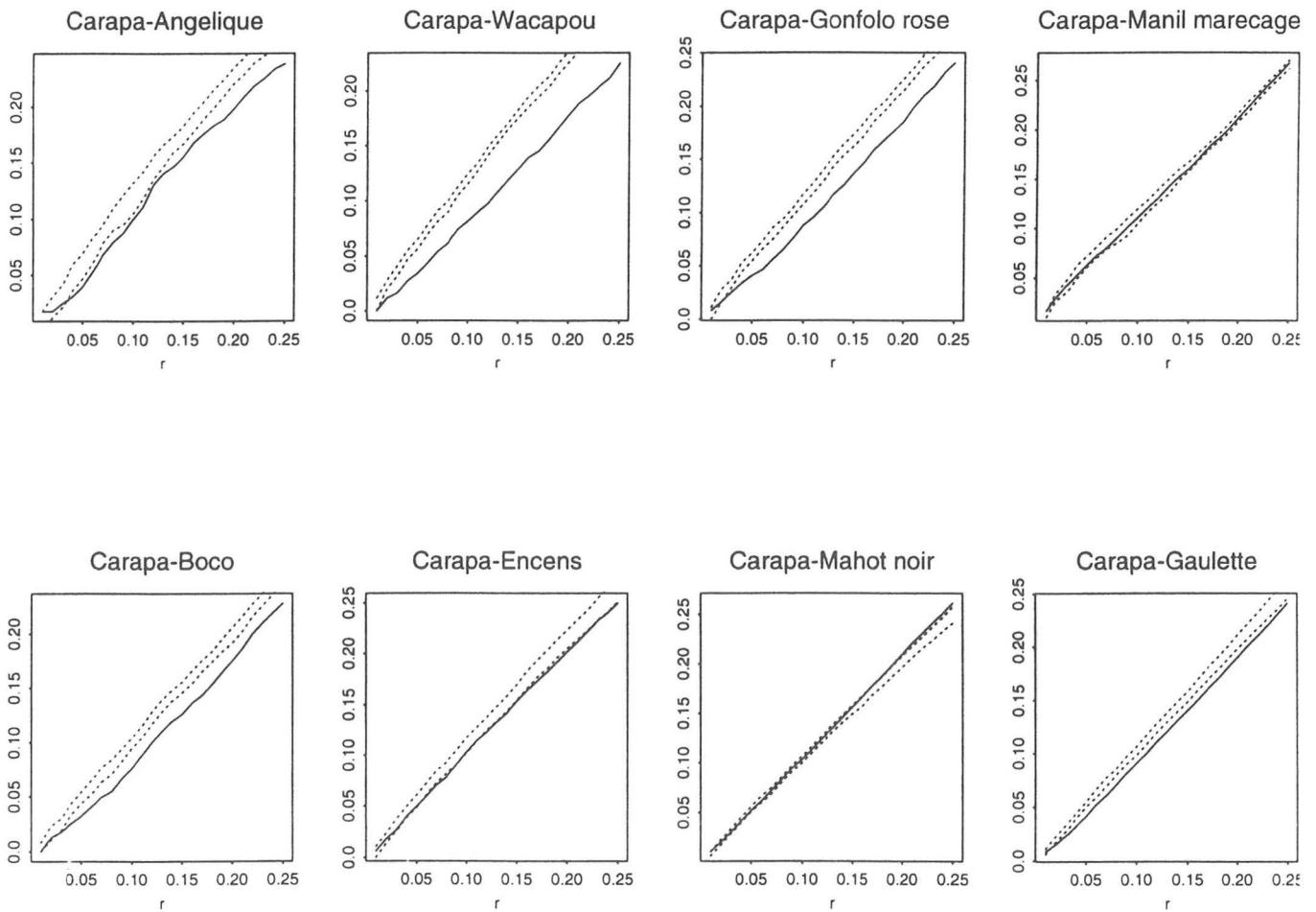
Fonction  $L(r)$  bivariee



Fonction  $g(r)$  bivariee

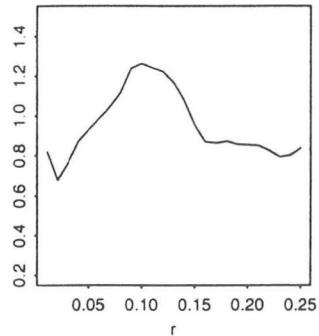


Fonction  $L(r)$  bivariee

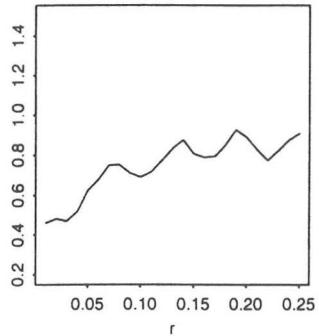


Fonction  $g(r)$  bivariee

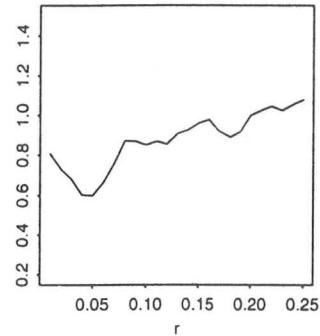
Carapa-Angelique



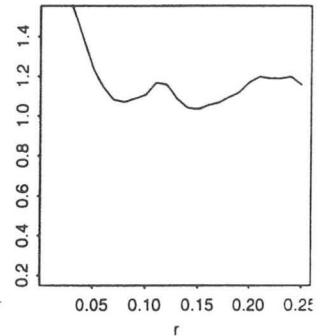
Carapa-Wacapou



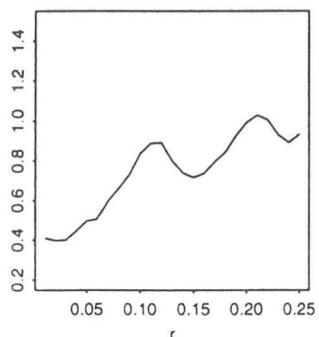
Carapa-Gonfolo rose



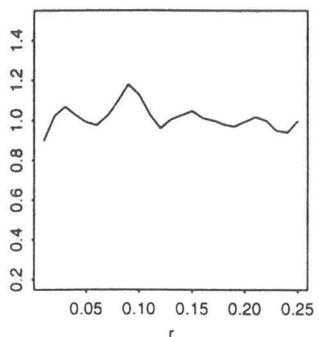
Carapa-Manil marecage



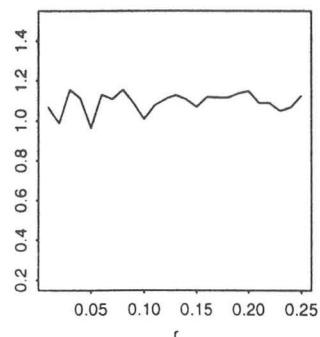
Carapa-Boco



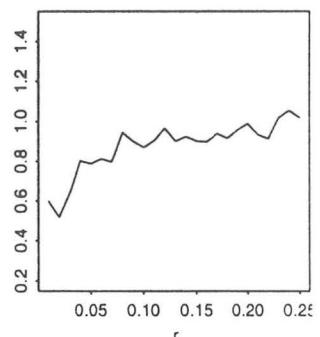
Carapa-Encens



Carapa-Mahot noir



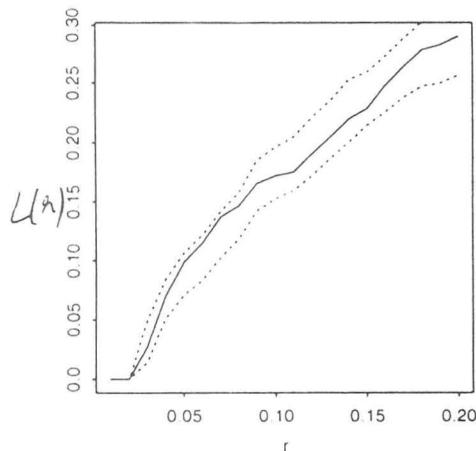
Carapa-Gaulette



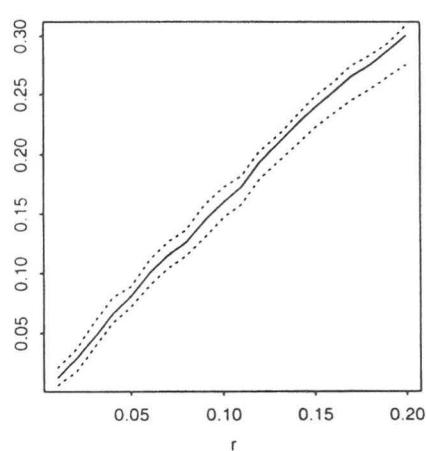
# Etude intraspécifique des circonférences $L_{mm}(r)$

Fonctions  $L_{mm}(r)$  des circonference

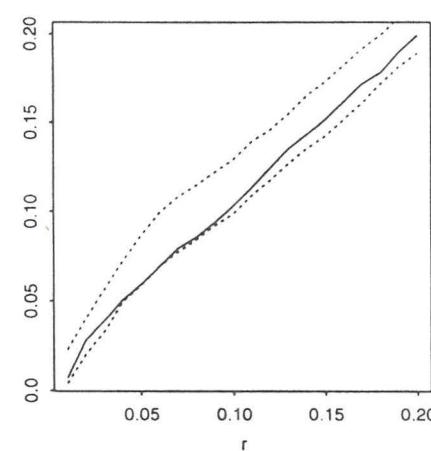
Angelique



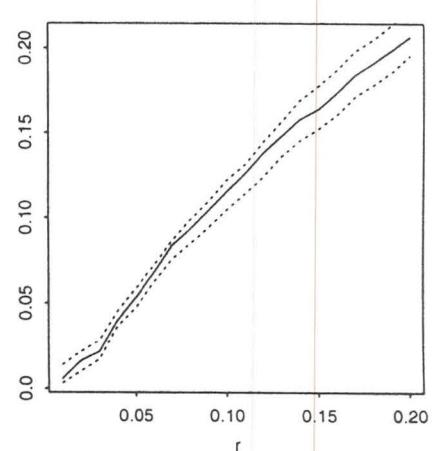
Wacapou



Manil mareage

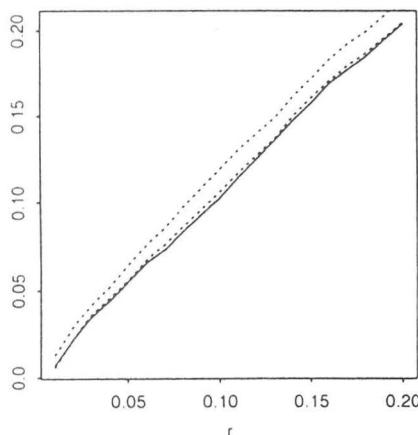


Boco

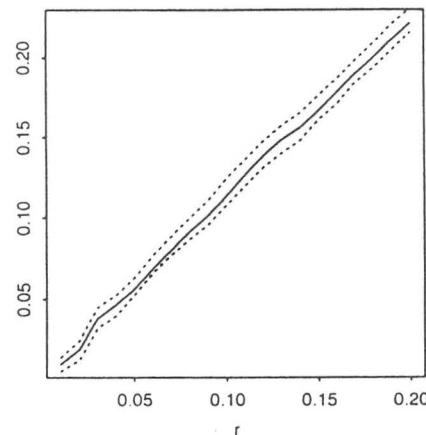


89

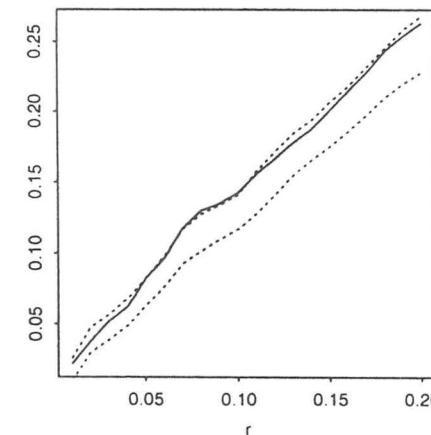
Tosso passa



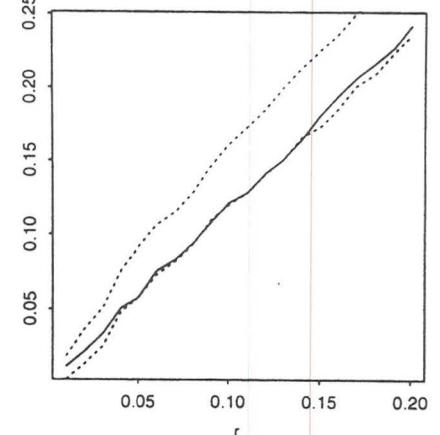
Encens



Mahot Rouge

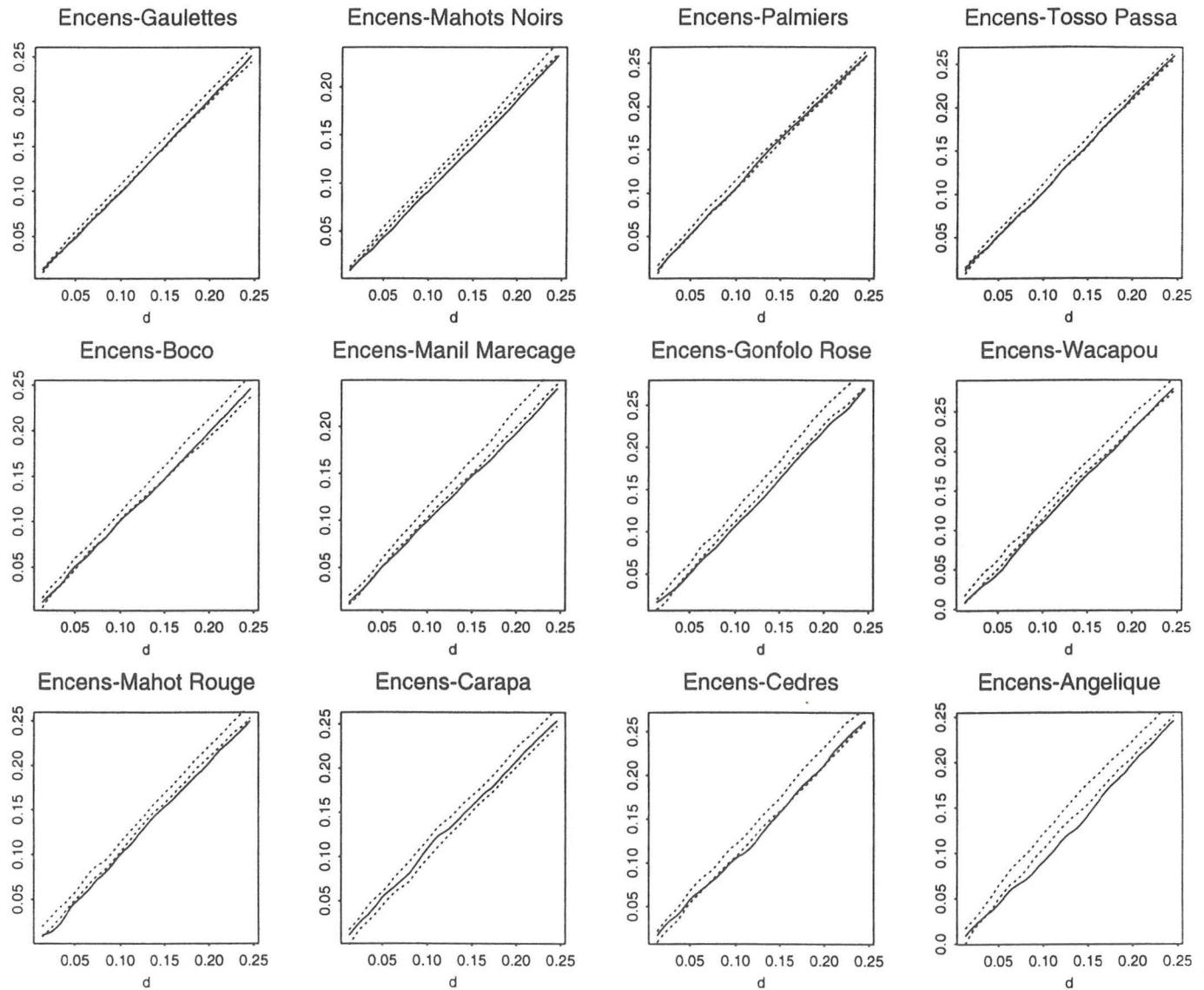


Gonfolo Rose

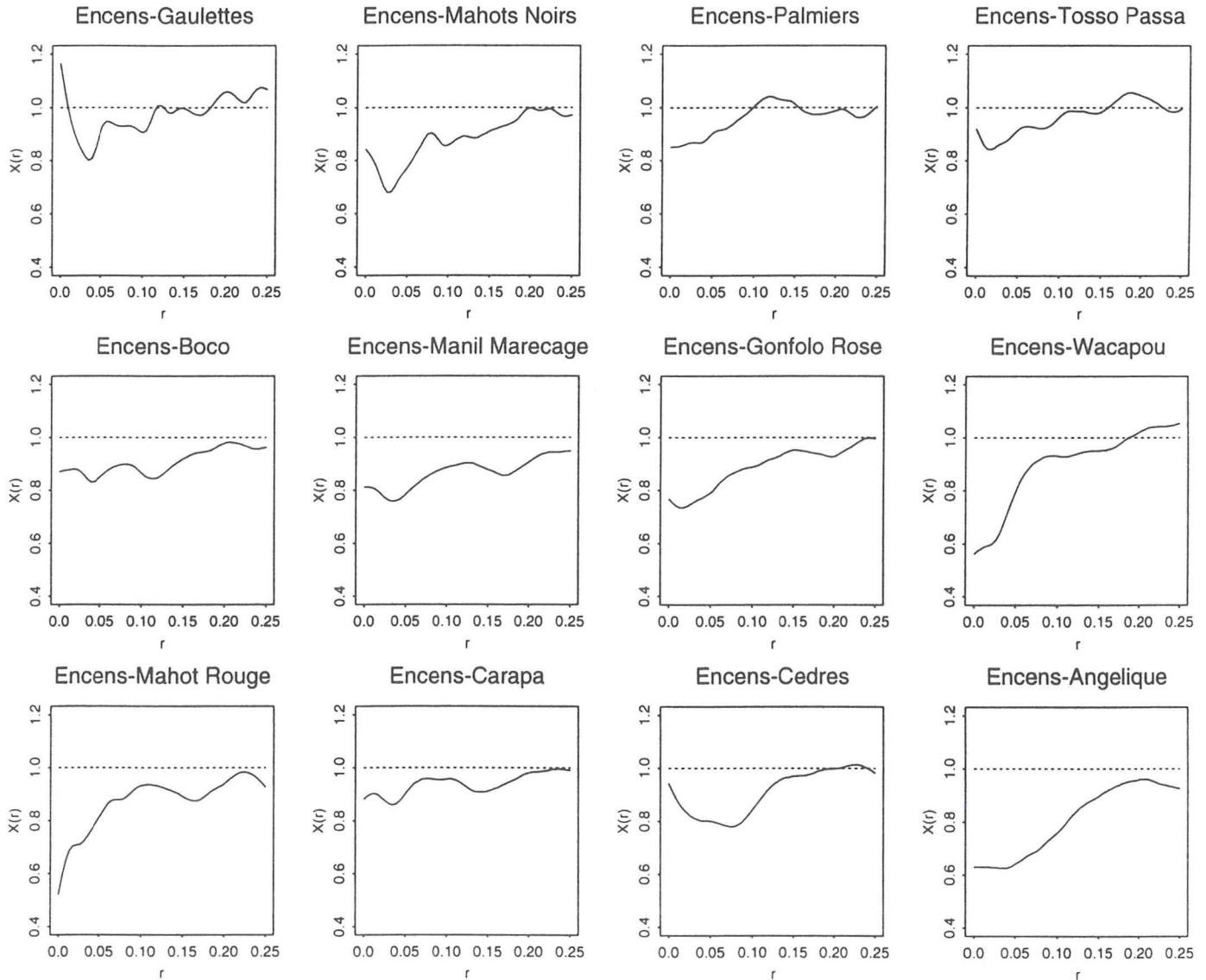


# Etude interspécifique des circonférences $L_{m^i m^j}(r)$ et $\chi_{m^i m^j}(r)$

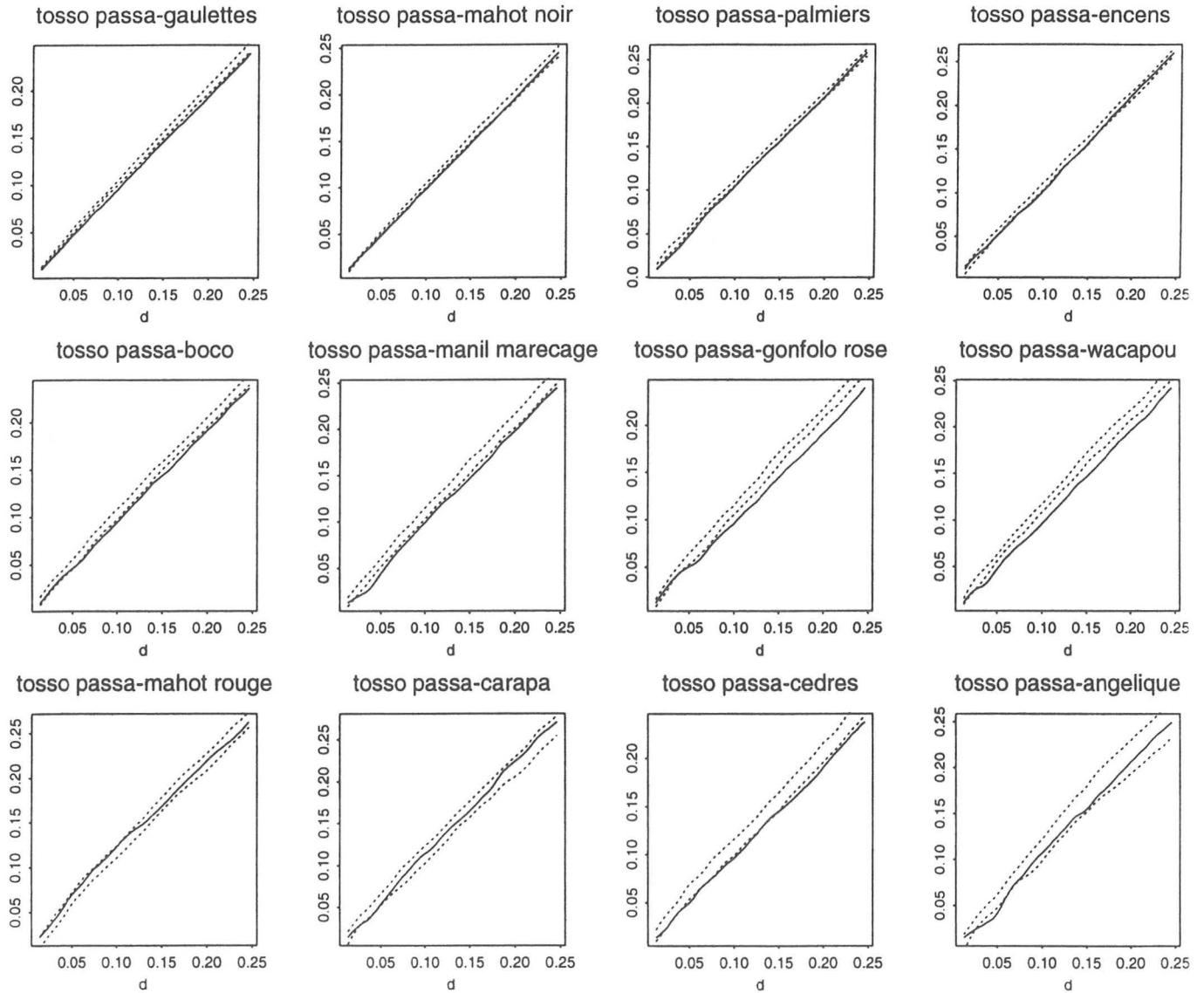
## Etude des circonférences interspécifique $L_{m^i m^j}(r)$



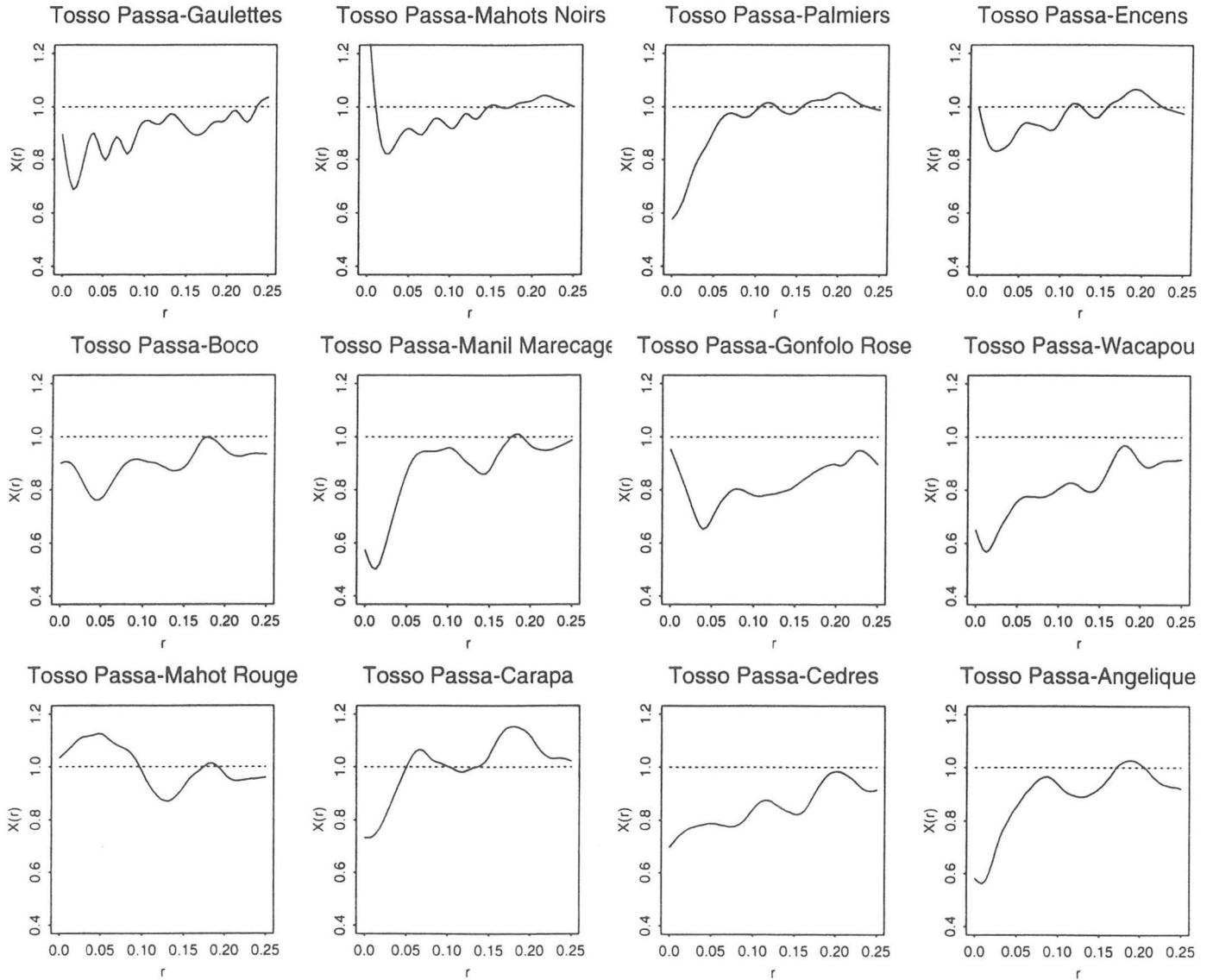
## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$



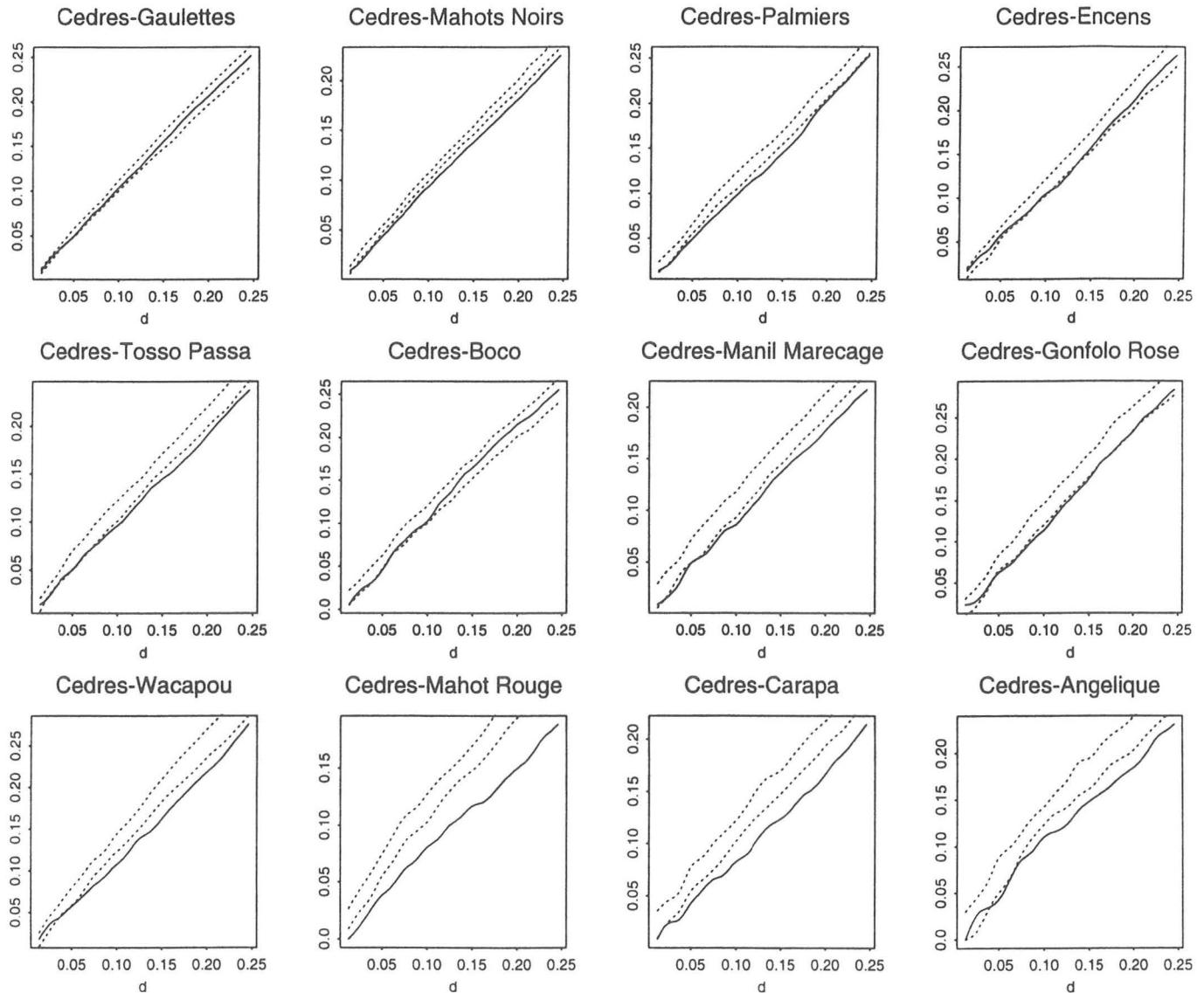
## Etude des circonférences interspécifique $L_{m^i m^j}(r)$



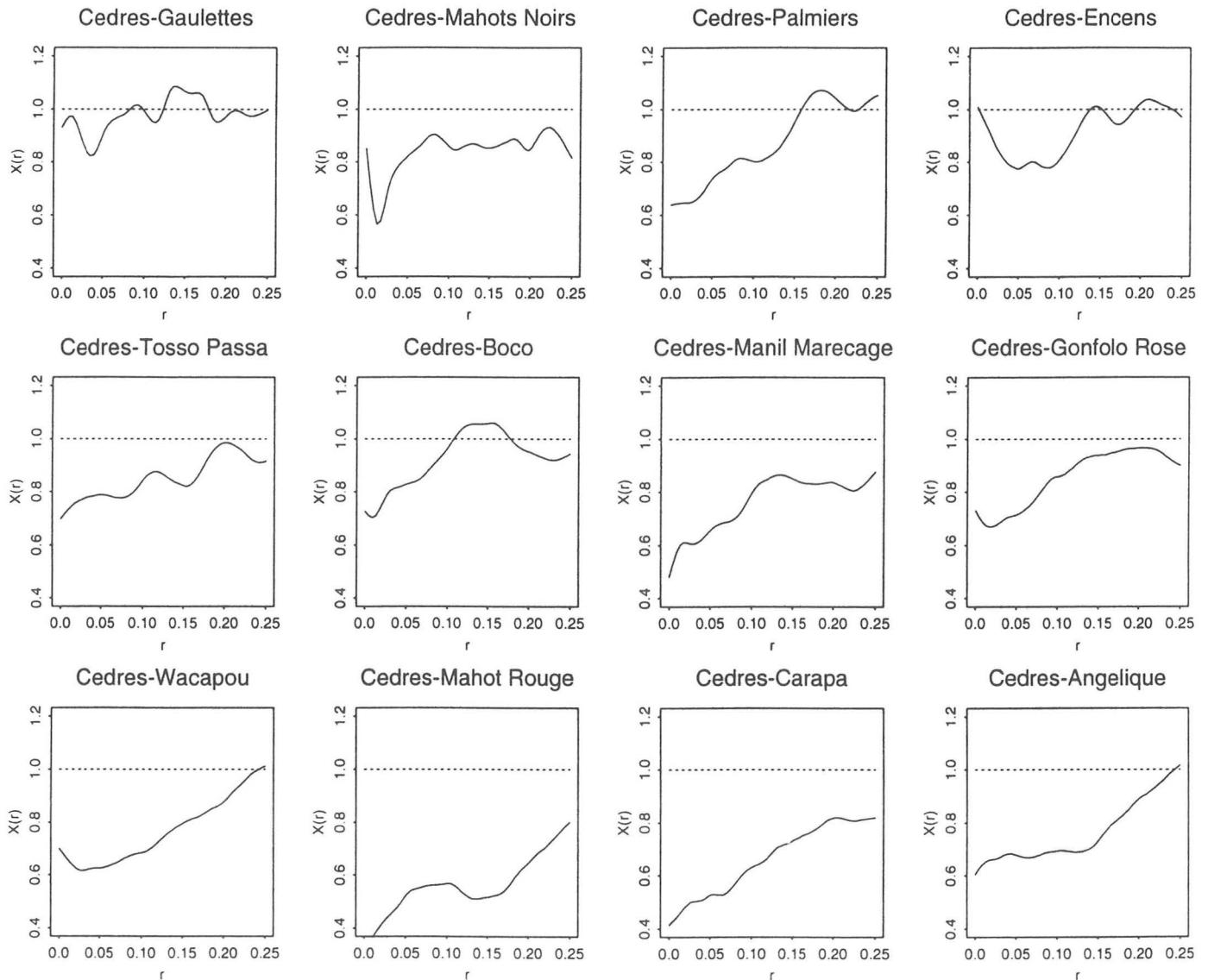
## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$



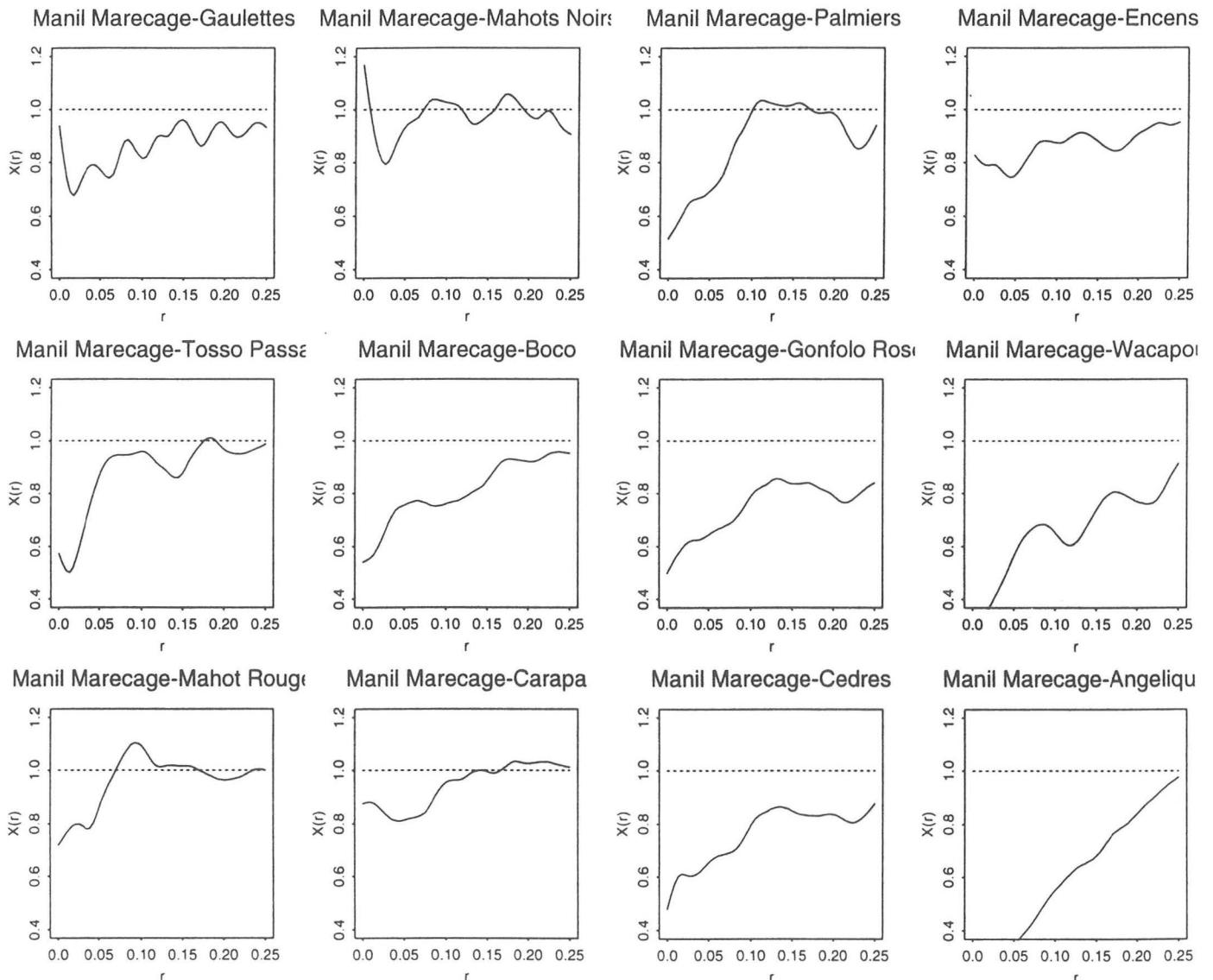
## Etude des circonférences interspécifique $L_{mimj}(r)$



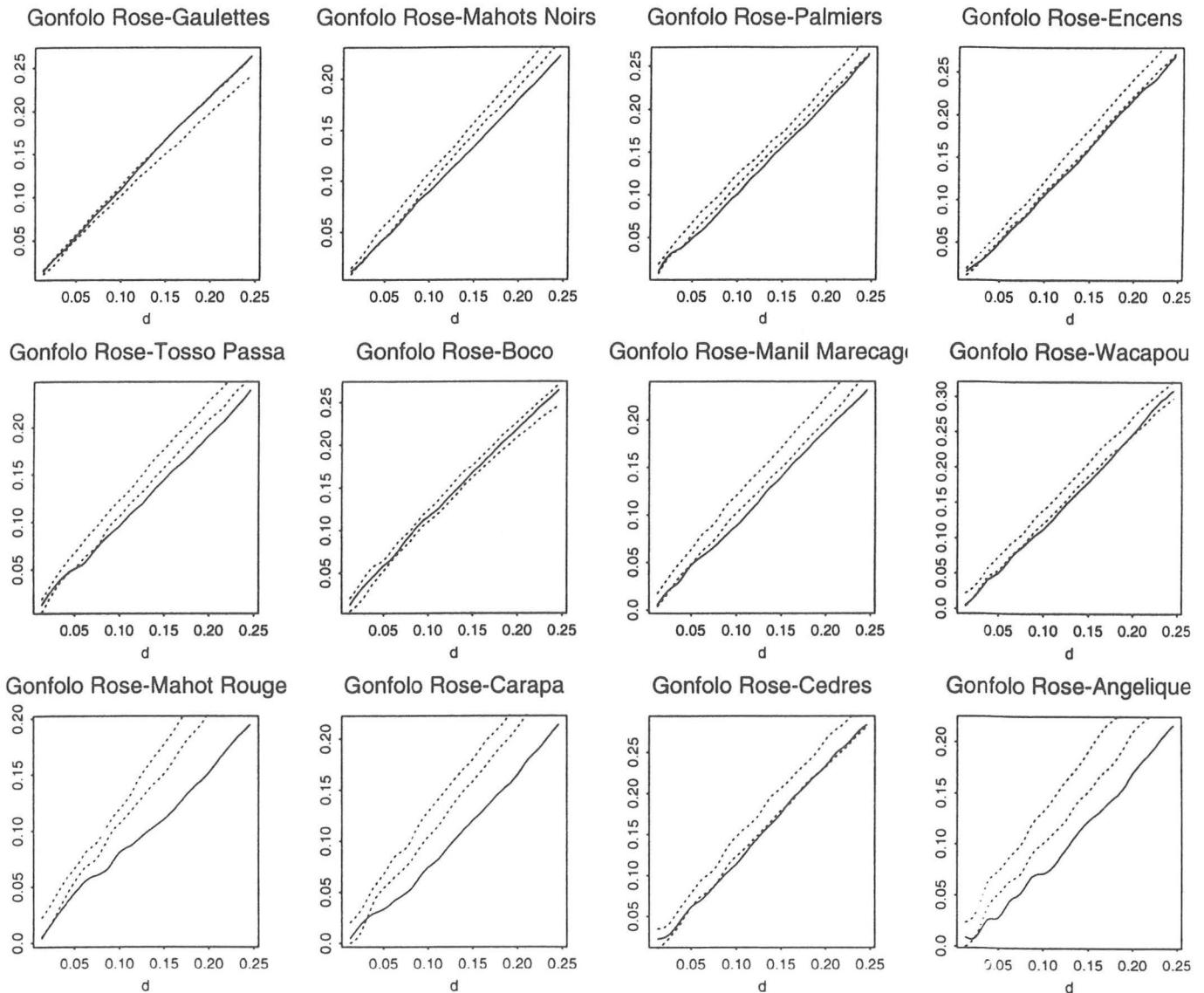
## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$



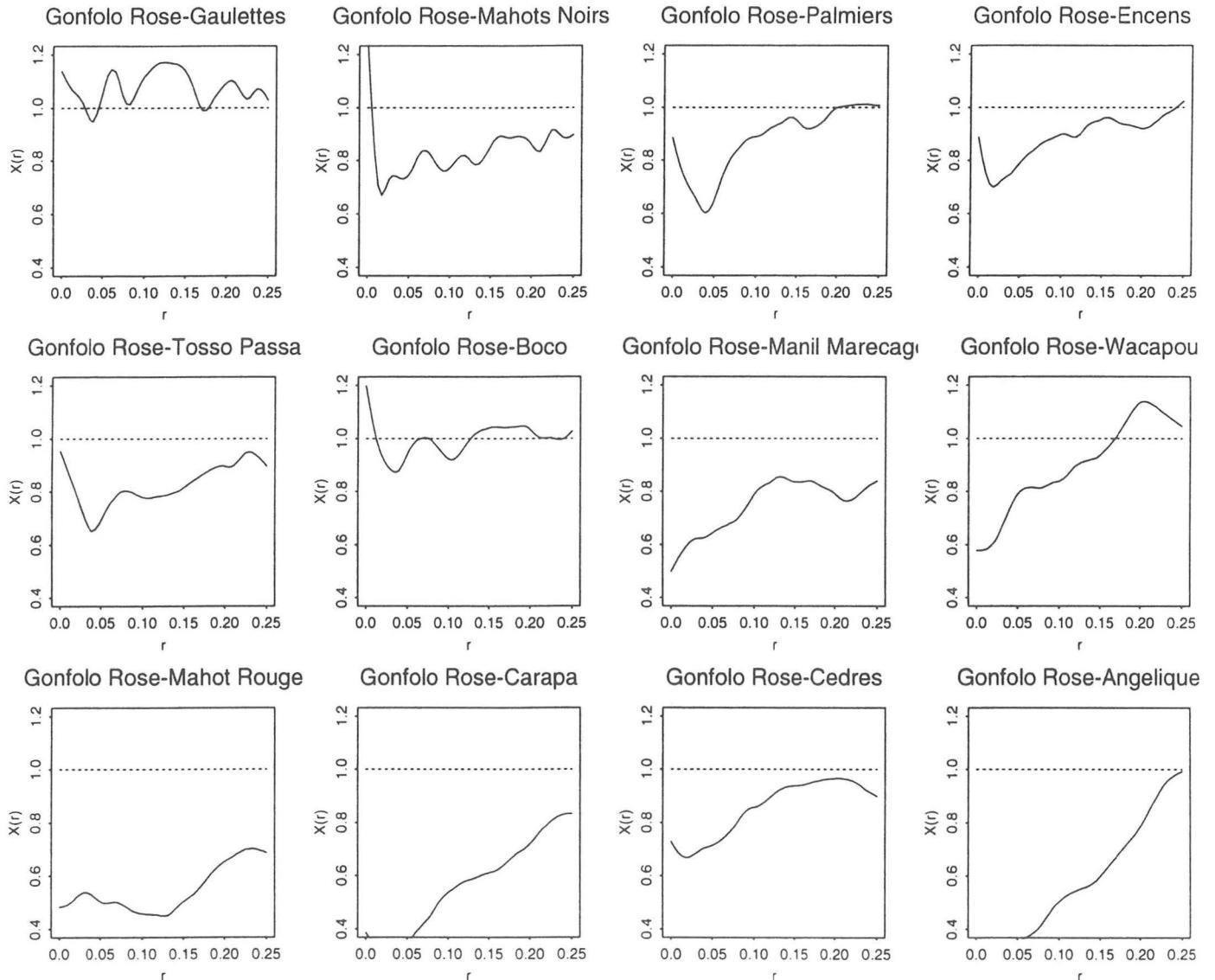
## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$



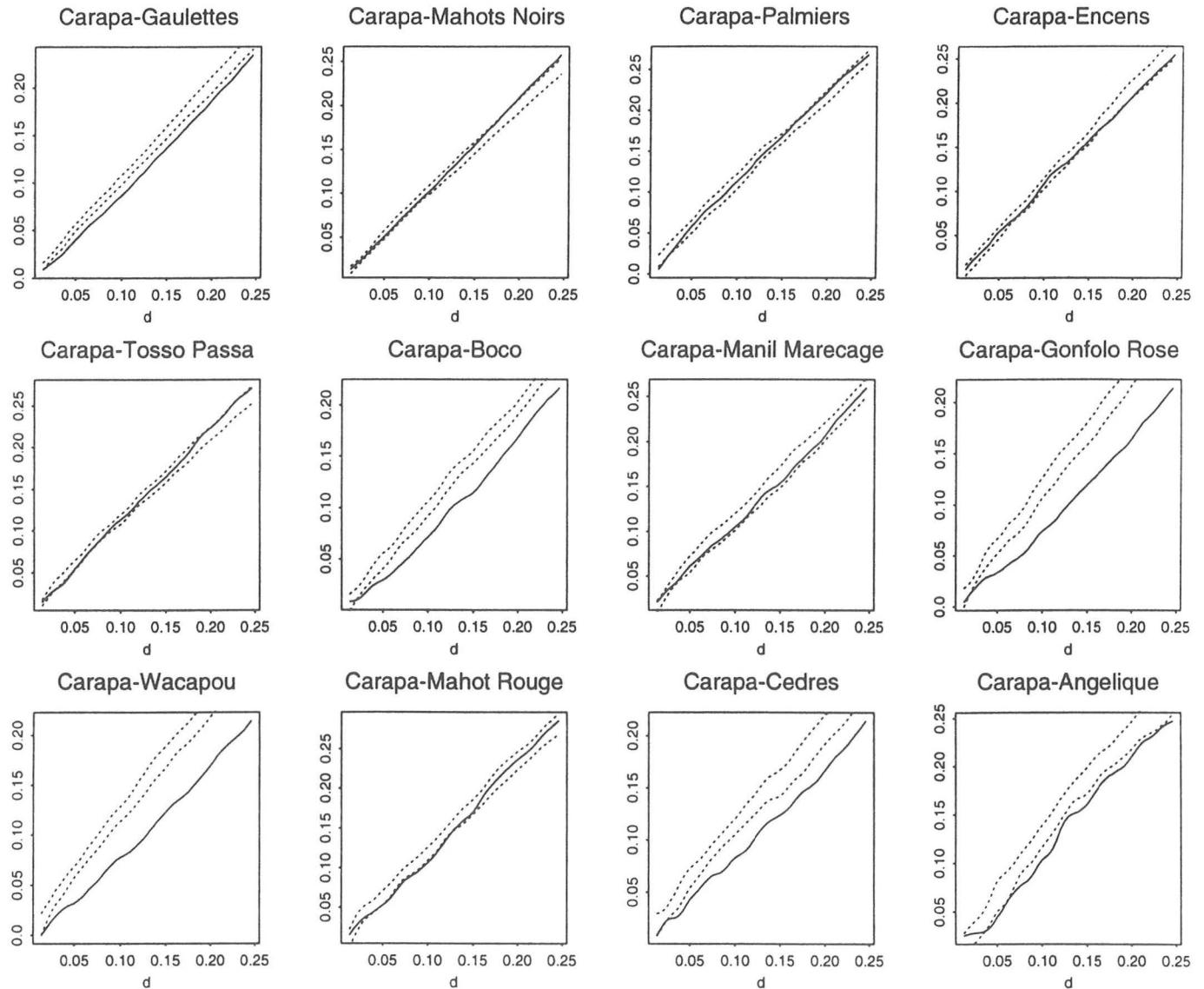
## Etude des circonférences interspécifique $L_{mimj}(r)$



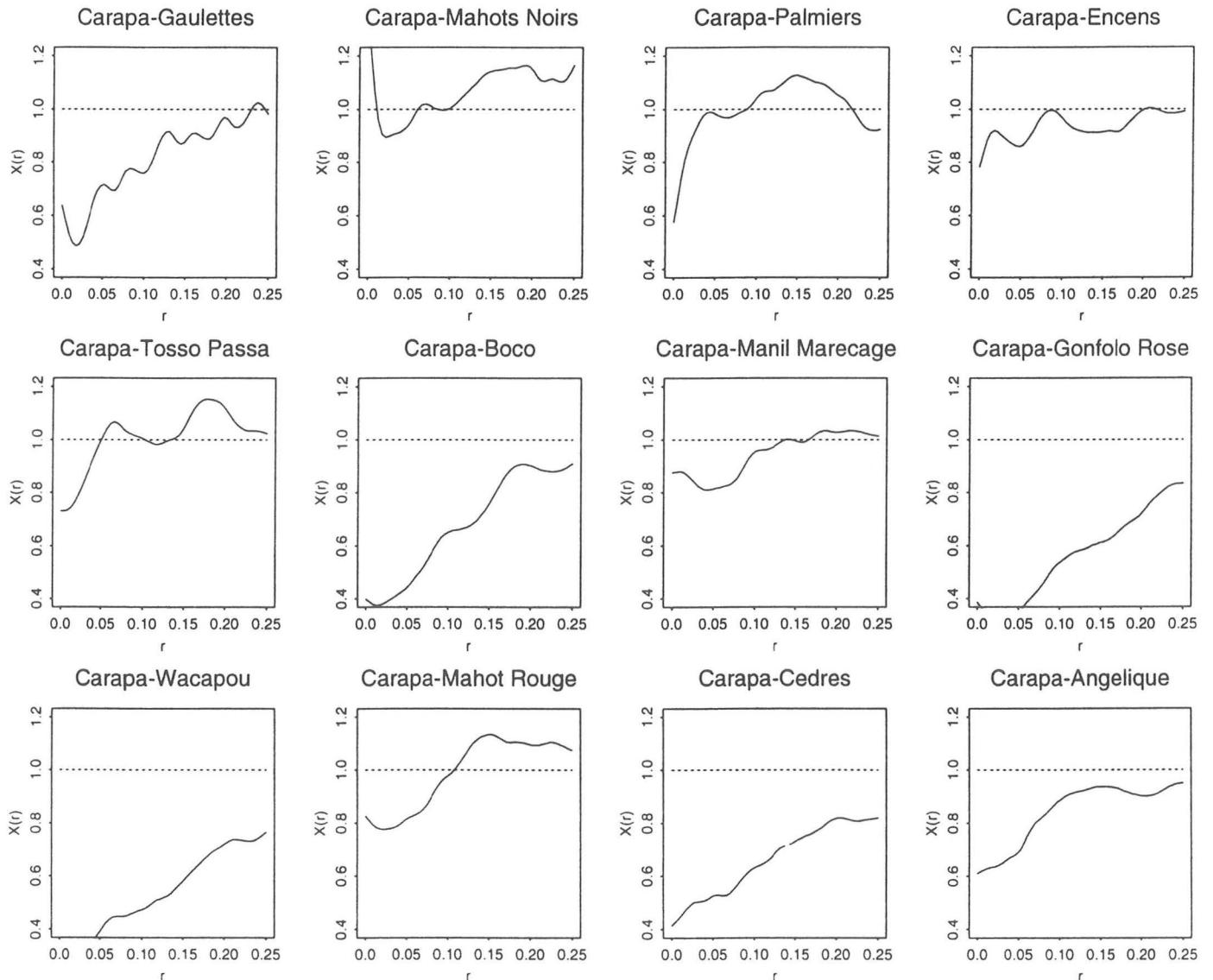
## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$



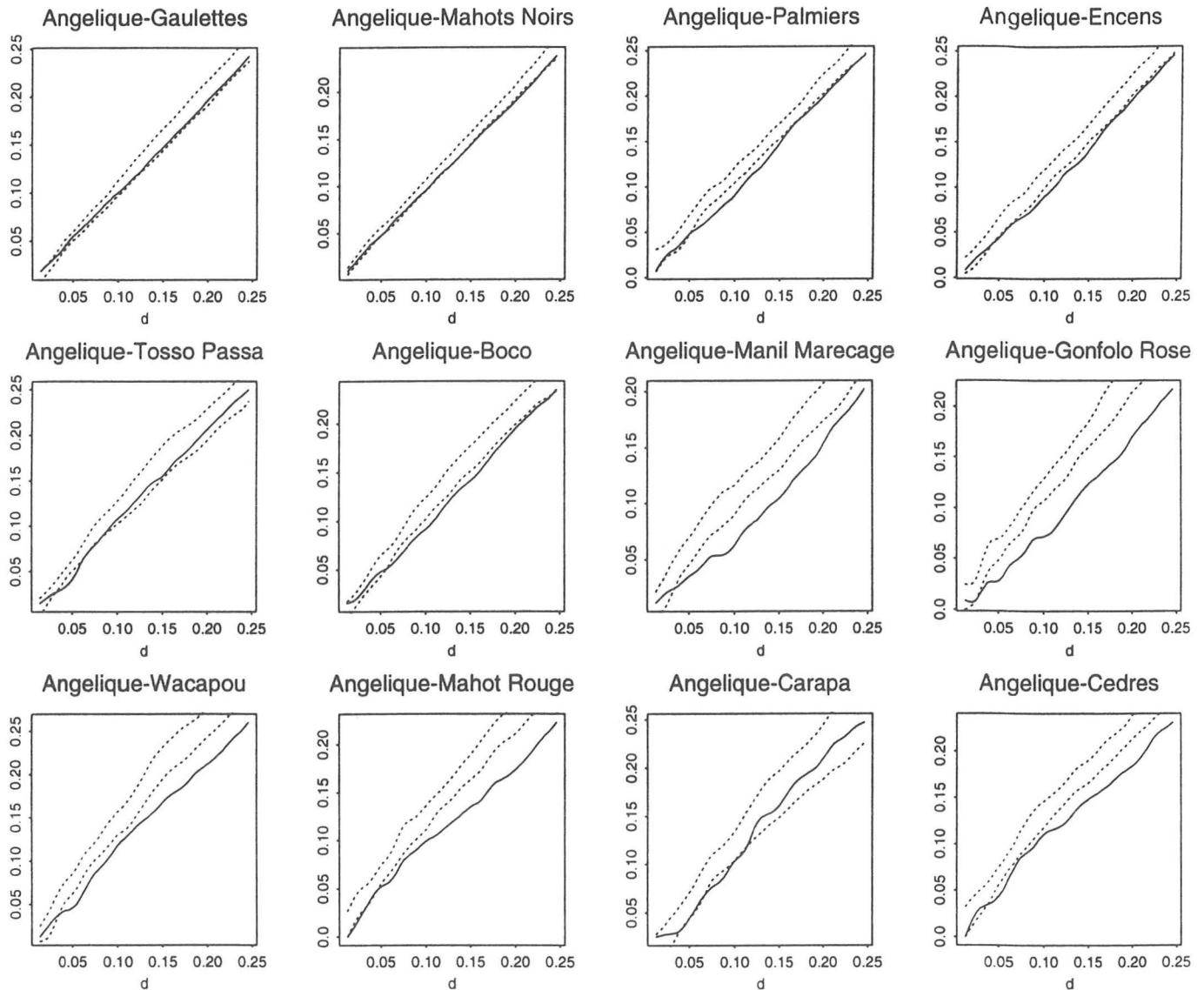
## Etude des circonférences interspécifique $L_{m^i m^j}(r)$



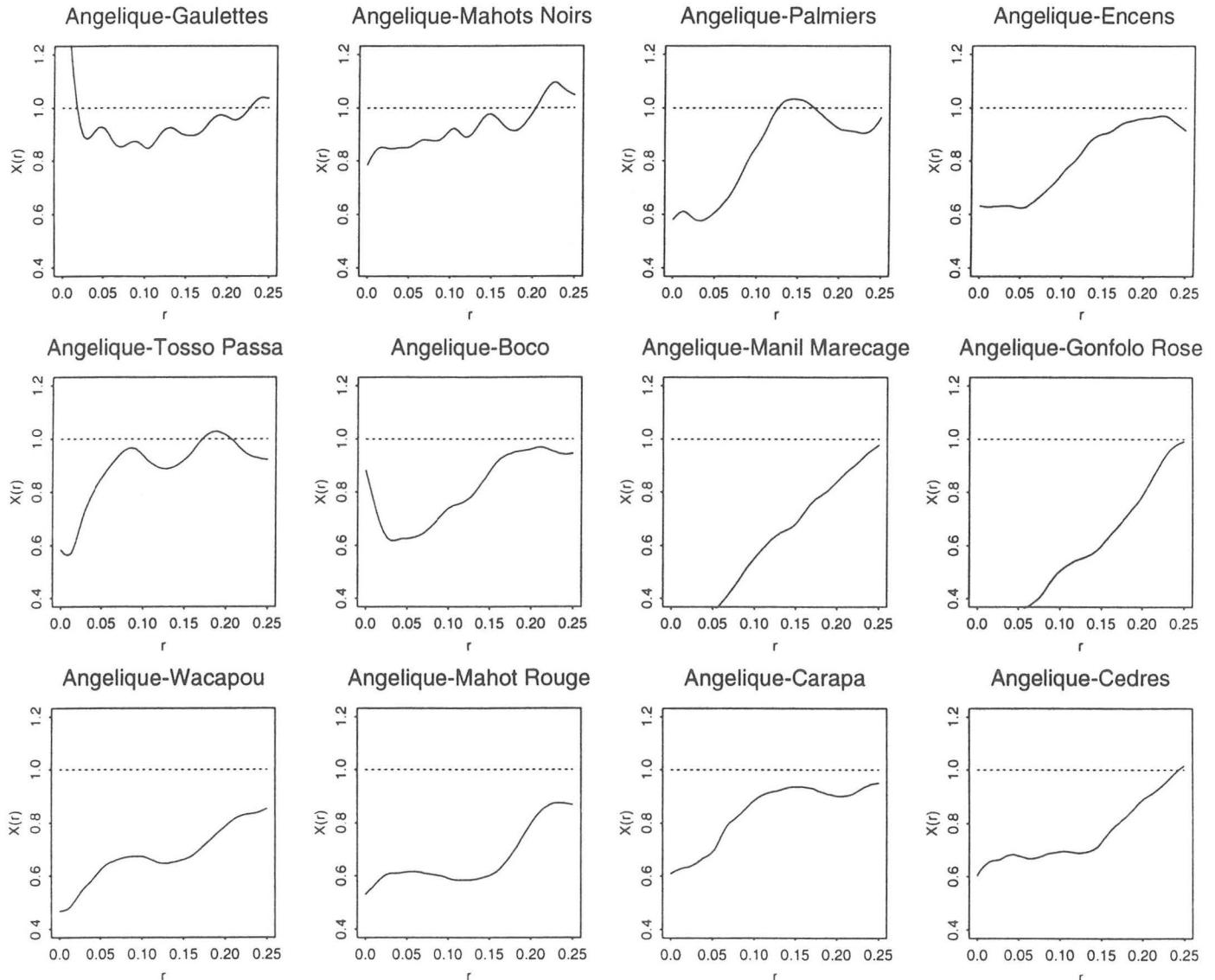
## Etude des circonférences interspécifique $\chi_{m^i m_j}(r)$



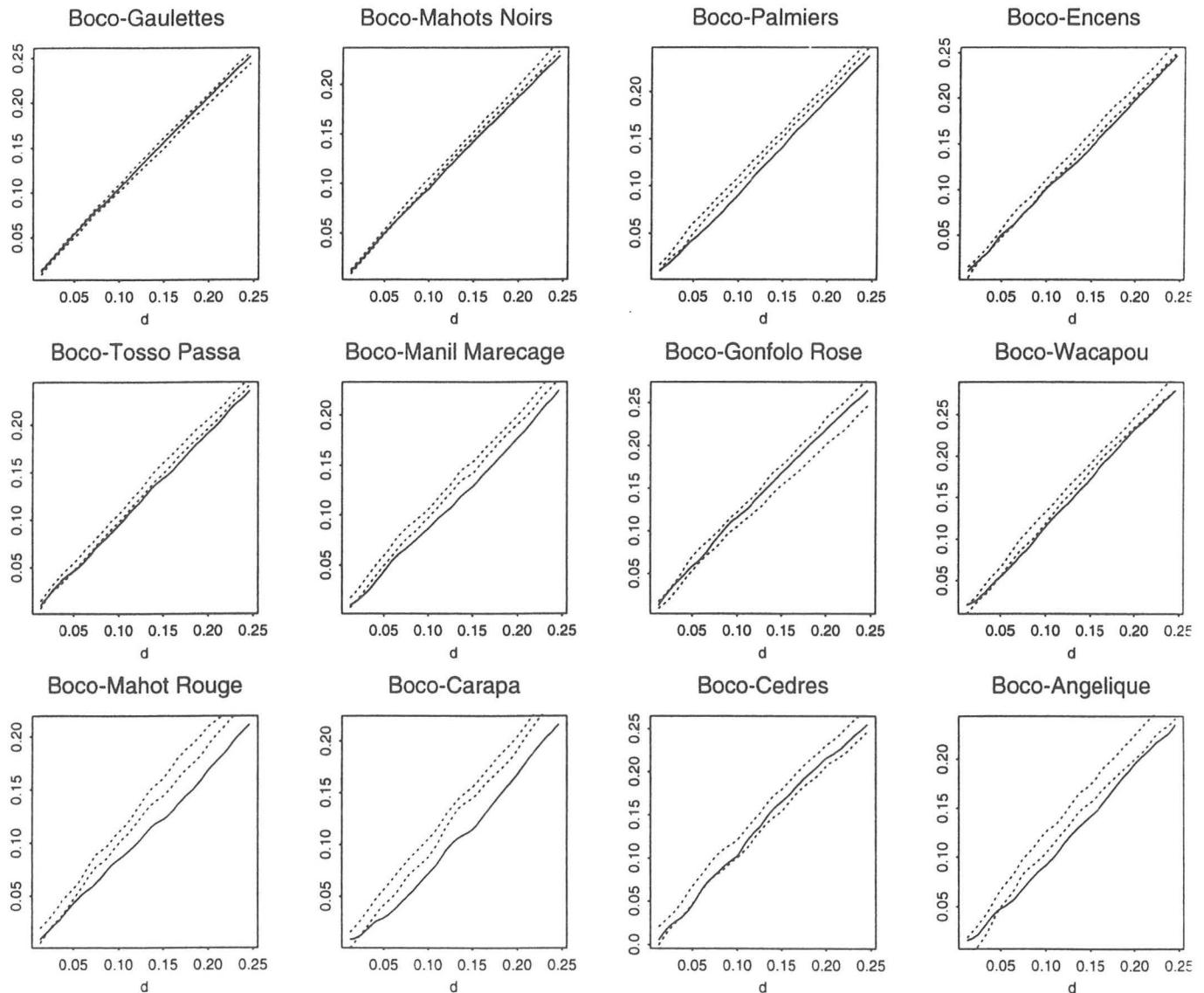
## Etude des circonférences interspécifique $L_{m^i m^j}(r)$



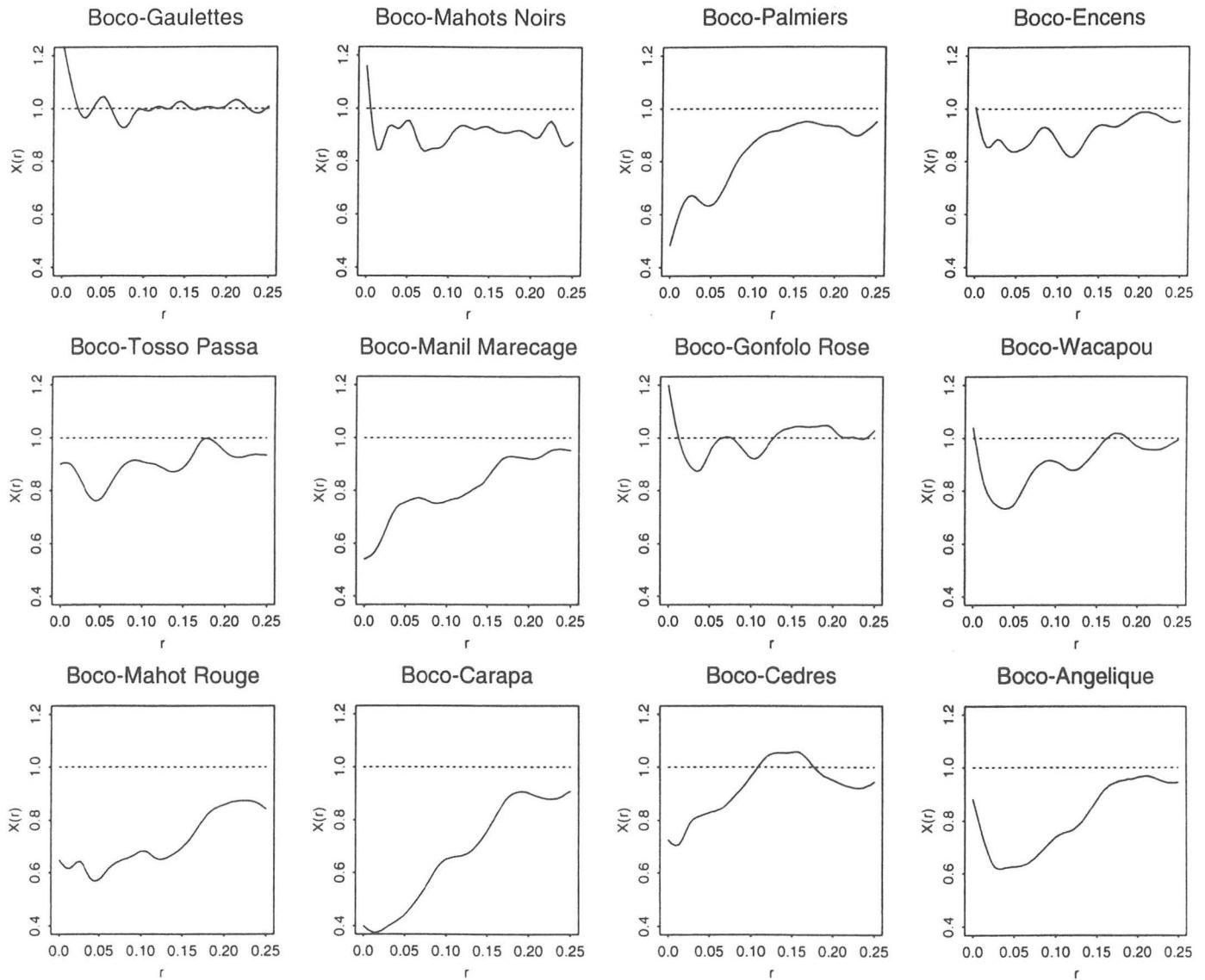
## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$



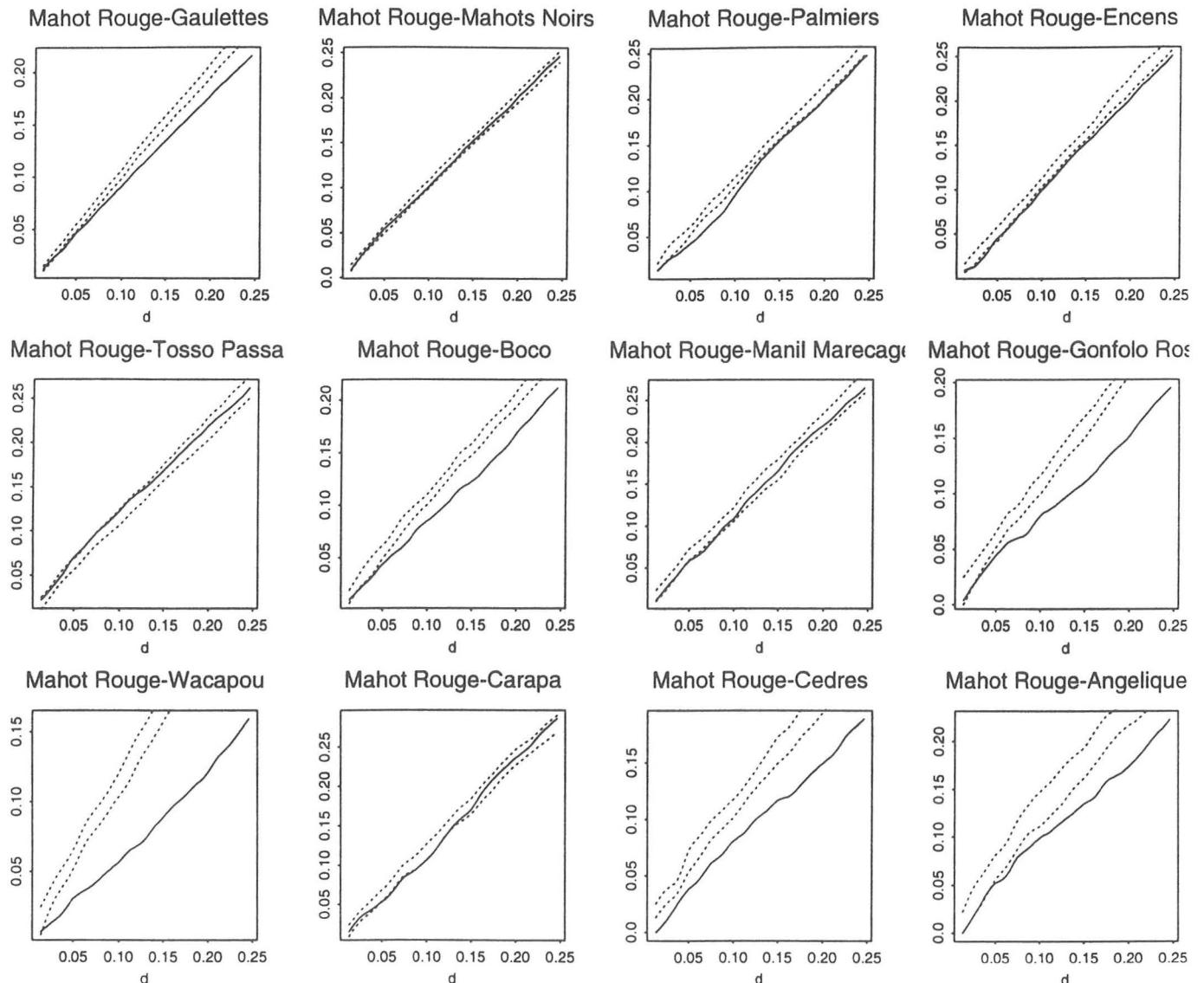
## Etude des circonférences interspécifique $L_{m^i m^j}(r)$



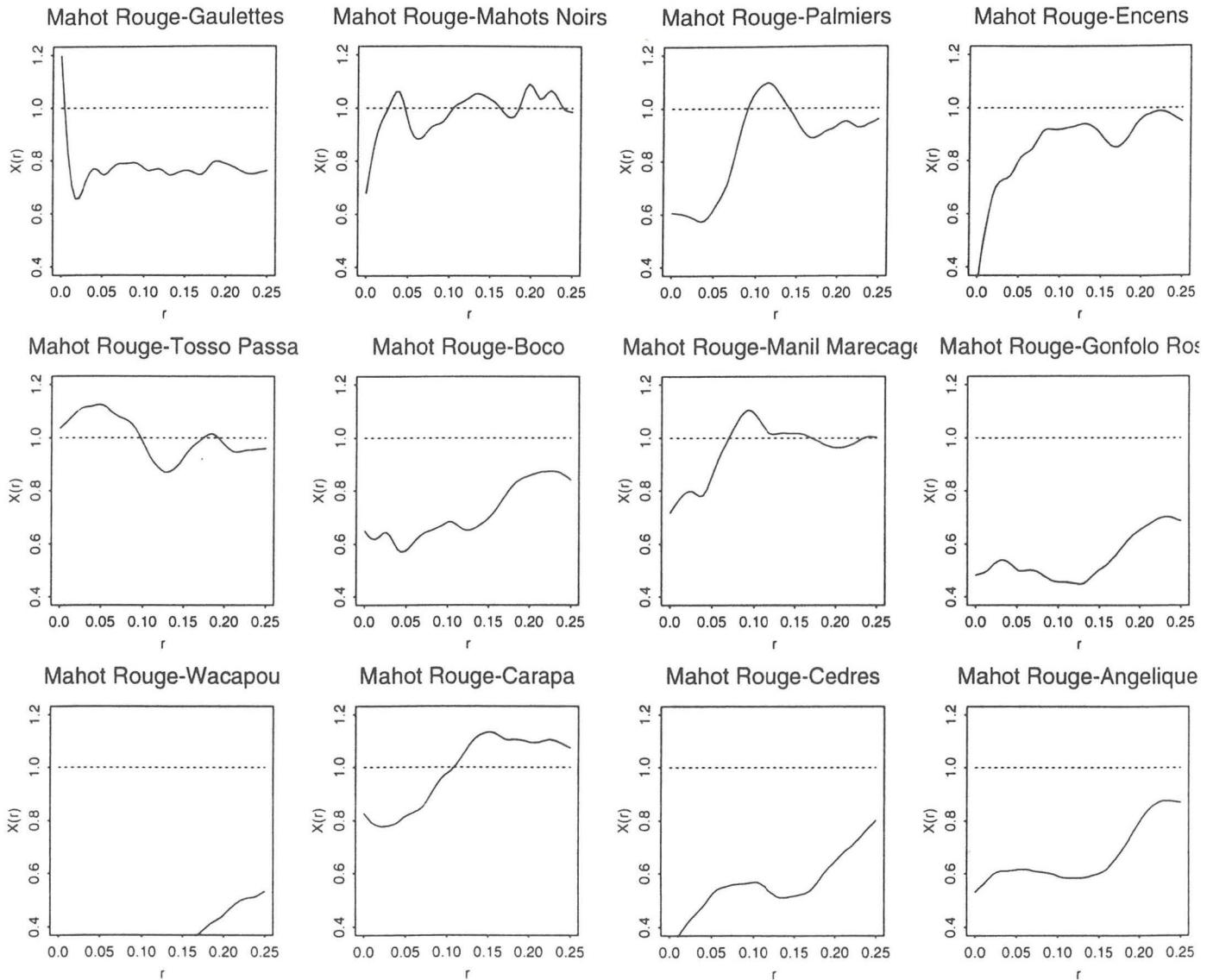
## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$



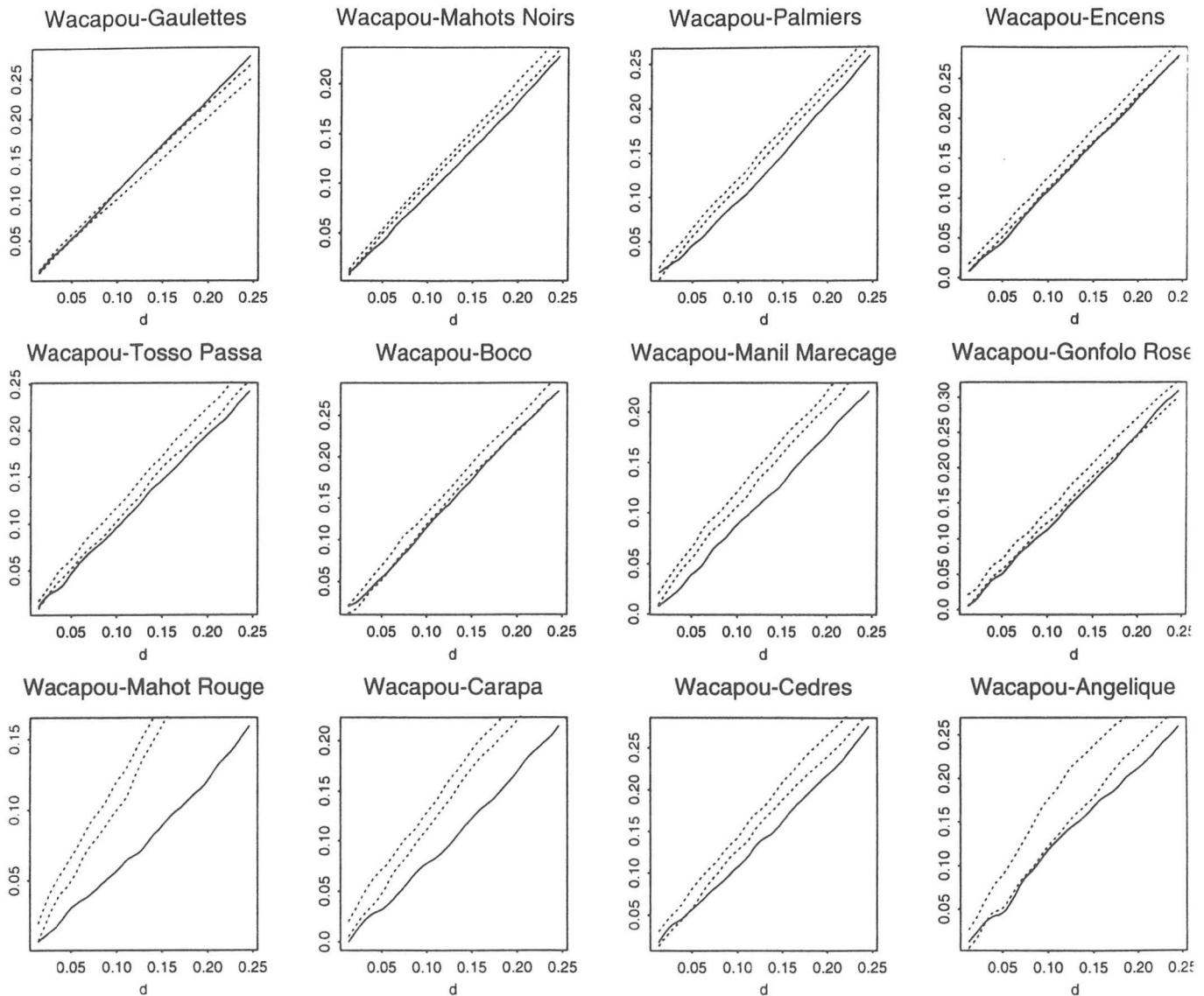
## Etude des circonférences interspécifique $L_{m^i m^j}(r)$



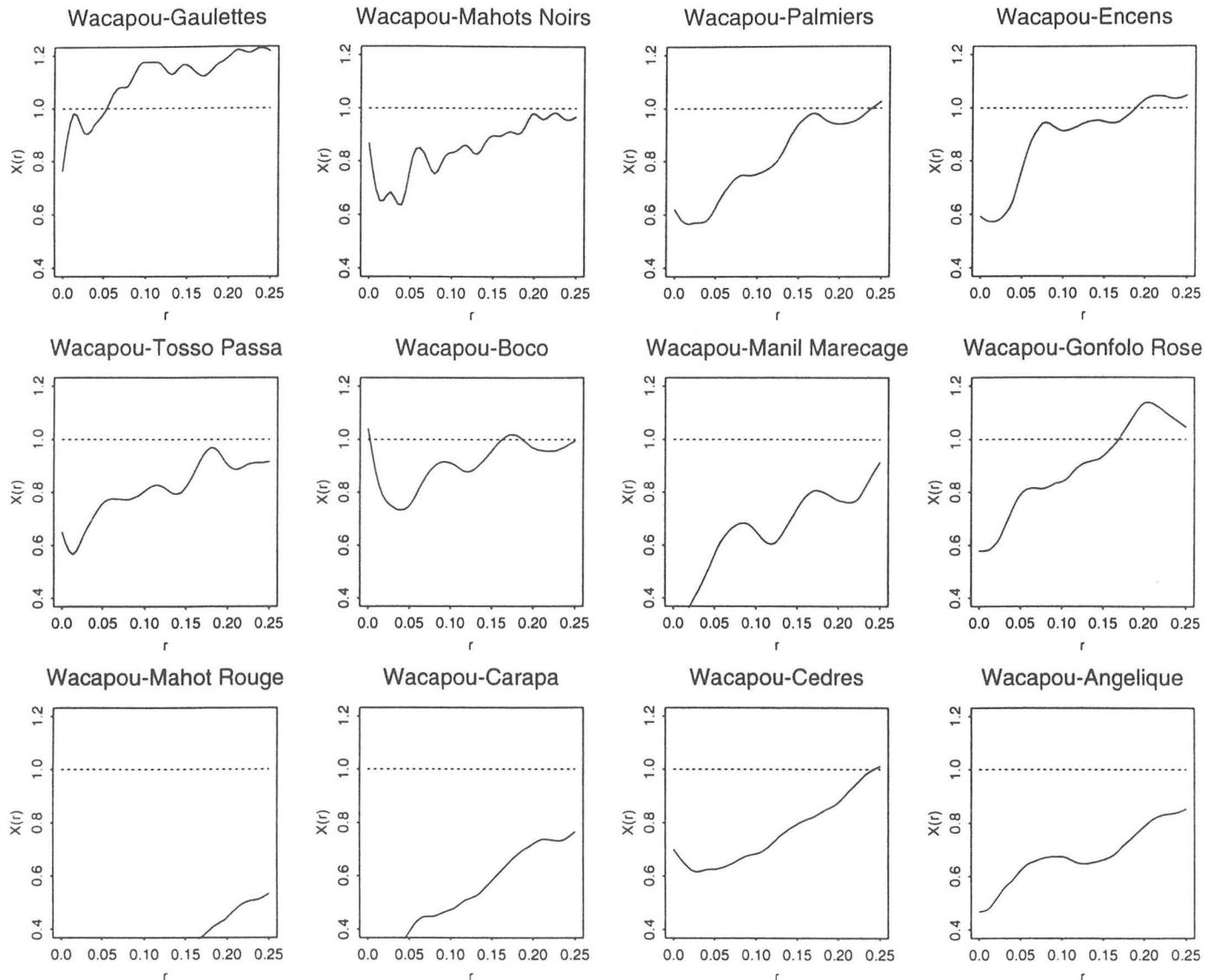
## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$



## Etude des circonférences interspécifique $L_{m^i m^j}(r)$



## Etude des circonférences interspécifique $\chi_{m^i m^j}(r)$

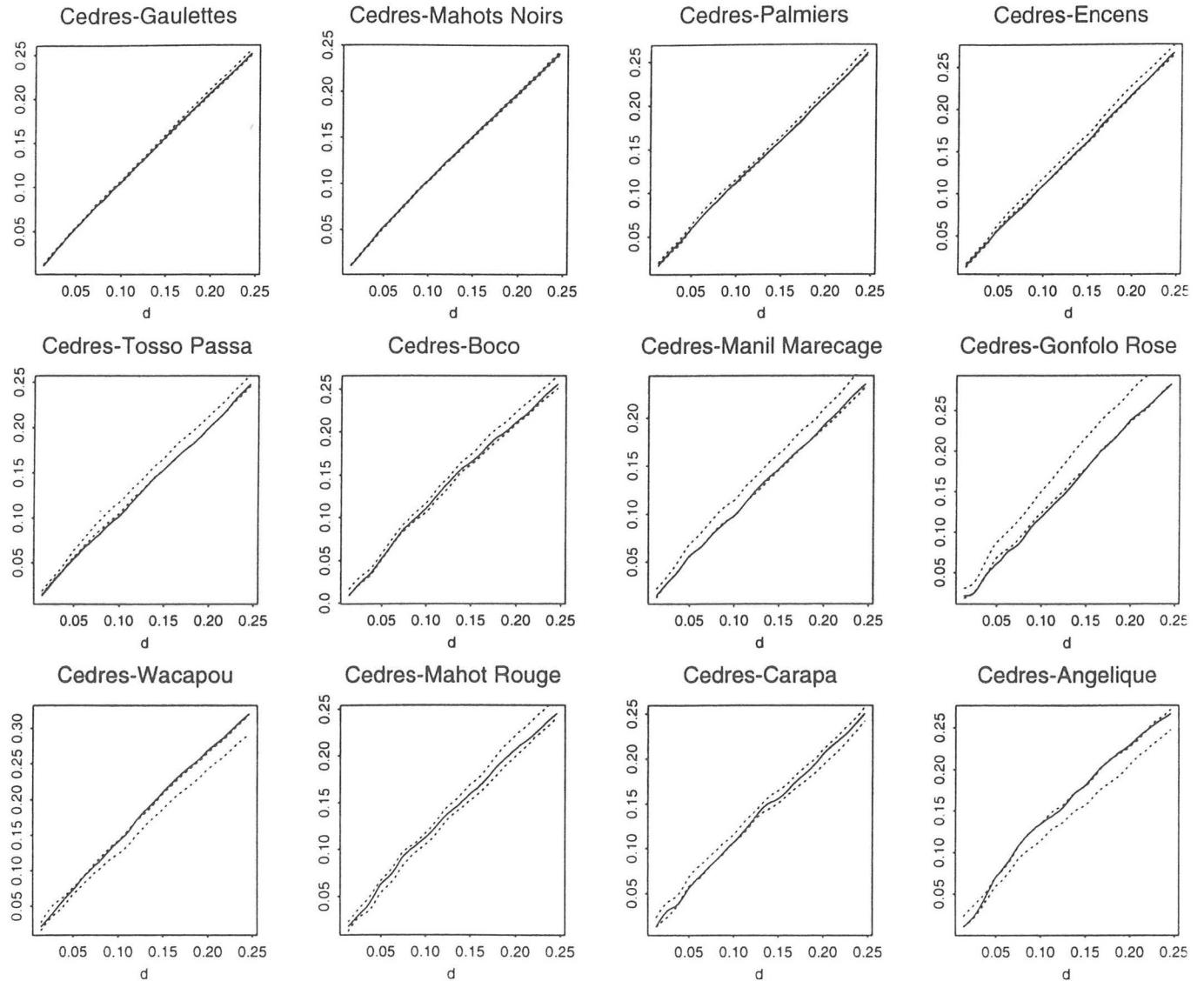


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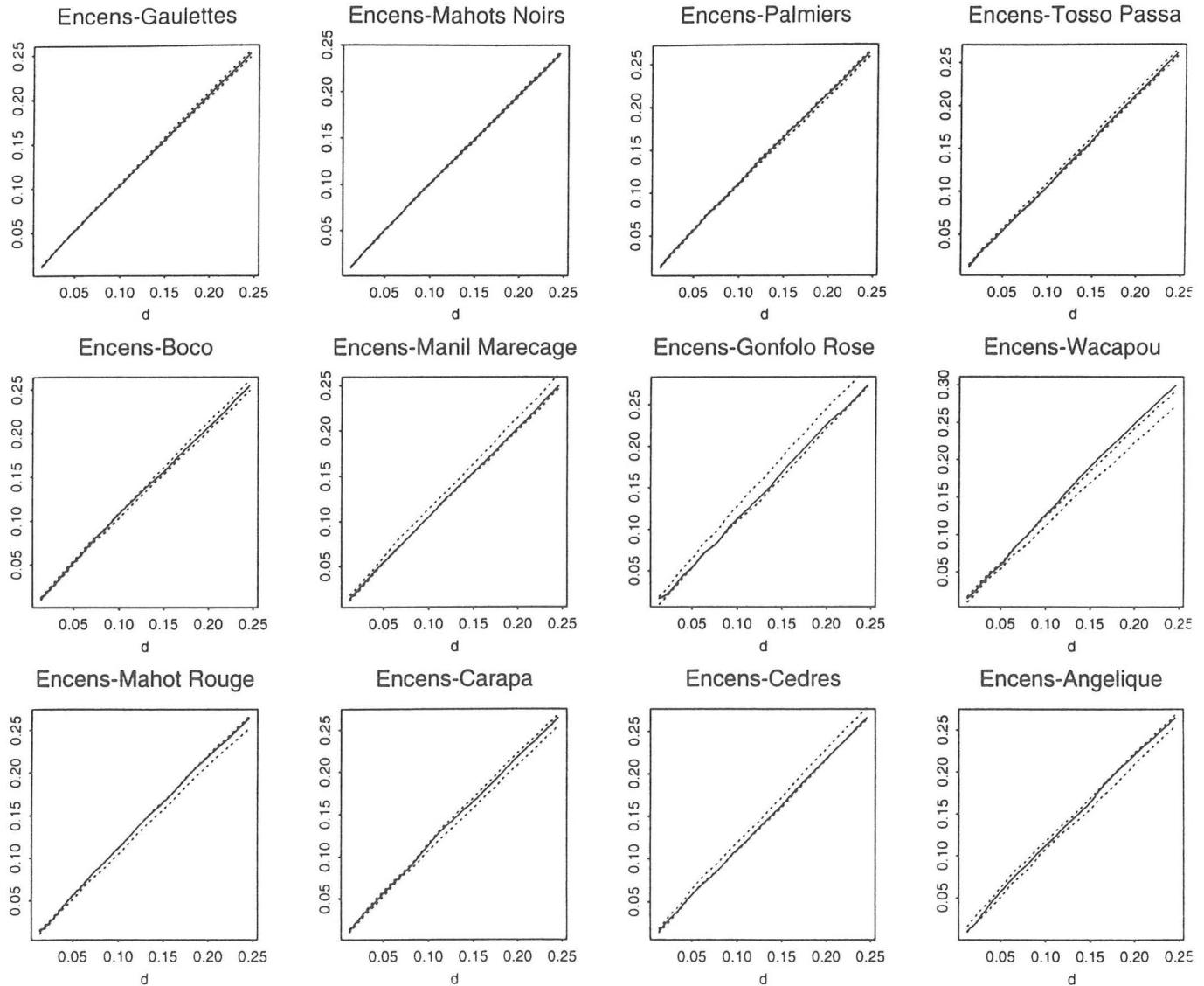
## Etude “intraspécifique” des circonférences $L_{mm}(r)$

*L ’étude des corrélations entre circonférences est réalisée au sein d ’une seule population formée par deux espèces indiquées dans les titres de chacun des graphiques*

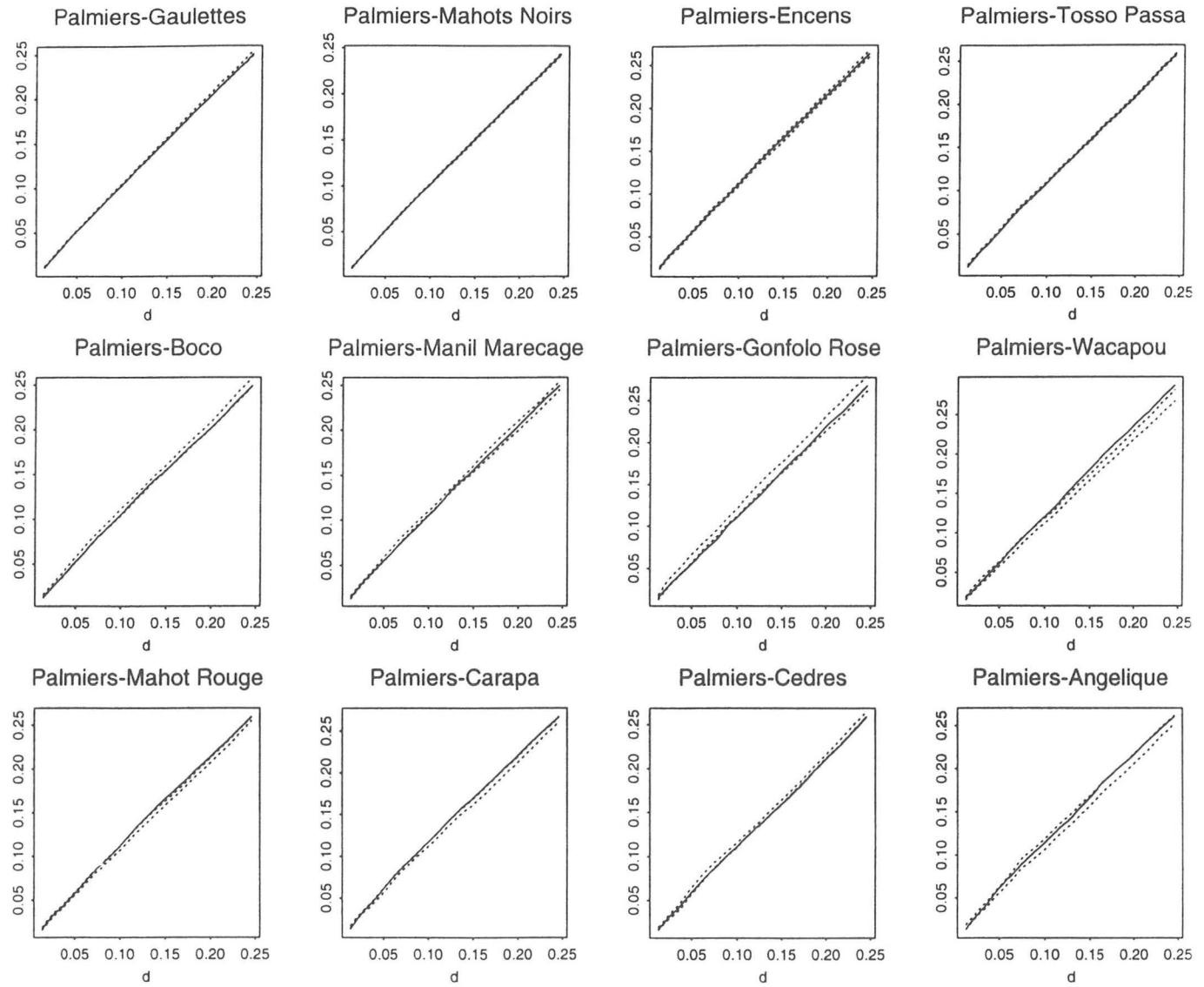
## Etude des circonférences “intraspécifique” $L_{mm}(r)$



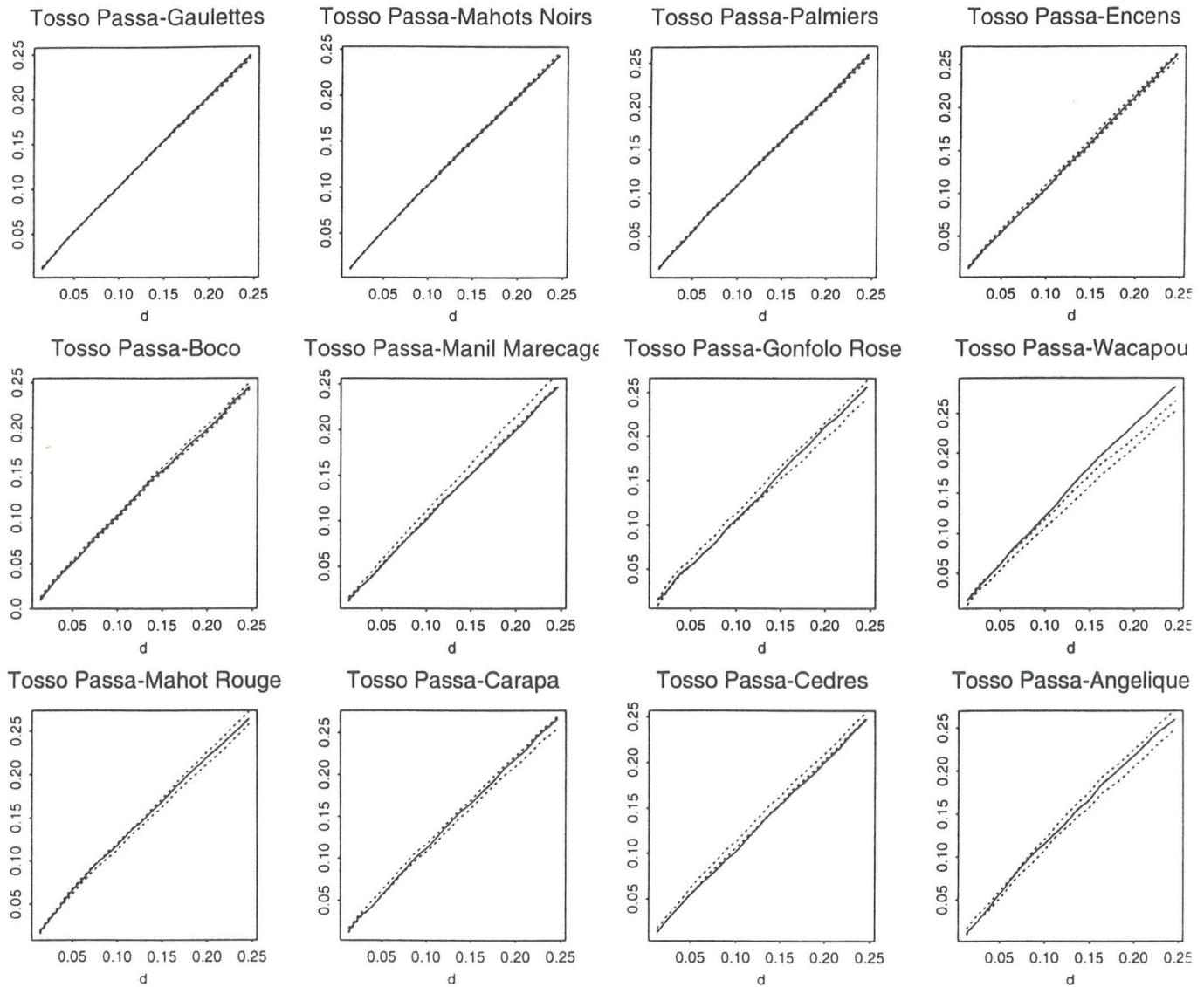
## Etude des circonférences “intraspécifique” $L_{mm}(r)$



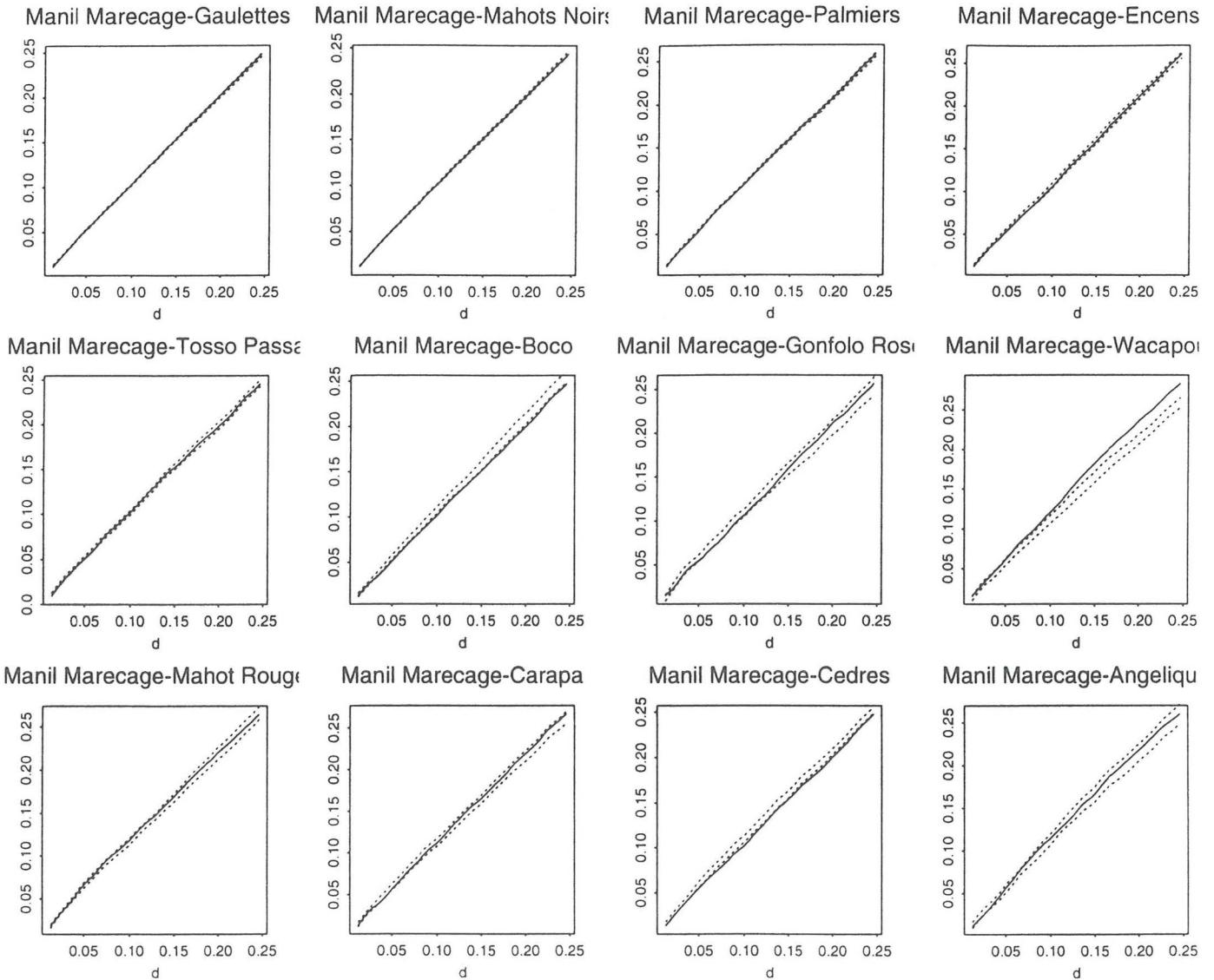
## Etude des circonférences “intraspécifique” $L_{mm}(r)$



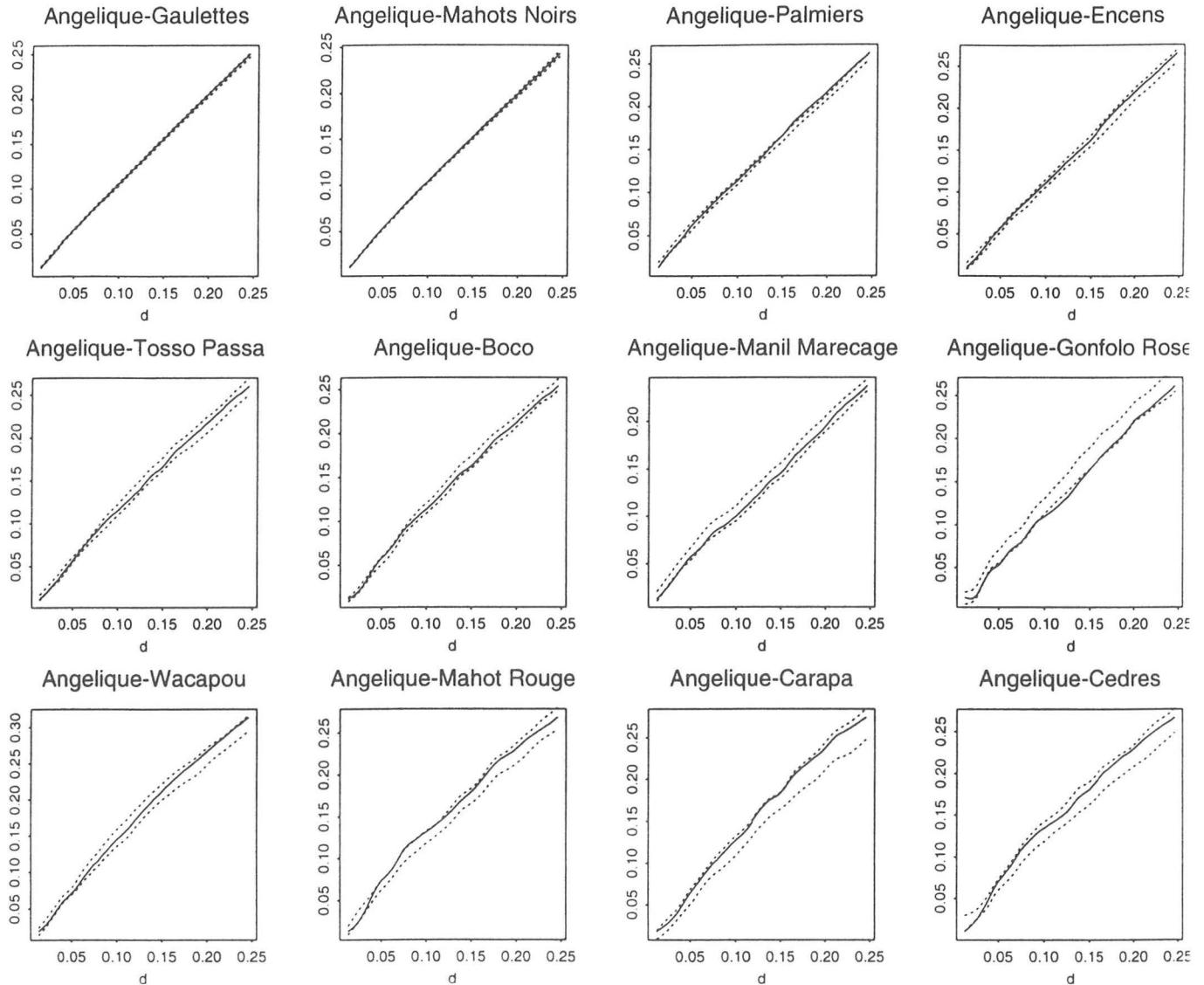
## Etude des circonférences “intraspécifique” $L_{mm}(r)$



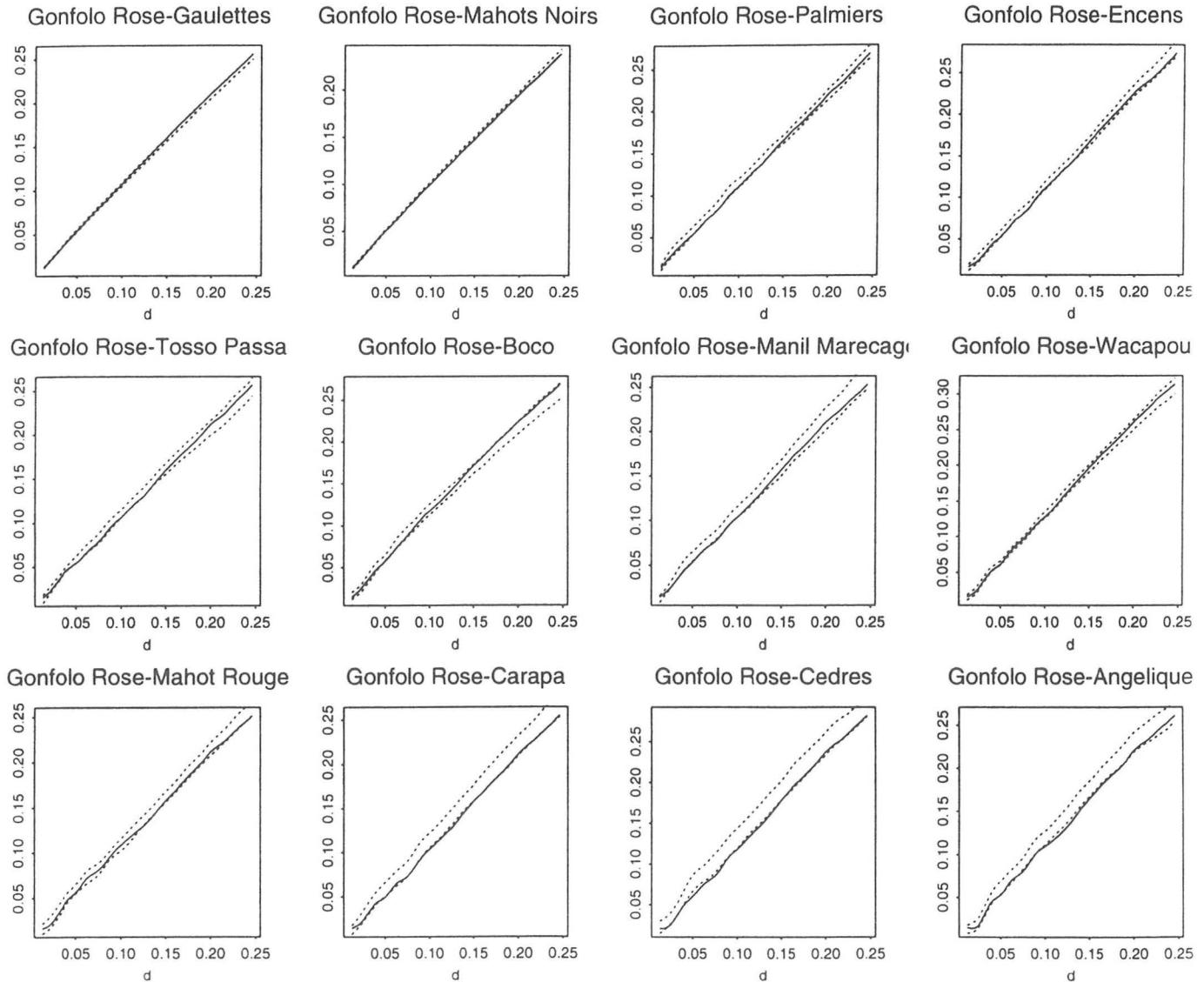
## Etude des circonférences “intraspécifique” $L_{mm}(r)$



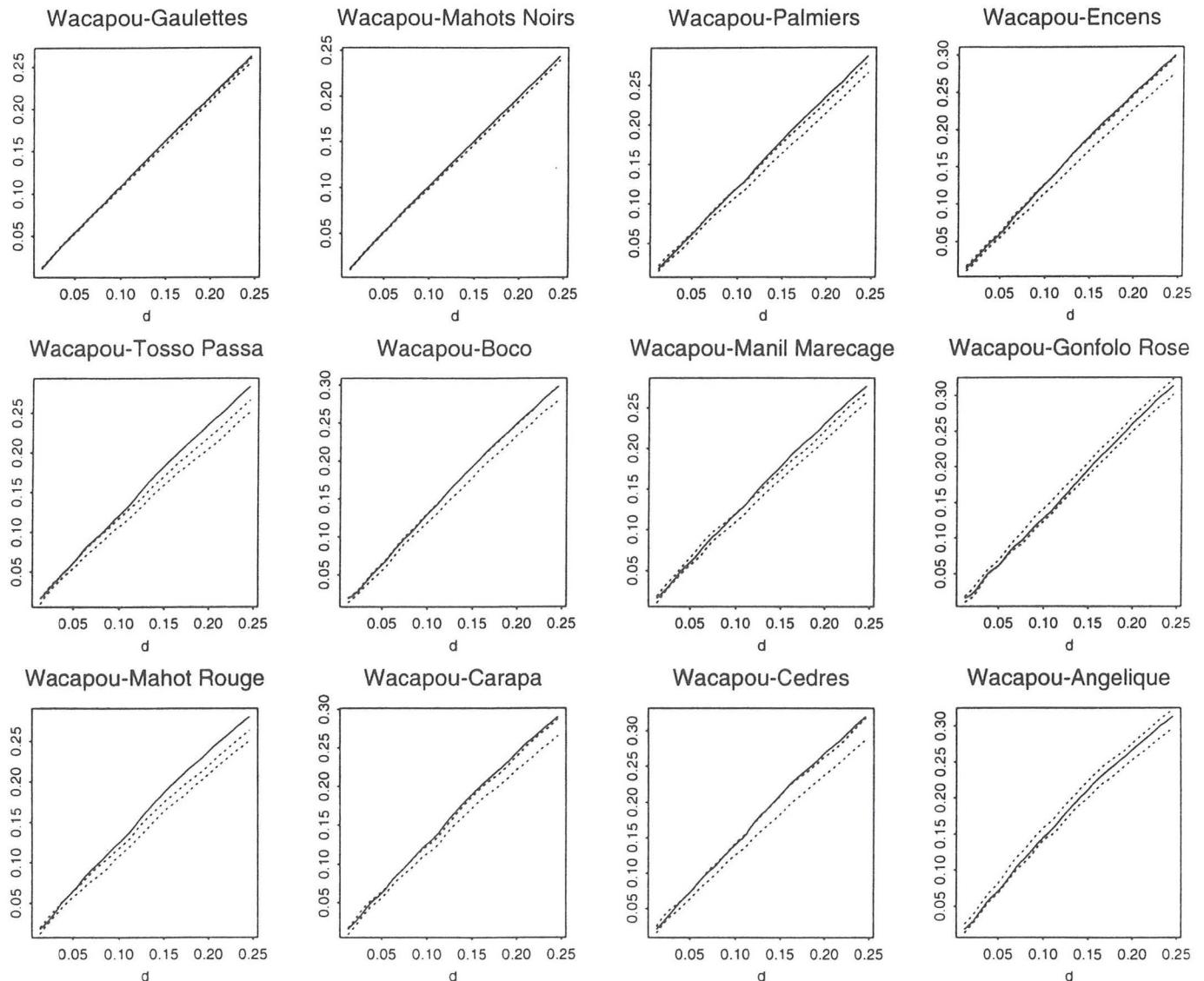
## Etude des circonférences “intraspécifique” $L_{mm}(r)$



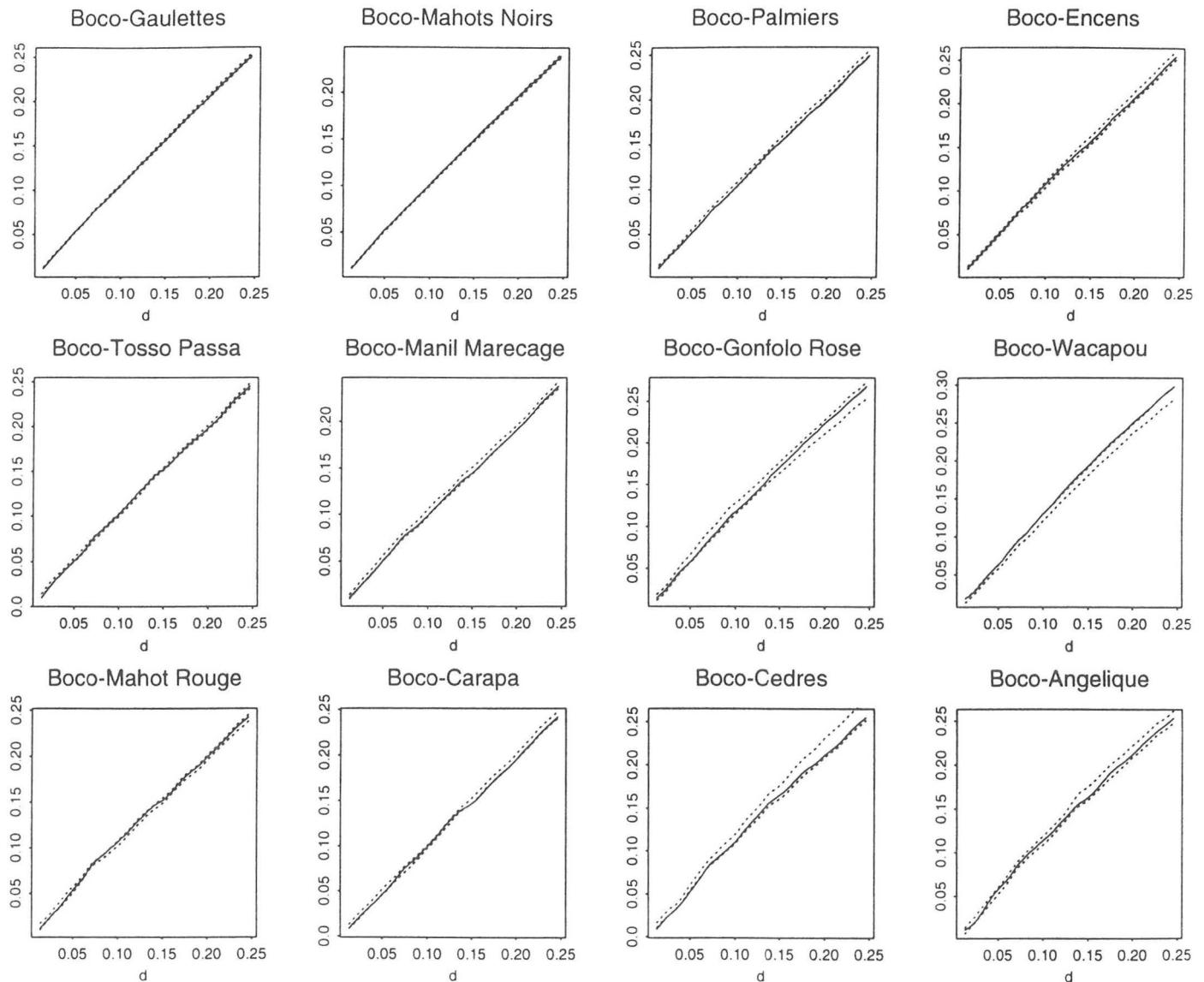
## Etude des circonférences “intraspécifique” $L_{mm}(r)$



## Etude des circonférences “intraspécifique” $L_{mm}(r)$



## Etude des circonférences “intraspécifique” $L_{mm}(r)$



## 6 Etude de l'intensité locale

### Comportement de $h$ par rapport aux modèles

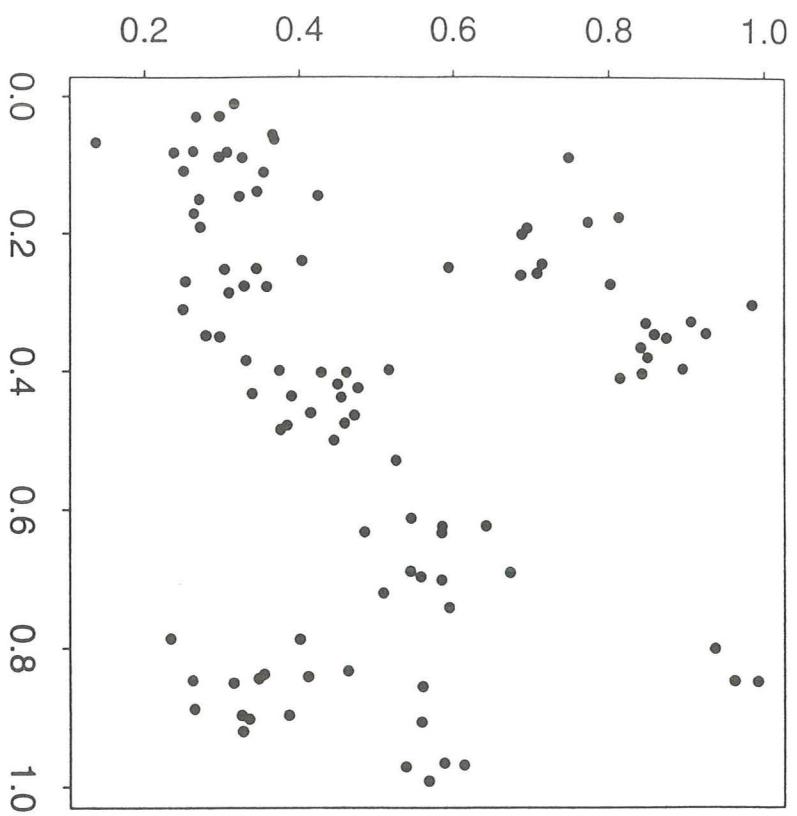
Les graphiques sont légendés directement.

### Application : estimation de l'intensité locale sur quelques espèces

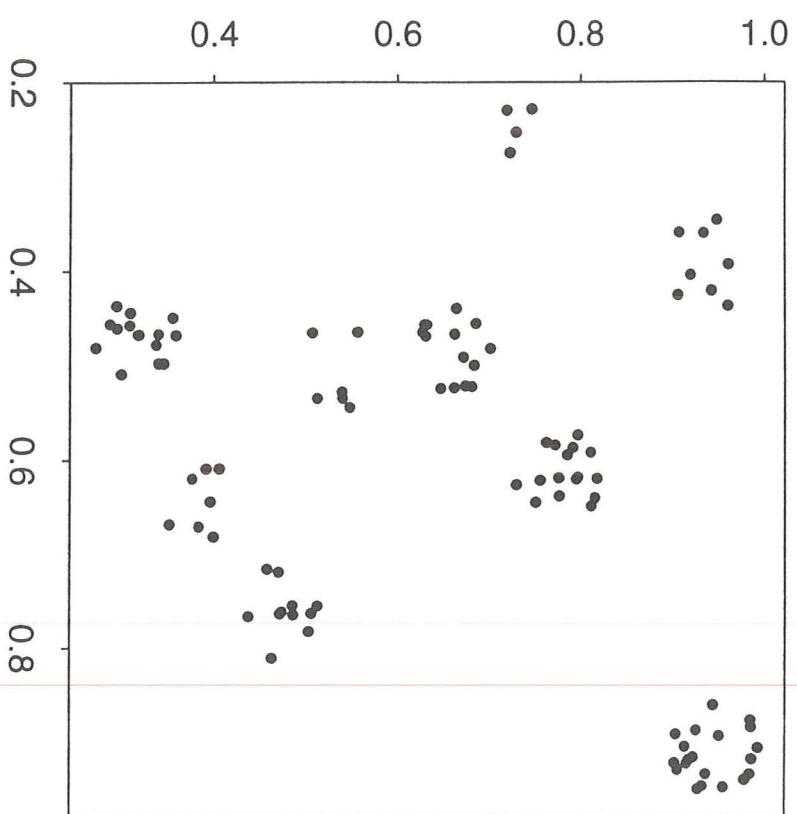
(Se référer au texte pp 137-146)

2 réalisations d'un P.P de Cox, n=100, p=10

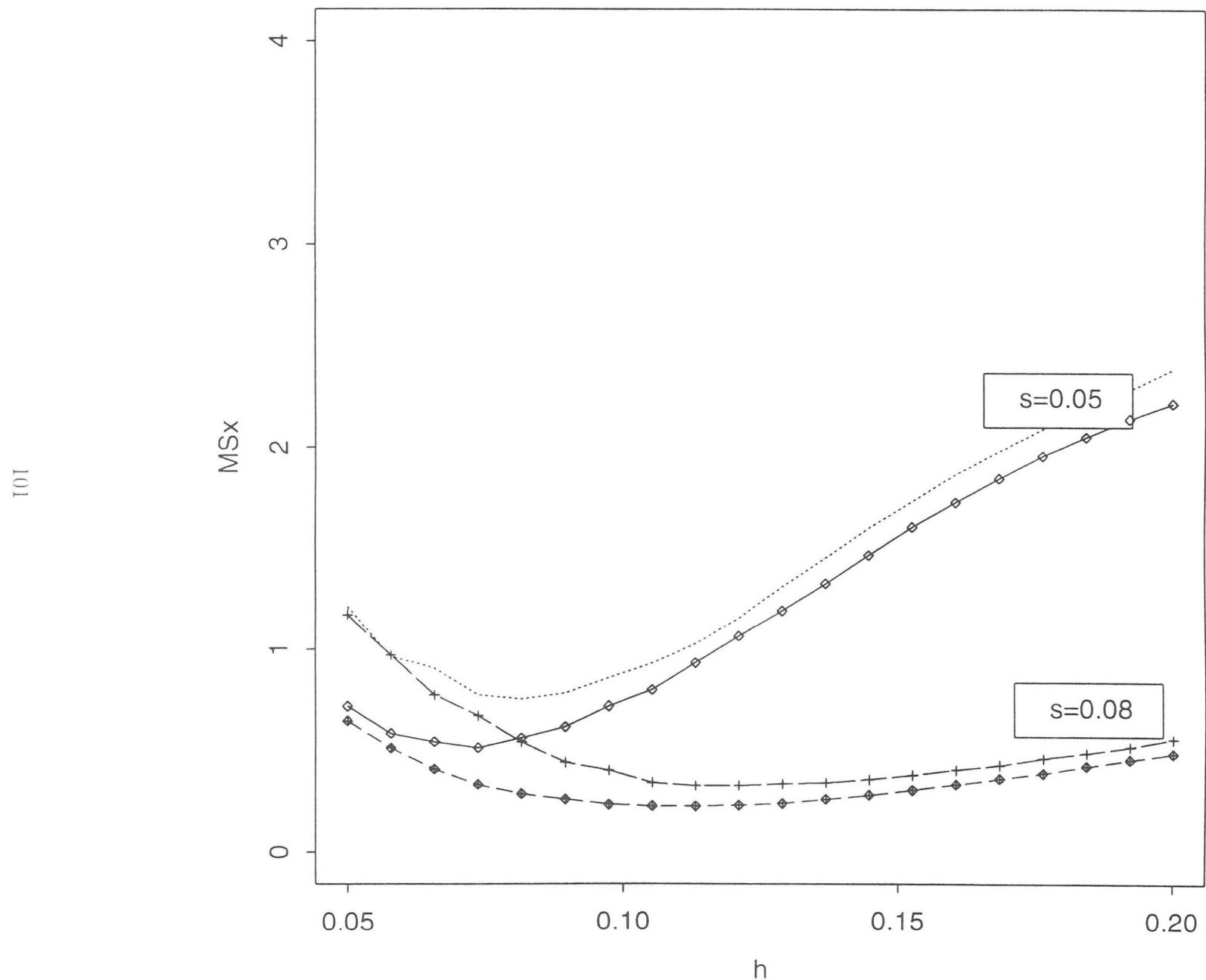
Modèle linéaire,  $s=0.05$



Modèle booleen,  $r=0.05$

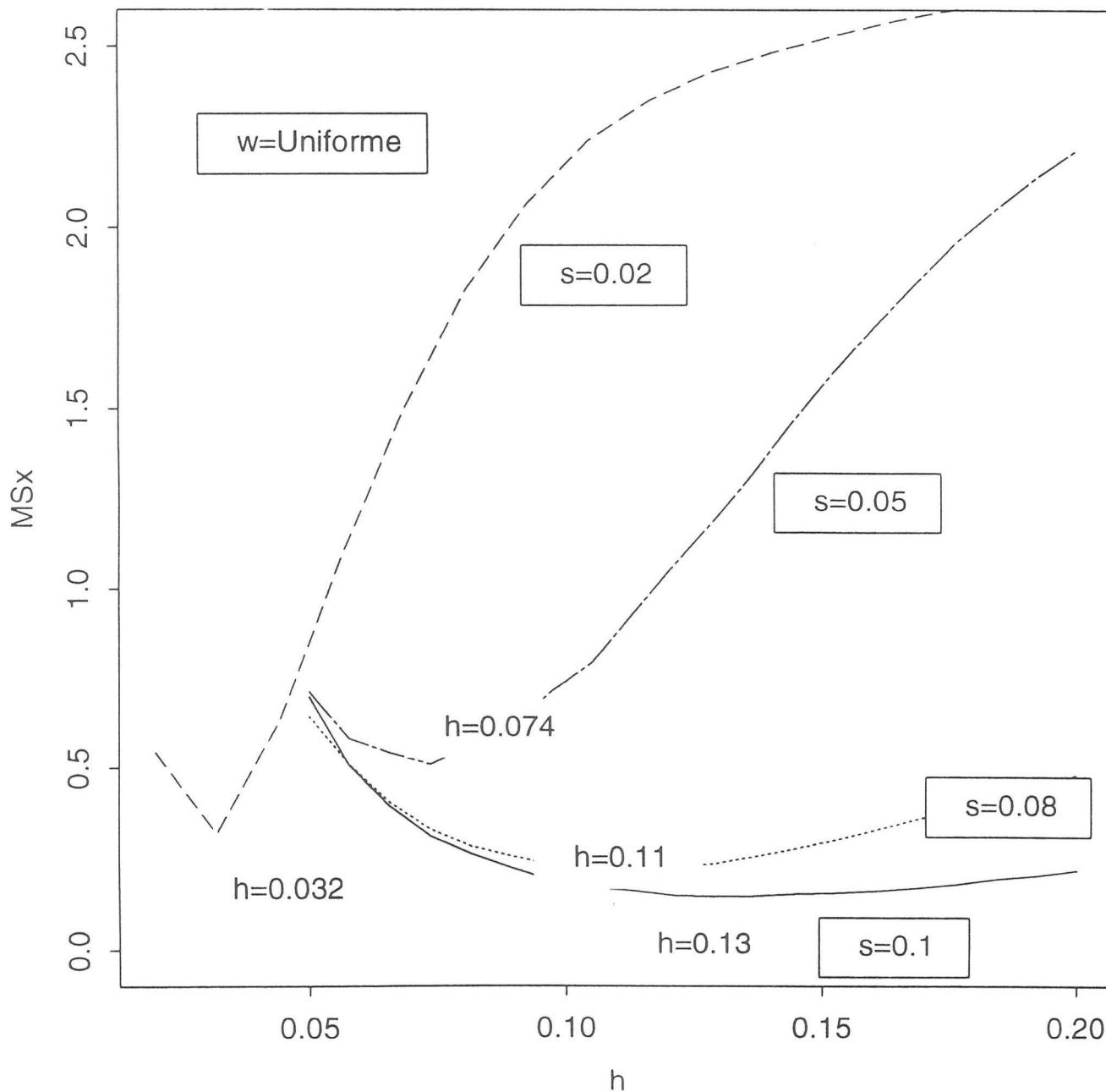


### Effet n, w=Uniforme, Cox lineaire



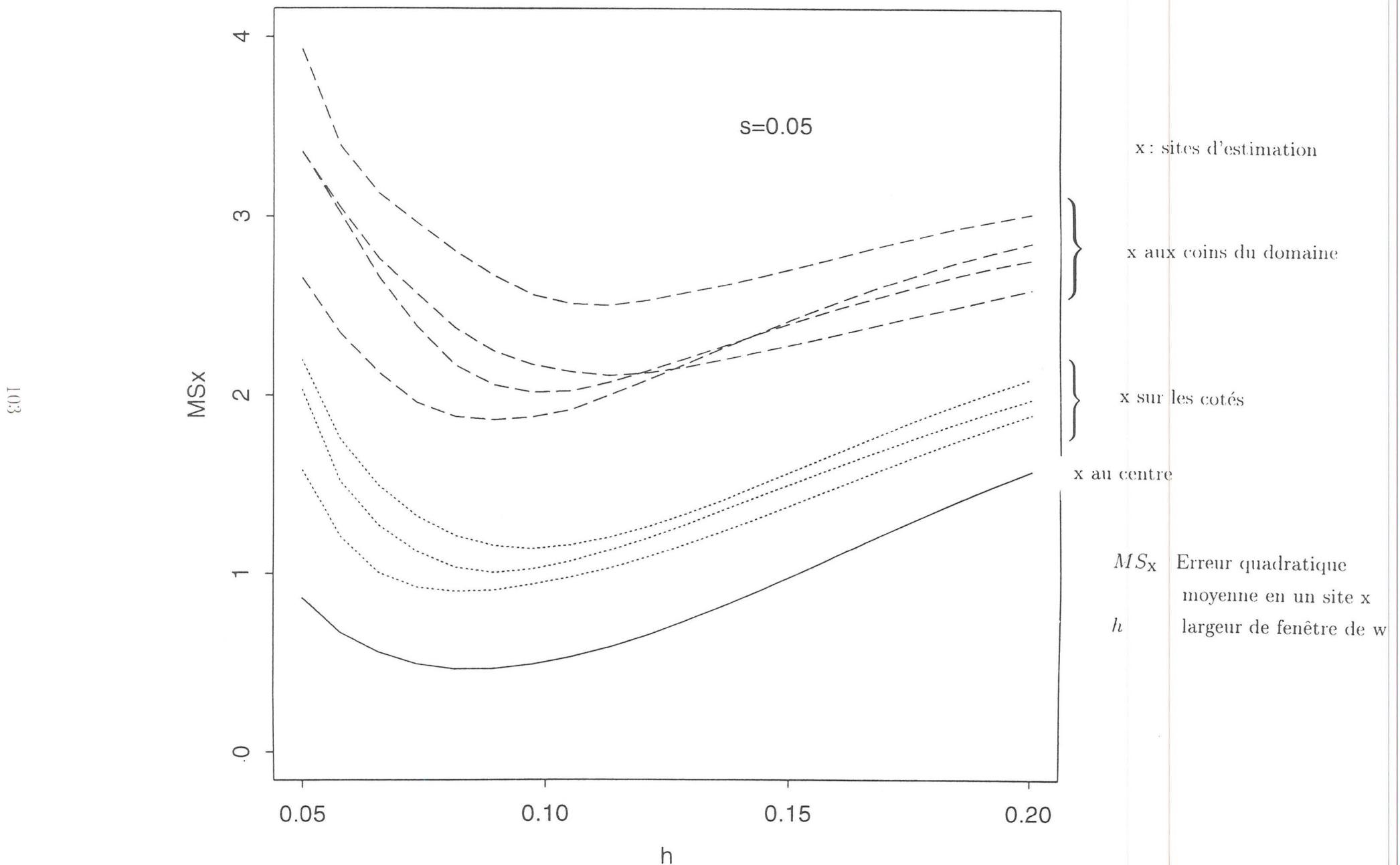
$MS_x$  Erreur quadratique moyenne en un site x au centre de W  
 $w$  noyau de  $\hat{\lambda}_h(x)$   
 $s$  variance de la loi f du modèle  
 $h$  largeur de fenêtre de w  
 $\diamond$   $n = 200$  points  
 $\dots$   $n = 100$

### Effet s sur h, Cox lineaire, 200 points

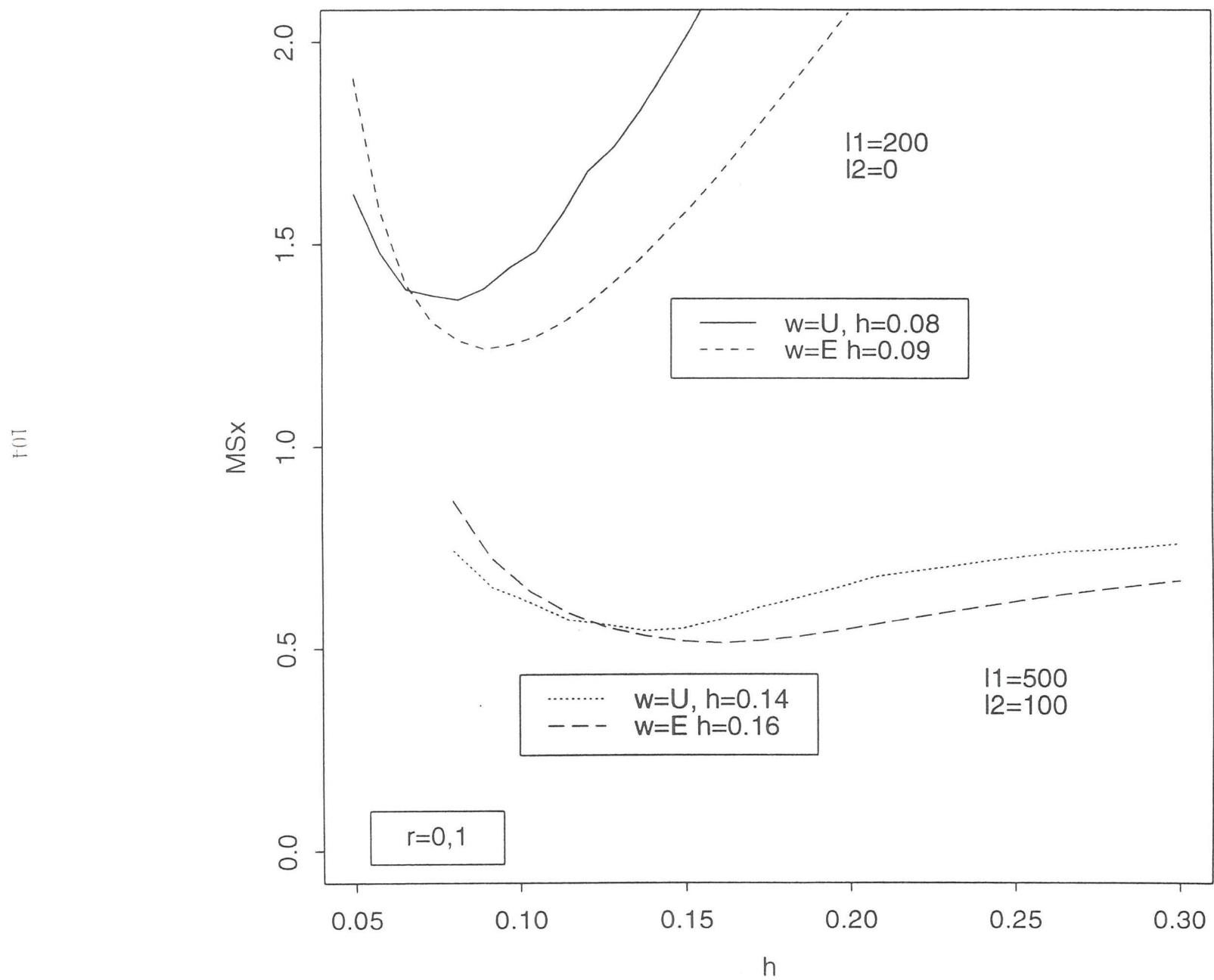


$MS_x$  Erreur quadratique moyenne en un site  $x$  au centre de  $W$   
 $w$  noyau de  $\hat{\lambda}_h(x)$   
 $s$  variance de la loi  $f$  du modèle  
 $h$  largeur de fenêtre de  $w$

Effets de bords, Cox linéaire,  $w=Ep, n=200$

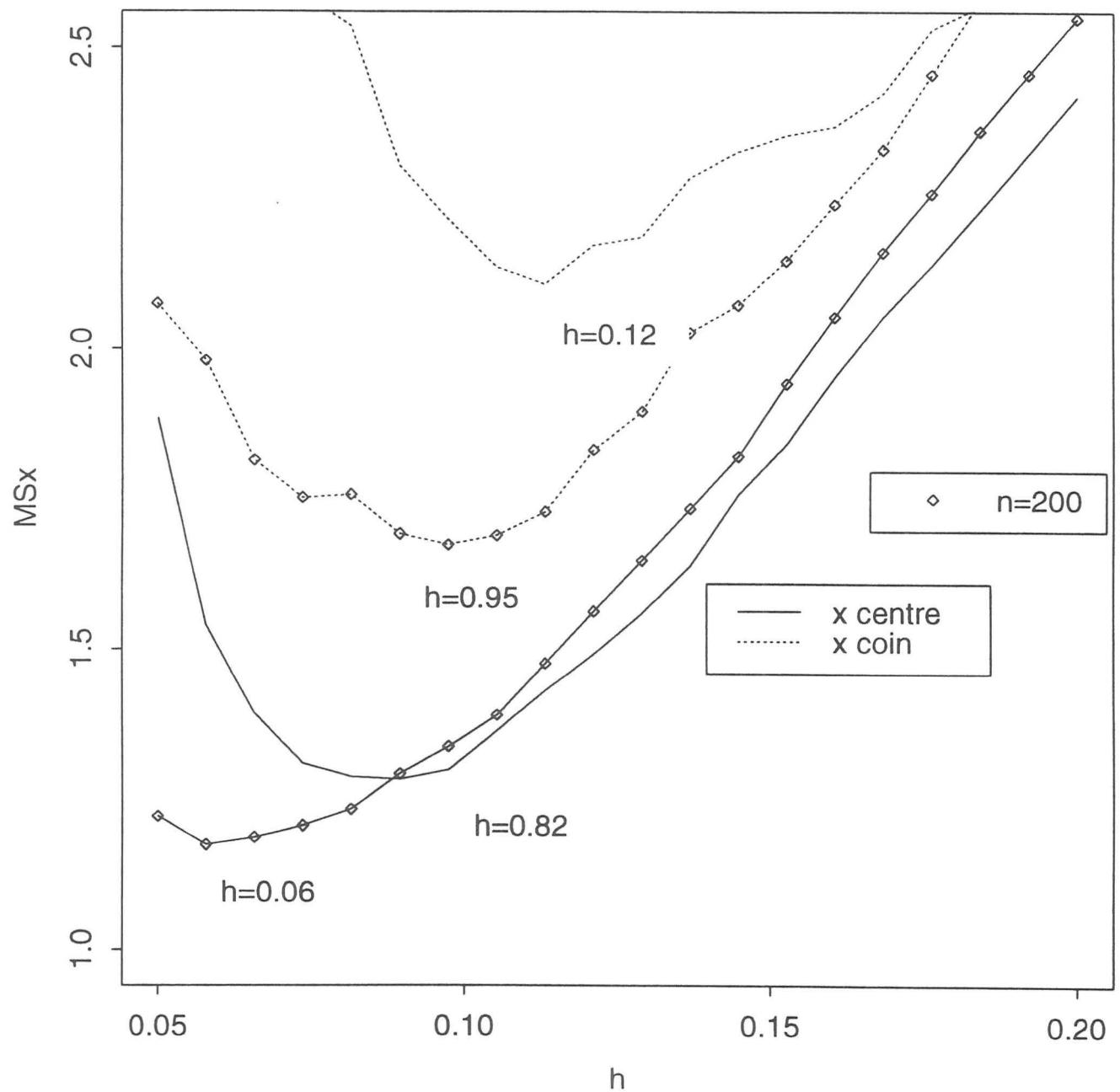


### Effet intensités, Cox booleen, n=100



$MS_x$	Erreur quadratique moyenne en un site $x$ au centre de $W$
$w$	noyau de $\hat{\lambda}_h(x)$
$r$	rayon des disques
$l_1$	intensité à l'intérieur des disques
$l_2$	intensité à l'extérieur des disques
$h$	largeur de fenêtre de $w$
$U$	$w$ Uniforme
$E$	$w$ Epanechnikov

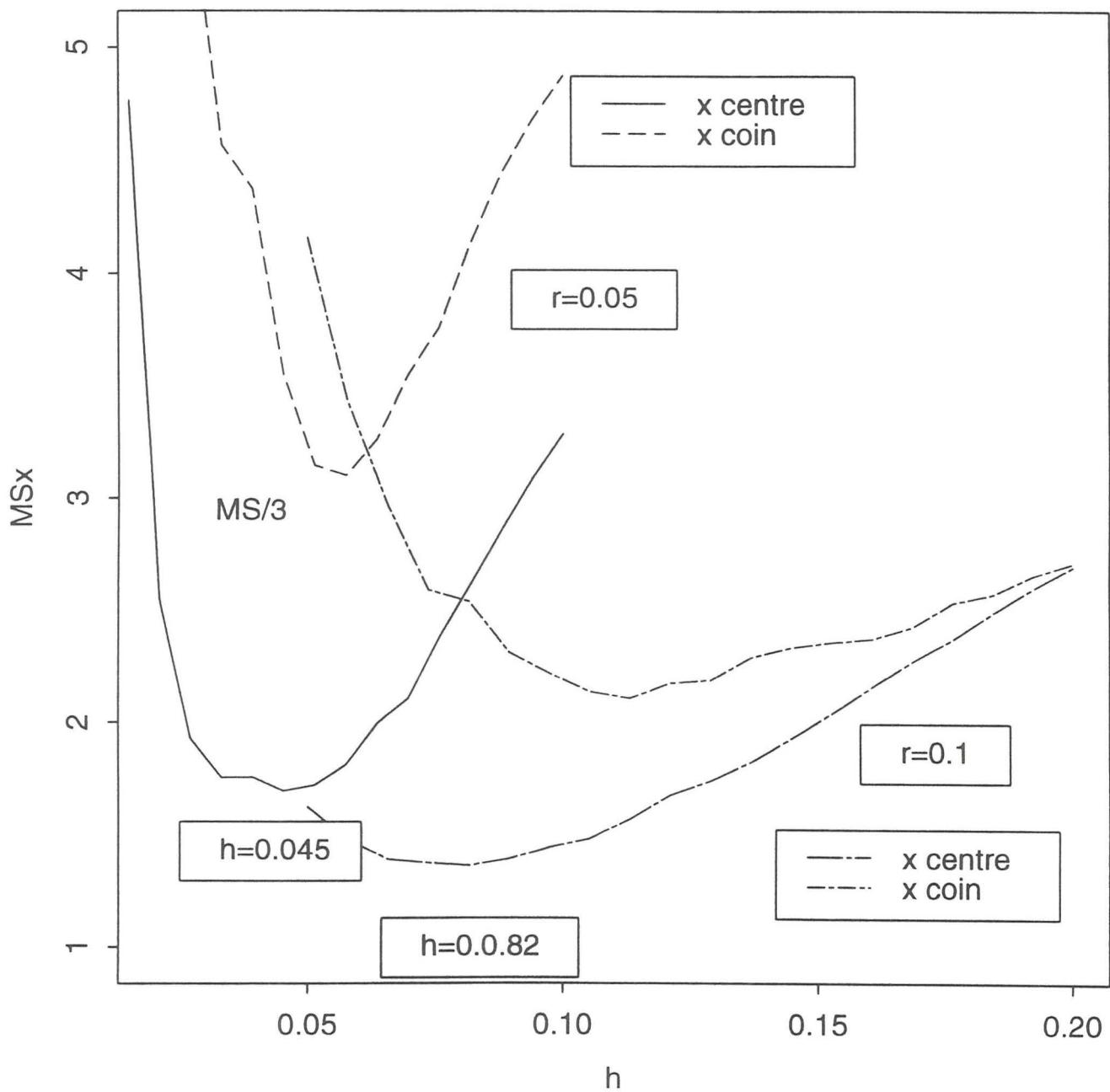
Effet n, Cox booleen, w=Unif, r=0,1, l1=200, l2=0



$MS_x$  Erreur quadratique moyenne en un site  $x$  au centre de  $W$   
 $w$  noyau de  $\hat{\lambda}_h(x)$   
 $r$  rayon des disques  
 $l_1$  intensité à l'intérieur des disques  
 $l_2$  intensité à l'extérieur des disques  
 $h$  largeur de fenêtre de  $w$

Effet rayon, Cox booleen, n=100,l1=200,l2=0, w=Unif

901

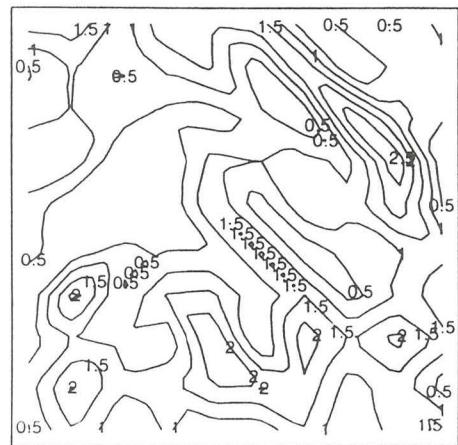


$MS_x$  Erreur quadratique  
 moyenne en un site  $x$   
 au centre de  $W$   
 $w$  noyau de  $\hat{\lambda}_h(x)$   
 $r$  rayon des disques  
 $l_1$  intensité à l'intérieur des disques  
 $l_2$  intensité à l'extérieur des disques  
 $h$  largeur de fenêtre de  $w$

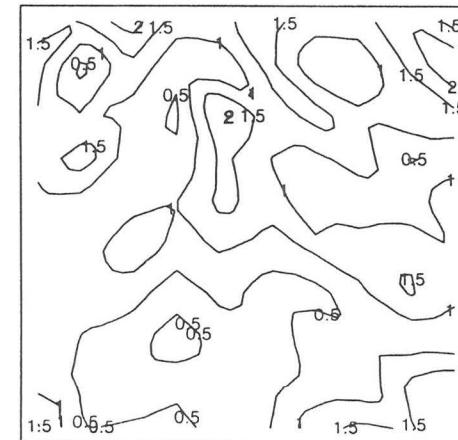
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# Cartes des intensités locales des espèces

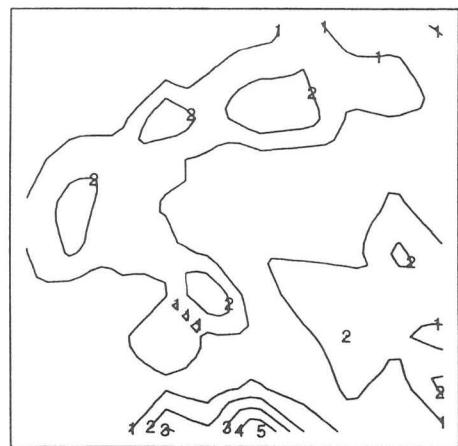
## Galette



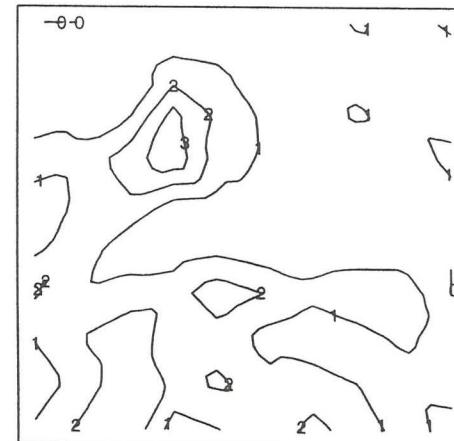
## Mahot Noir



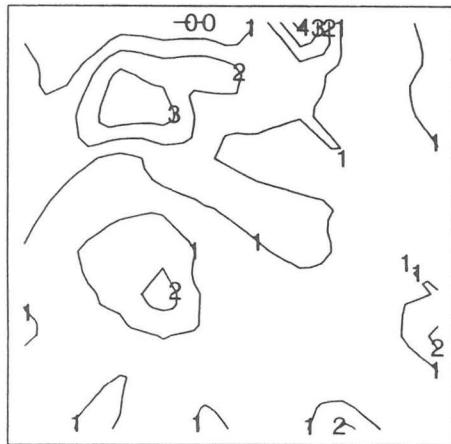
## Palmiers



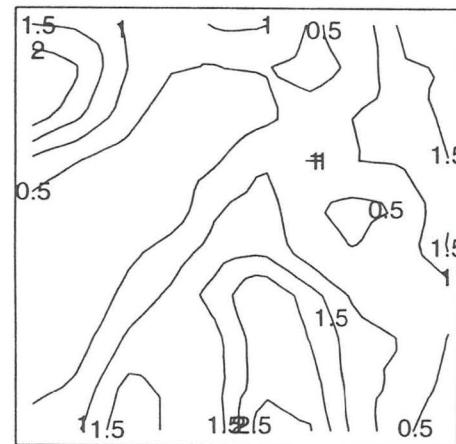
## Encens



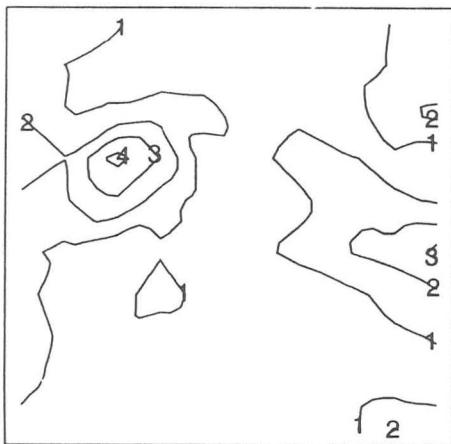
Tosso Passa



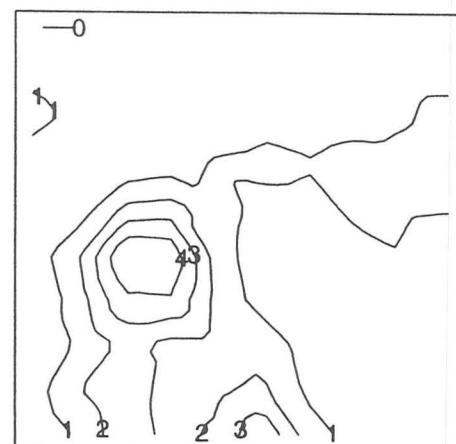
Boco



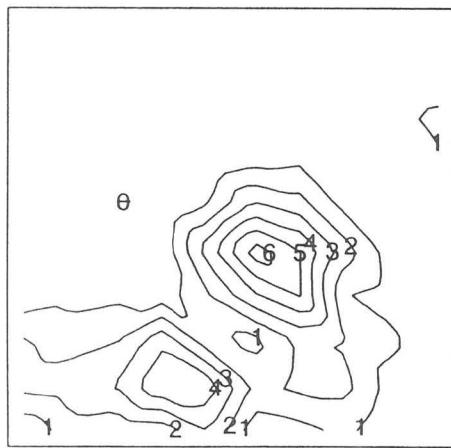
Manil Marecage



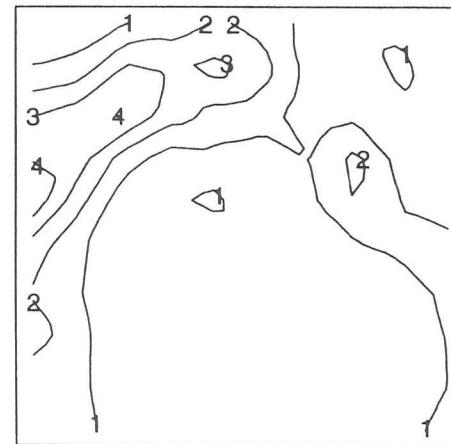
Gonfolo Rose



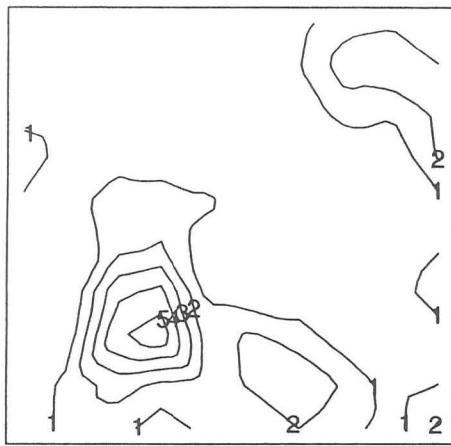
# Wacapou



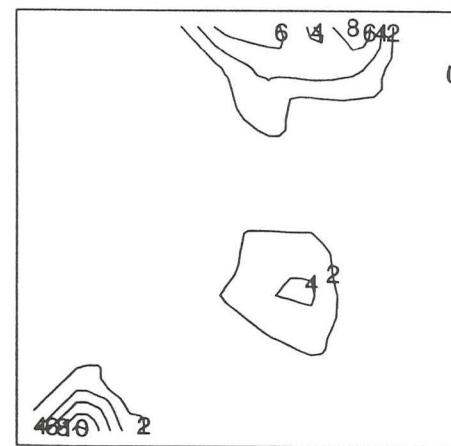
Mahot Rouge



Cedres



# Angelique



# **7 Etude de la liaison de l'intensité avec la topographie**

## **Relief et modèles de relation**

(Se référer au texte p 148 pour le relief et pp 174 pour les modèles de relation)

## **Variance des estimateurs**

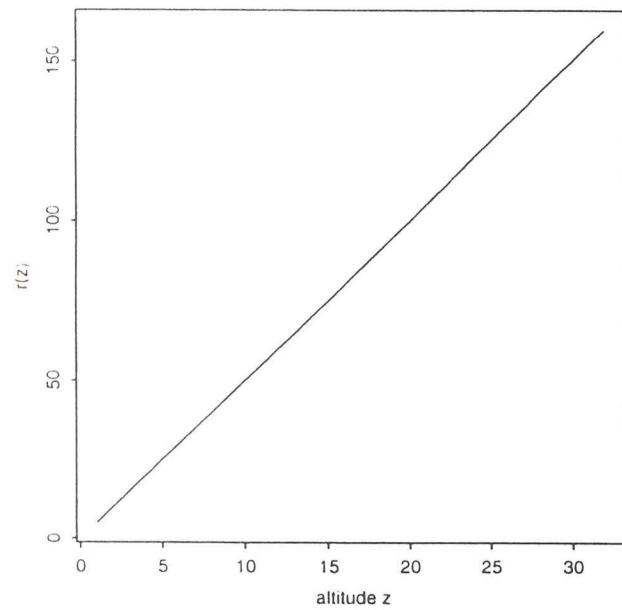
(Se référer au texte p 175-185)

## **Application à quelques espèces**

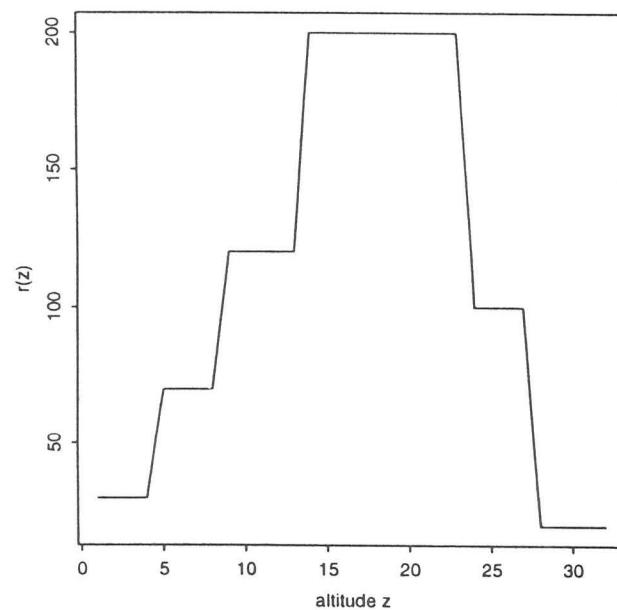
(Se référer au texte p 185)

## Modeles de covariable

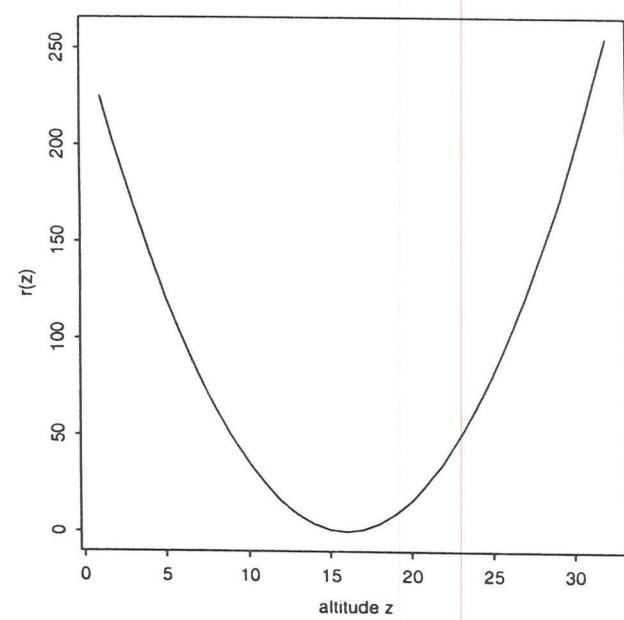
modele 1



modele 2

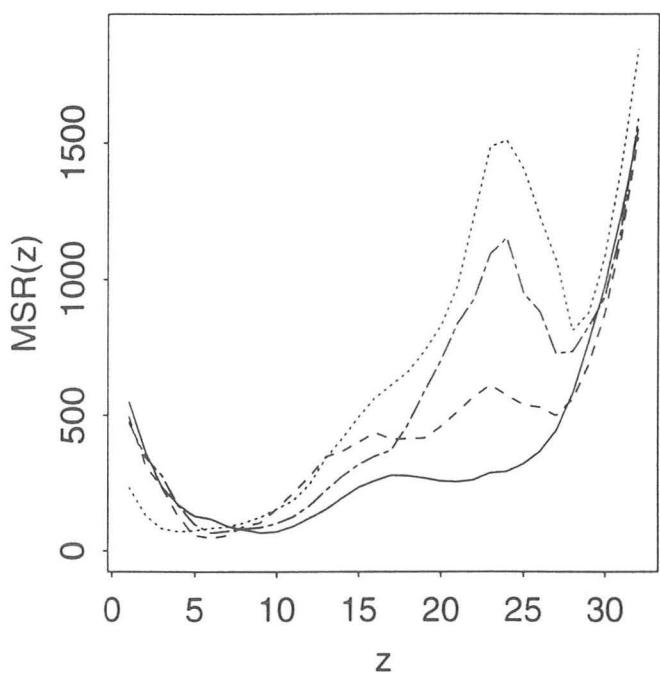


modele 3

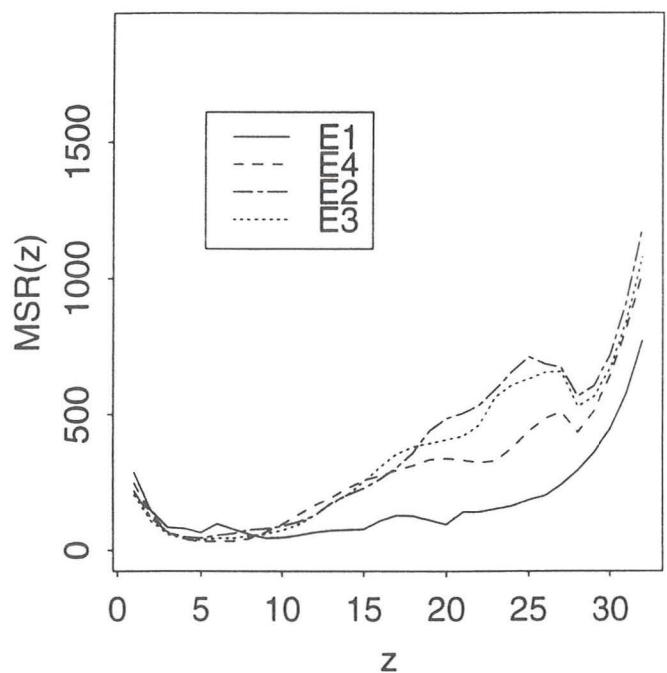


### Modele 1

$n=100$



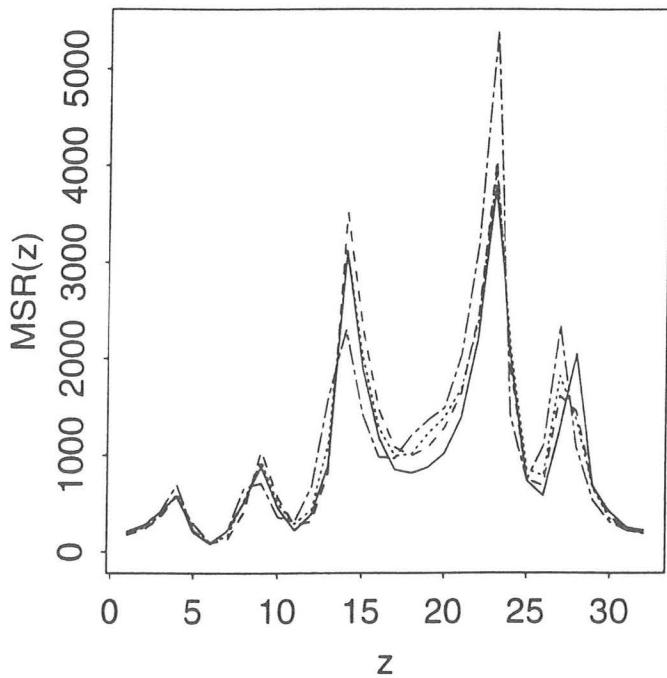
$n=200$



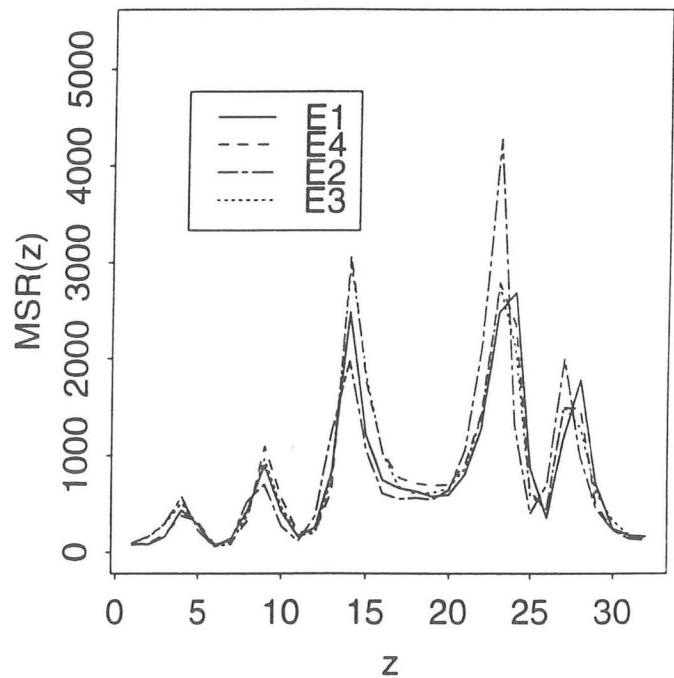
Erreur quadratique minimale des 4 estimateurs

## Modele 2

$n=100$

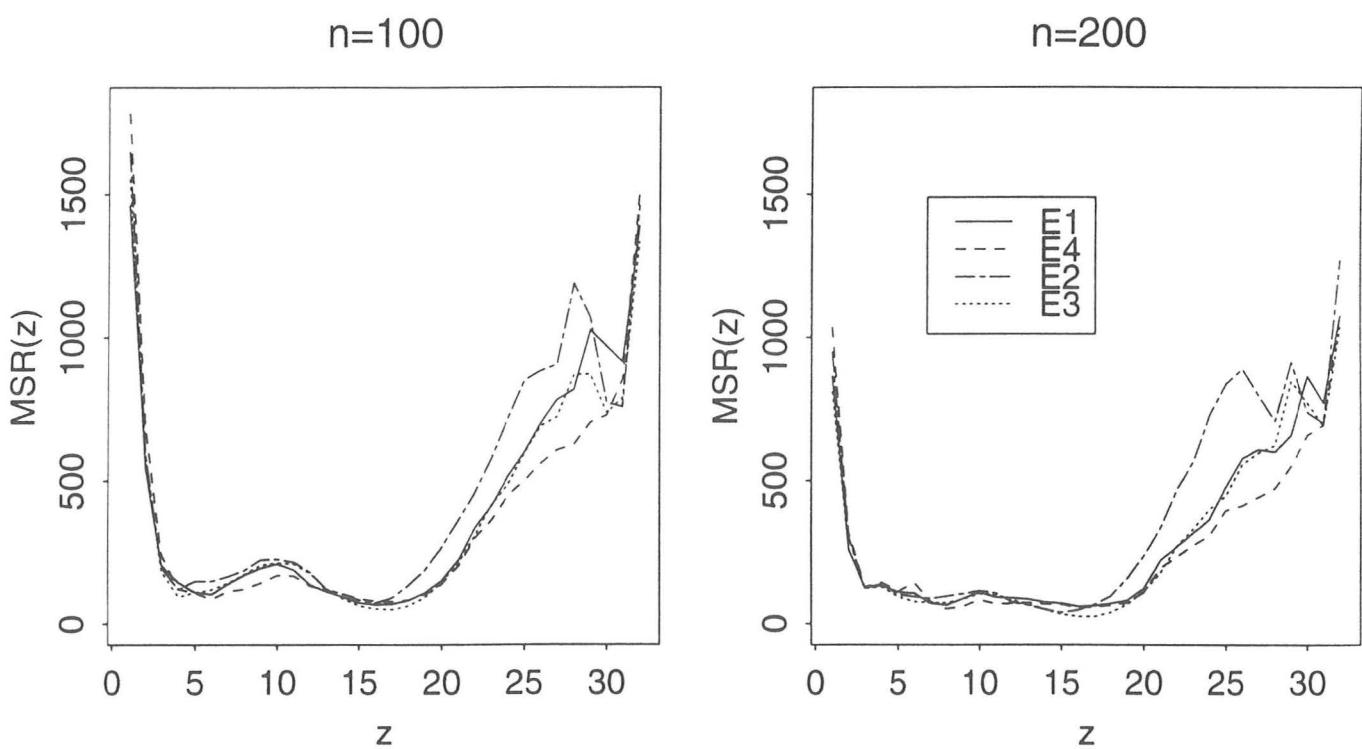


$n=200$



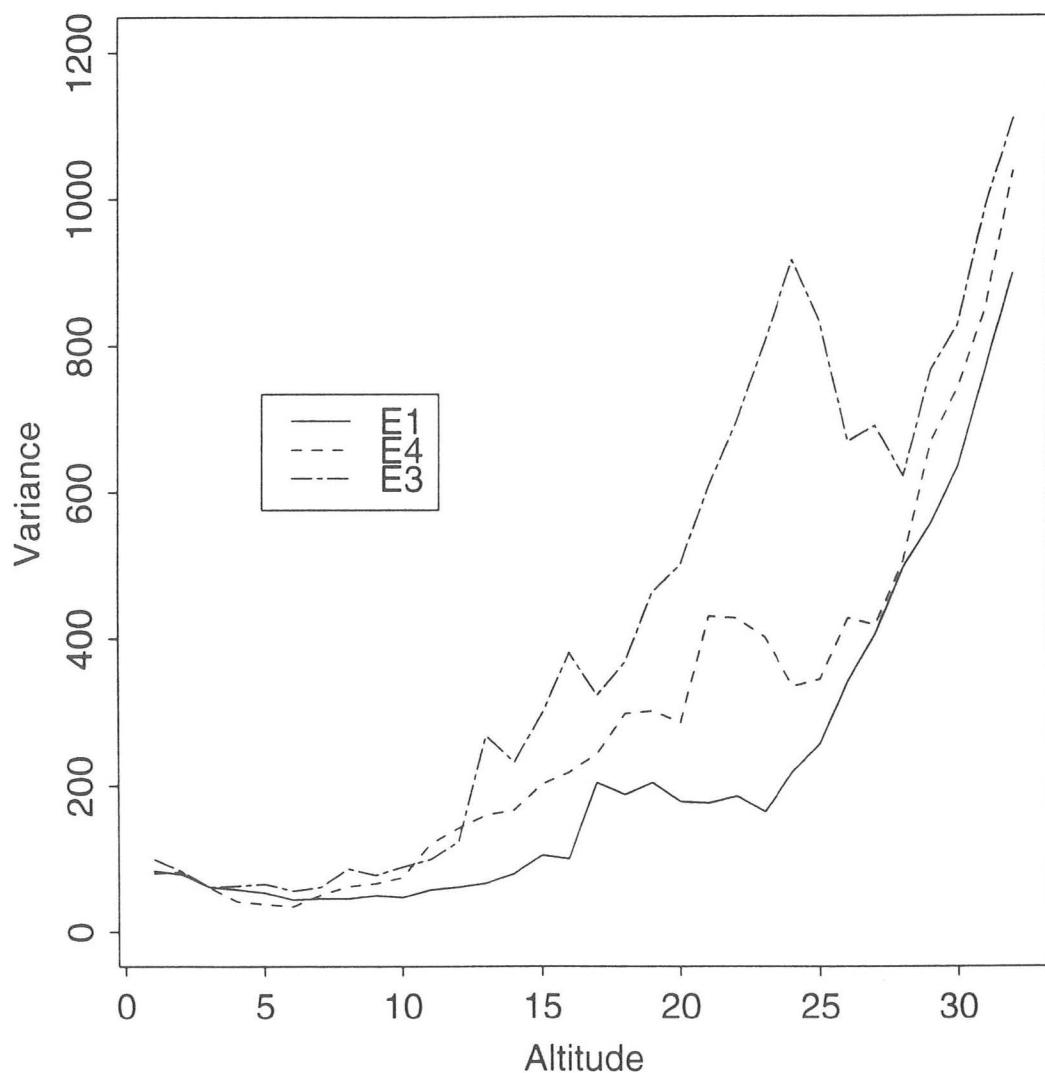
Erreur quadratique minimale des 4 estimateurs

### Modele 3

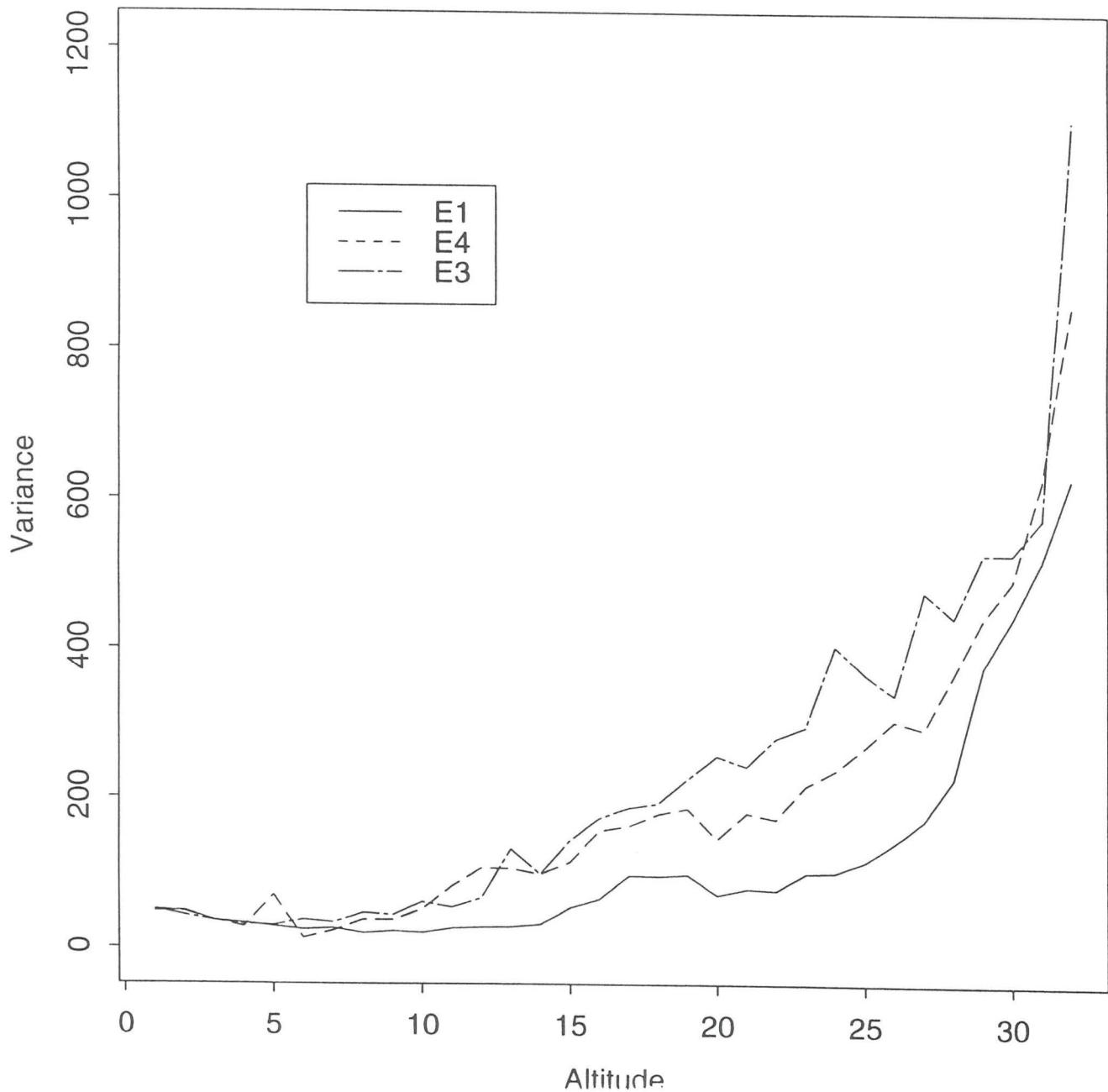


Erreur quadratique minimale des 4 estimateurs

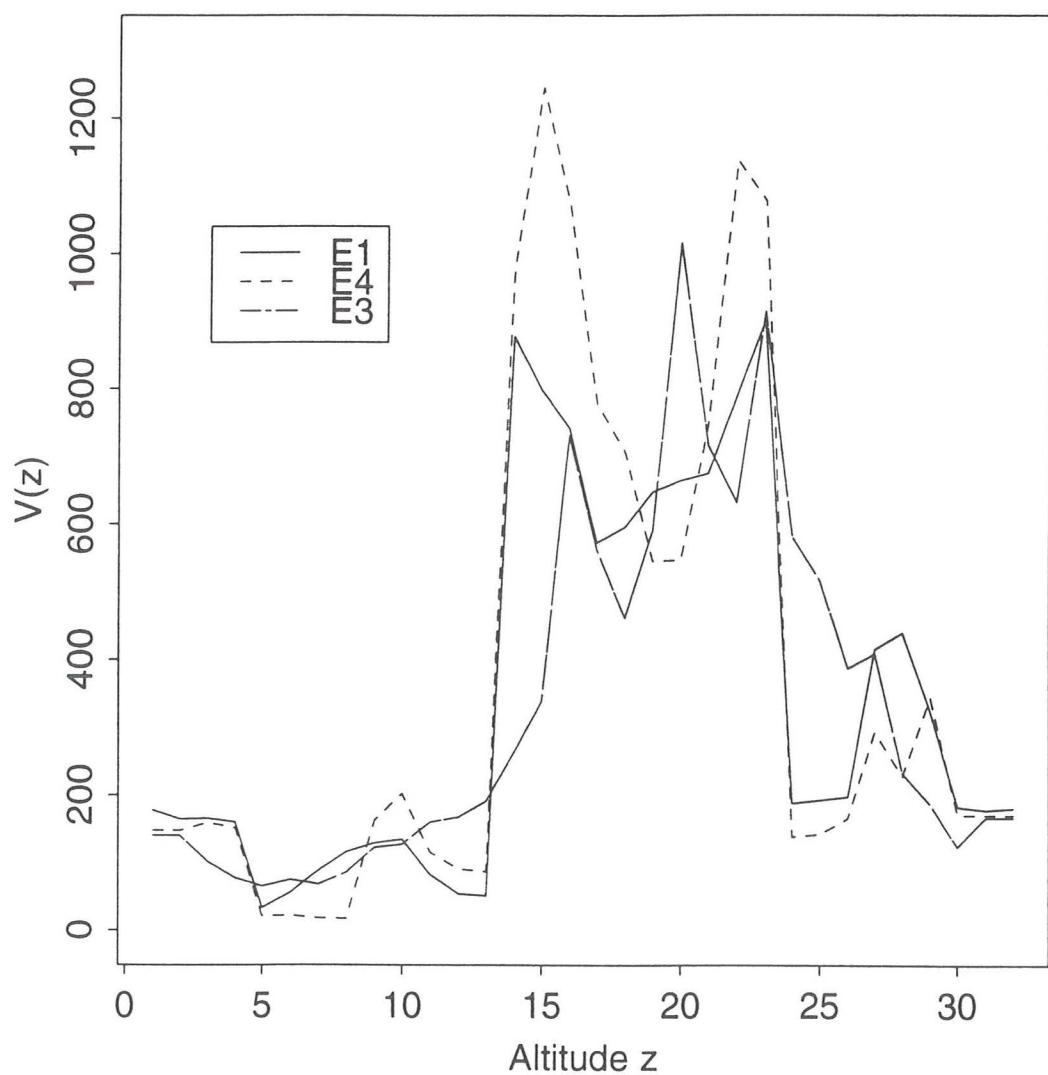
Variances locales des estimateurs, n=100, modele 1



Variance locale des estimateurs, n=200, modele 1

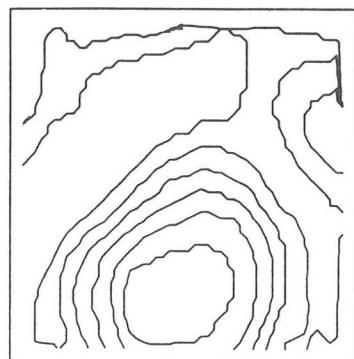
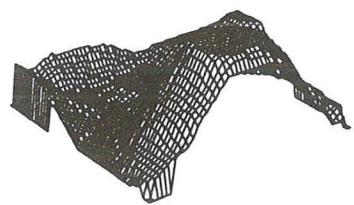


## Variances locales des estimateurs de $r$ , modele 2

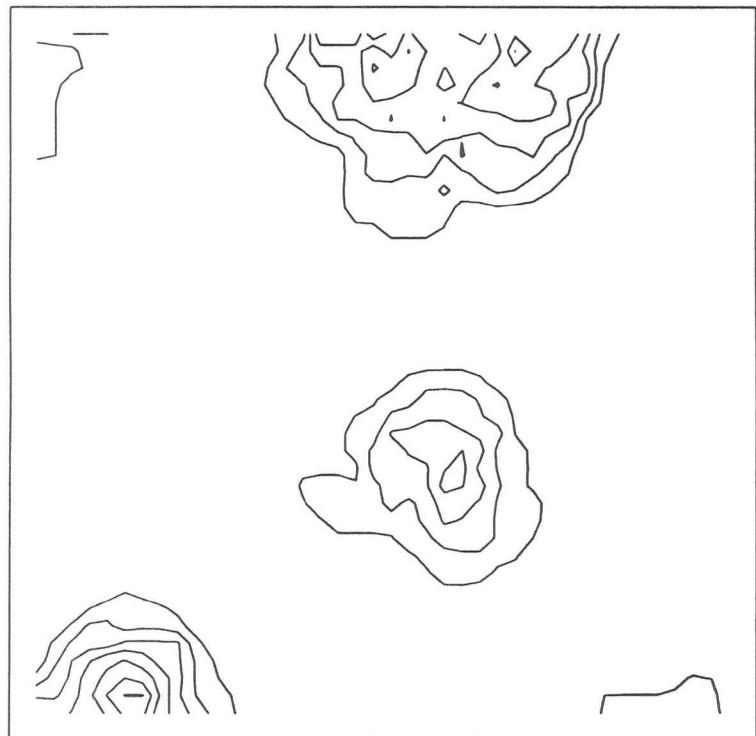


# Estimation de la relation topographie-intensité pour quelques espèces

## Relief de la parcelle 1

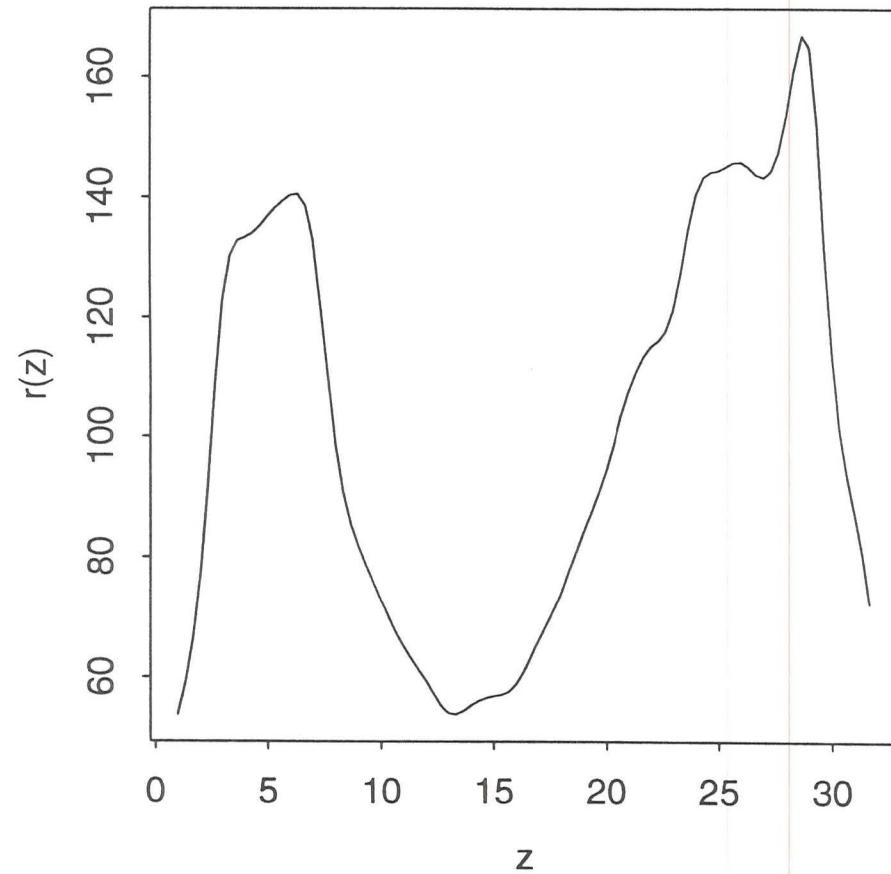


Intensité locale des Angelique

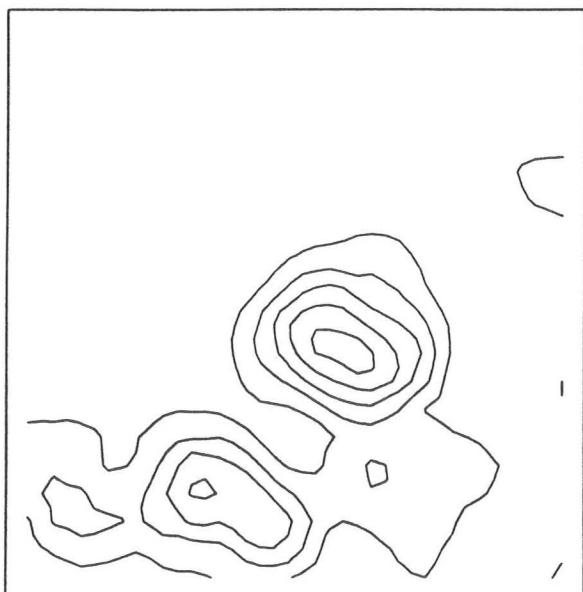


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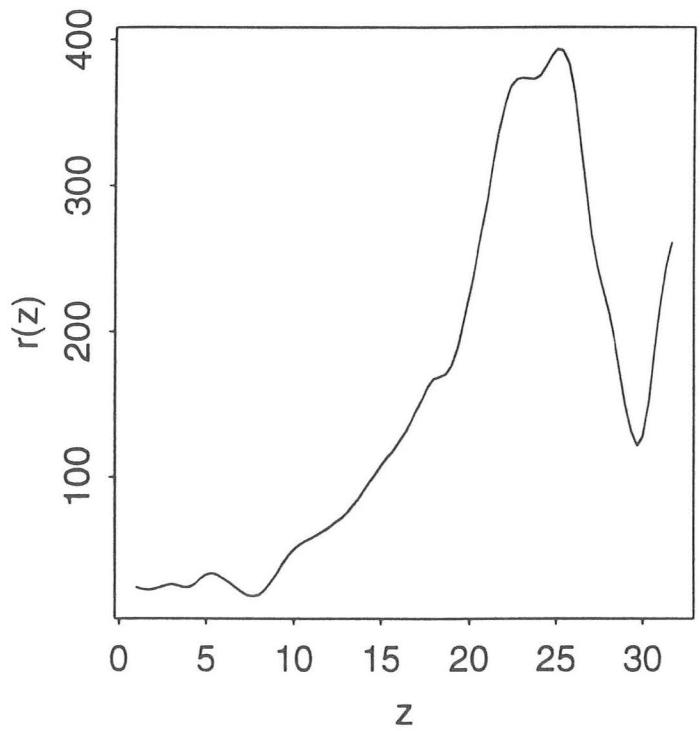
Estimation de  $r(z)$



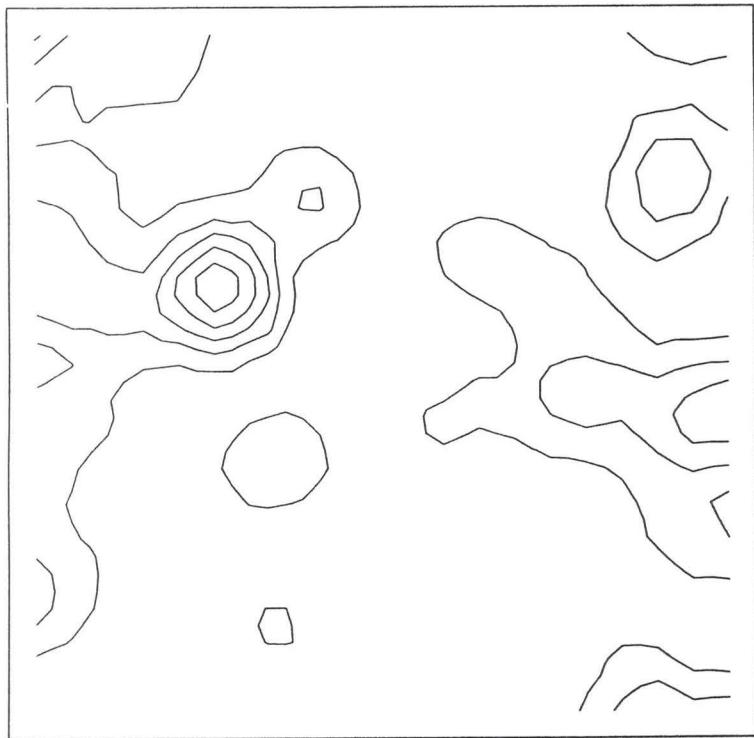
Intensité locale des Wacapou



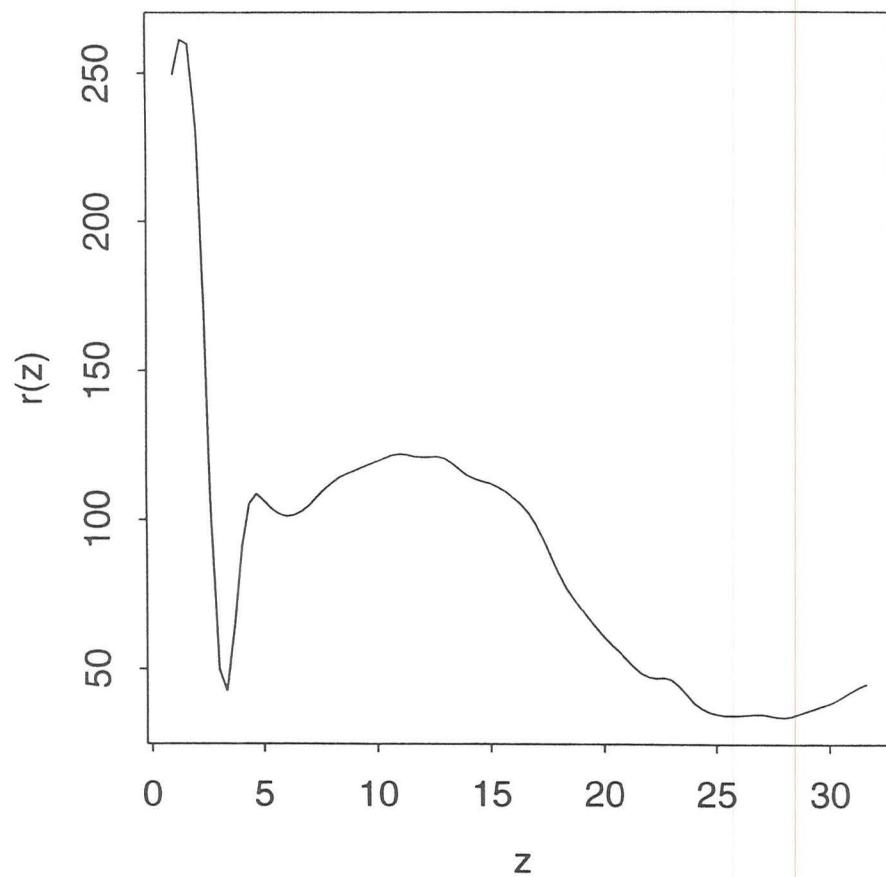
Estimation de  $r(z)$



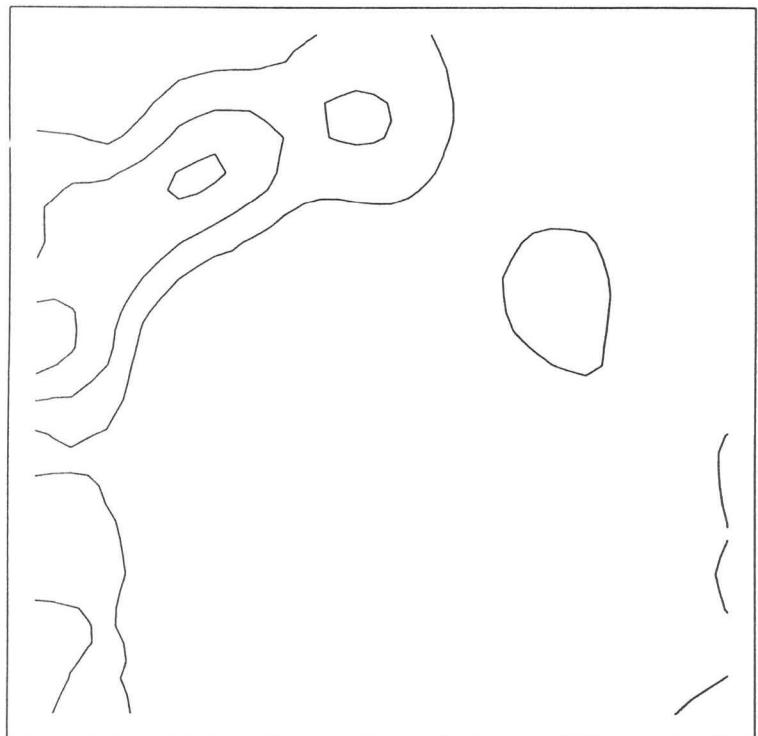
Intensité locale des filaments d'érosion



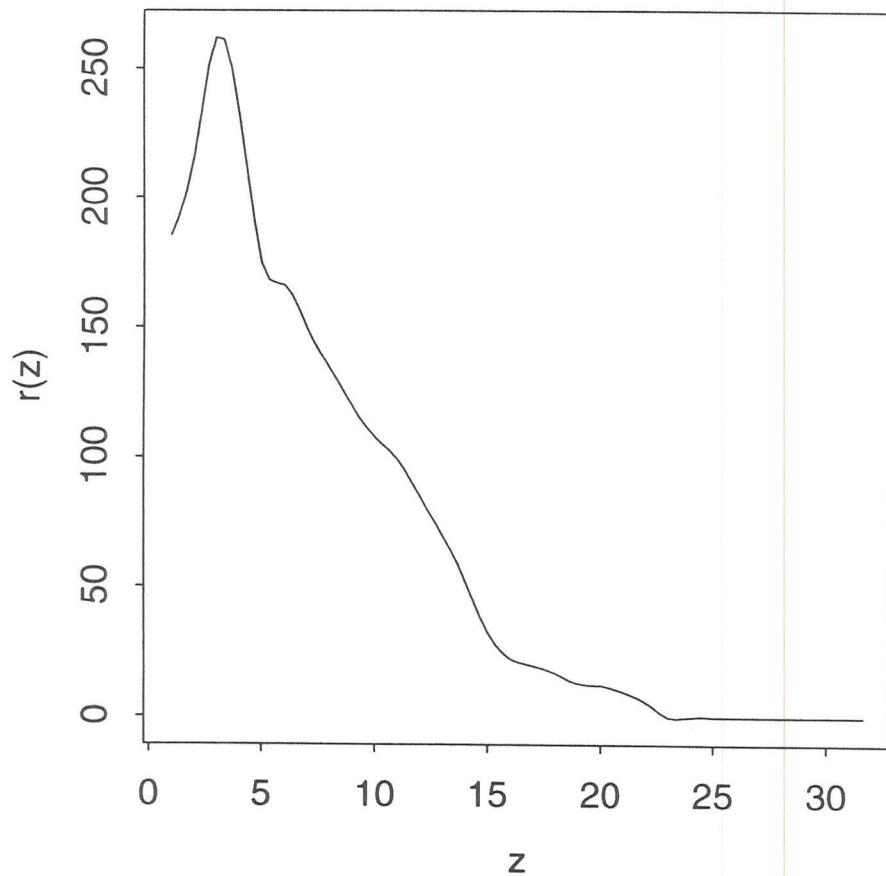
Estimation de  $r(z)$



Intensité locale des Mahots Rouge

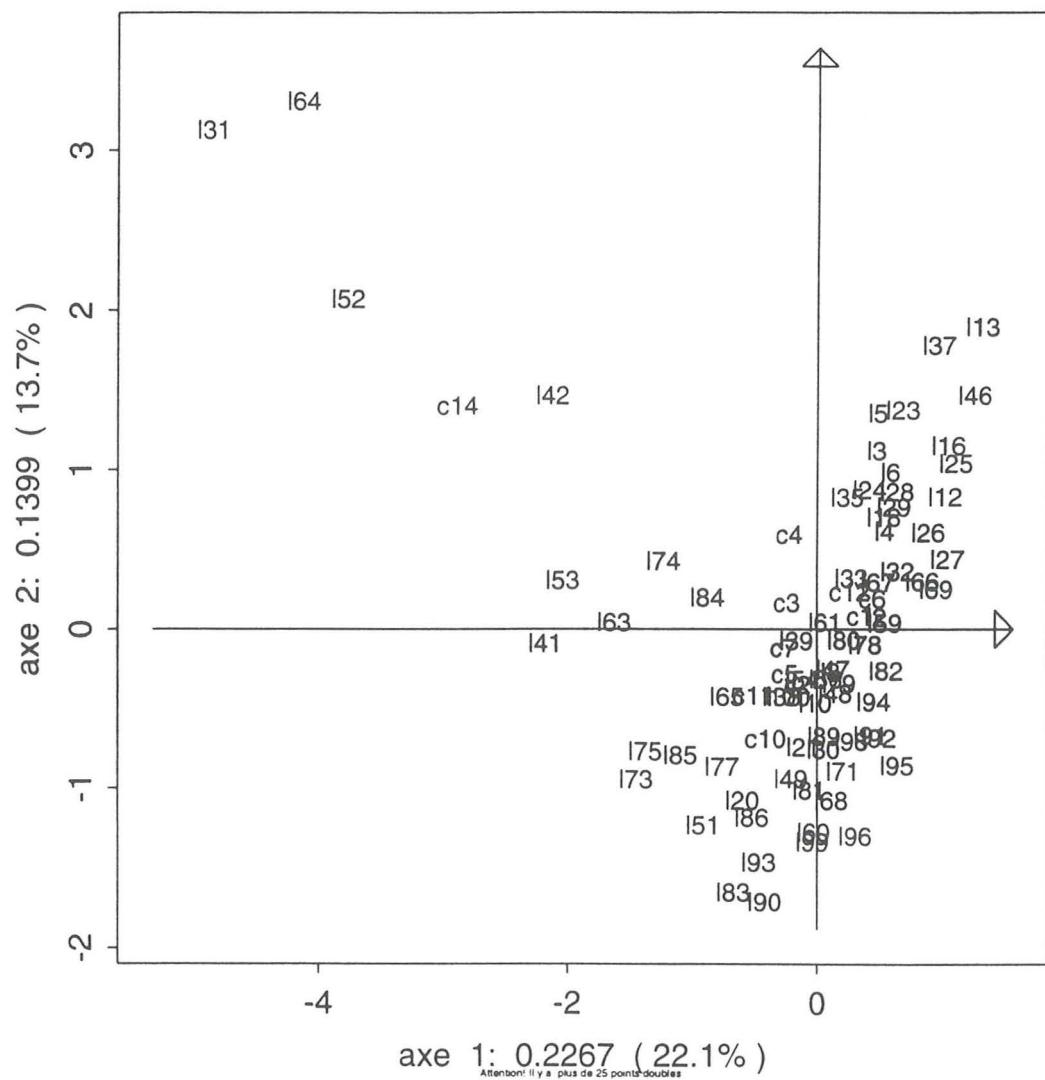


Estimation de  $r(z)$

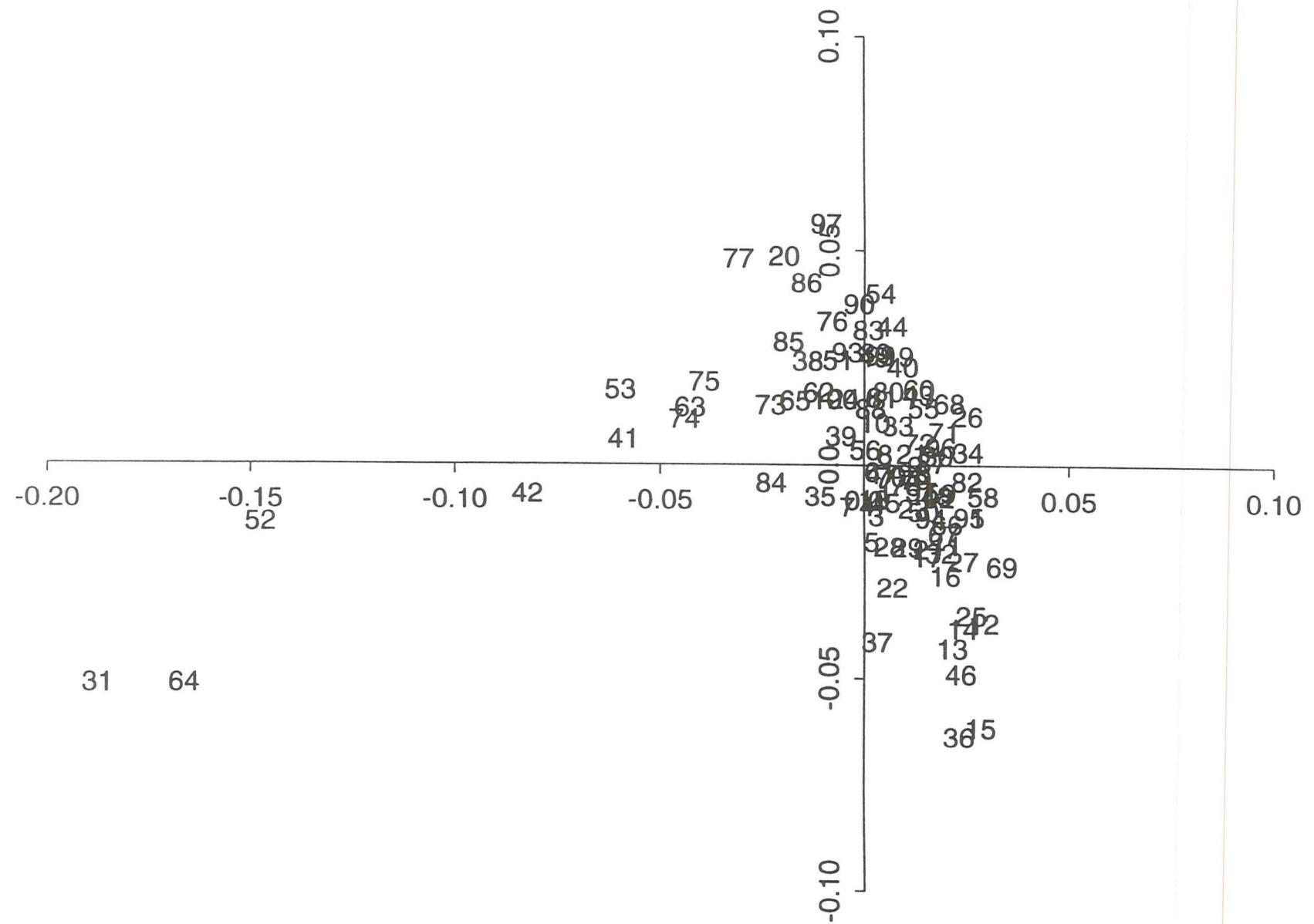


# 8 Analyses multidimensionnelles

Analyse des Correspondances : colonnes aux centres de gravité des lignes



## AFC sur graphe



# Positionnement multidimensionnel

