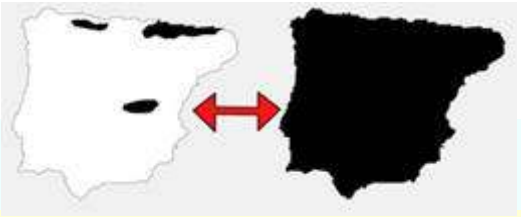
Relationship between geographic rarity and perception of threat in Iberian butterflies

ENRIQUE GARCÍA-BARROS, HELENA ROMO & MARCOS MOLINA
DEPT. BIOLOGÍA, UNIV. AUTÓNOMA DE MADRID

?

9 VARIABLES:

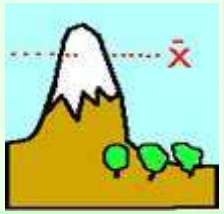


RARITY: GEOGRAPHIC RARITY, NR OF 10 X 10 KM CELLS *

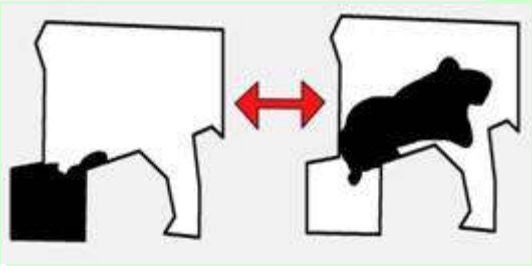
DSPVAR: DISPERSION (BASED ON X – Y VARIANCES) *

DSPNNB: DISPERSION (BASED ON NEAREST NEIGHBOUR ANALYSIS)*

YMEAN: RANGE POSITION, MEAN SPECIES LATITUDE *



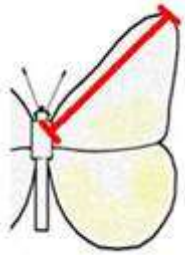
MALTM: MEAN ALTITUDE (m) *



CONCIB: CONCENTRATION OF THE RANGE IN IBERIA (after Kudrna, 2002)

MARGN: MARGINAL DISTRIBUTION IN EUROPE (van Swaay *et al*., 2010)

ADSIZE: MALE FOREWING LENGTH (IBERIAN SAMPLES) **



ACCEPT: ATTRACTIVENESS TO PUBLIC, ADULT STAGE ***

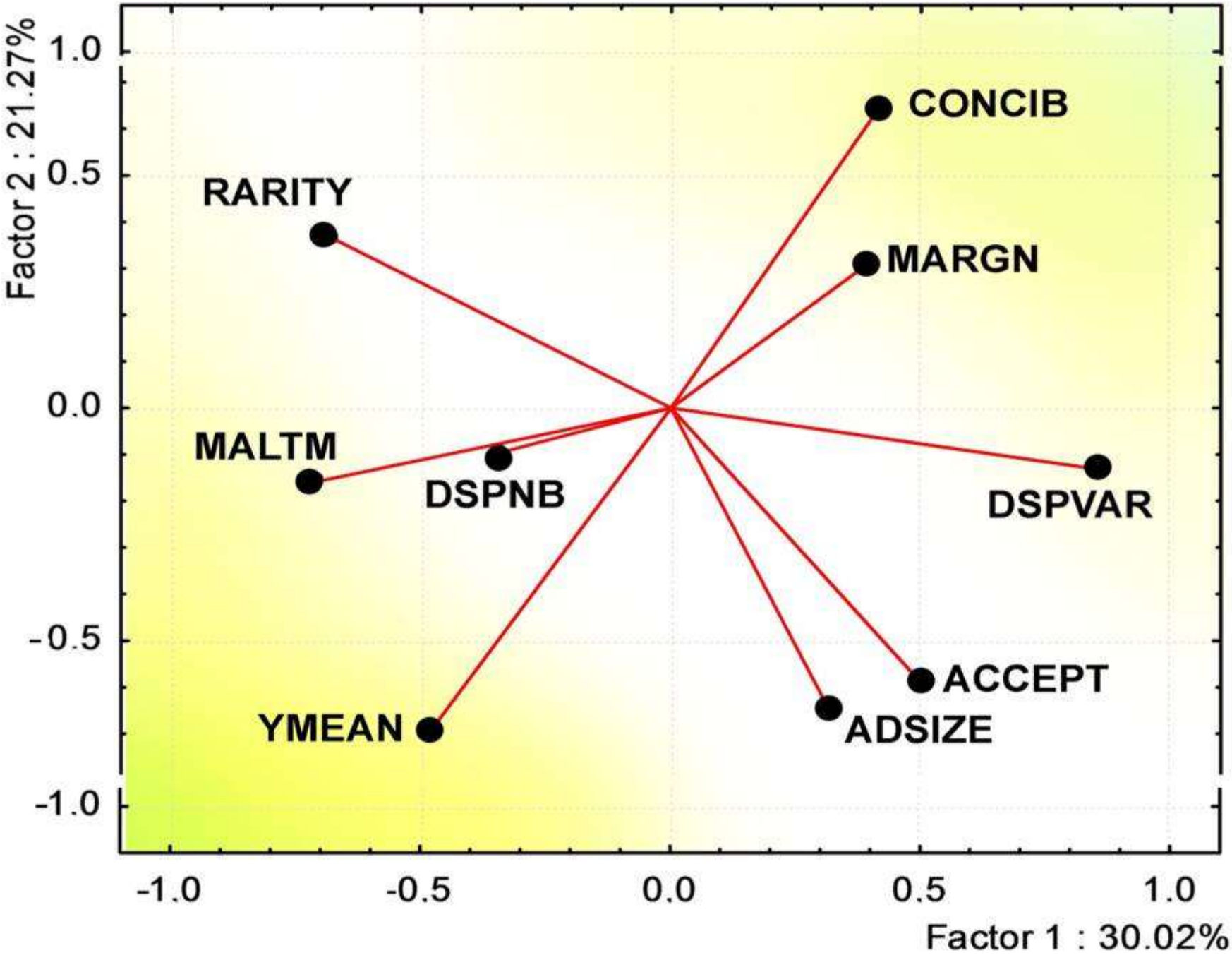
*= from Iberian distribution Atlas
**= unpublished (n>20 per sp)
***= unpublished, preliminary, n= 20 or so

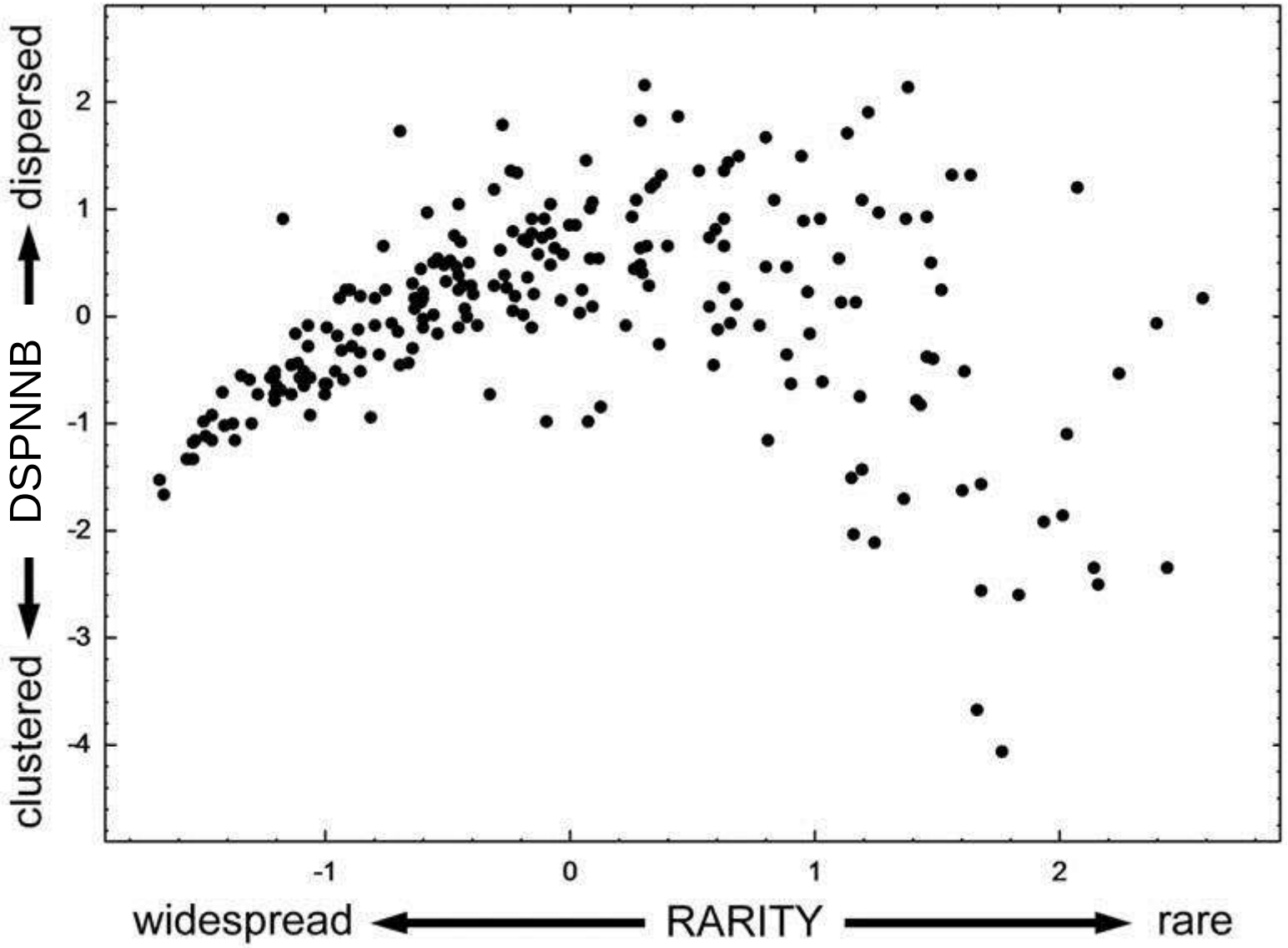

TSIB85
TSIB06
TSIBREG
TSEU09
TSEU10
LIBRO ROJO DE LOS LEPIDOPTEROS IBERICOS
REVISIÓN DEL LIBRO ROJO DE LOS LEPIDOPTEROS IBERICOS
LIBRO ROJO
DE LOS INVERTEBRADOS DE ESPAÑA
DIÁRIO DA REPÚBLICA
REGIONAL LEGISLATION
RED DATA BOOK OF EUROPEAN BUTTERFLIES (RHOPALOCERA)
European Red List of Butterflies
FIVE LISTS OF 'TARGET SPECIES'

species	TS lists
T. acteon (Rott., 1775)	2
B. borbonica (Boisd., 1833)	2
P. cirsii (Rbr., 1839)	2
P. cinarae (Rbr., 1839)	3
P. sidae (Esp., 1784)	3
P. apollo (L., 1758)	5
P. mnemosyne (L., 1758)	4
Z. rumina (L., 1758)	2
E. bazae Fabiano, 1993	4
P. ergane (Geyer, 1828)	2
V. virginiensis (Drury, 1773)	2
M. aetherie (Hb., 1826)	3
E. aurinia (Rott., 1775)	2
E. desfontainii (Godt., 1819)	2
L. achine (Scop., 1763)	5
E. epistygne (Hb., 1824)	5
E. zapateri Obth., 1875	2
C. prieuri (Pierret, 1837)	2
P. hippolyte (Esp., 1784)	3

species	TS lists
L. hippothoe (L., 1761)	2
L. helle (D. & Schiff., 1775)	4
C. lorquinii (H.-S., 1847)	3
I. debilitata (Schultz, 1905)	3
P. alcon (D. & Schiff., 1775)	2
P. arion (L., 1758)	5
P. nausithous (Bergs., 1779)	4
S. orion (Pallas, 1771)	2
A. zullichi Hemming, 1933	3
P. hespericus (Rbr., 1840)	4
P. ripartii (Freyer, 1830)	2
P. fabressei (Obth., 1910)	2
P. violetae (G.B.& *al*., 1979)	3
P. damon (D. & Schiff., 1775)	2
P. nivescens (Kef., 1851)	3
P. golgus (Hb., 1813)	4
P. caelestissima (Vty., 1921)	2
P. eros (Ochs., 1807)	2

37 species in 2 or more TS lists, plus 40 other species in only one of the TS lists (total = **80**)

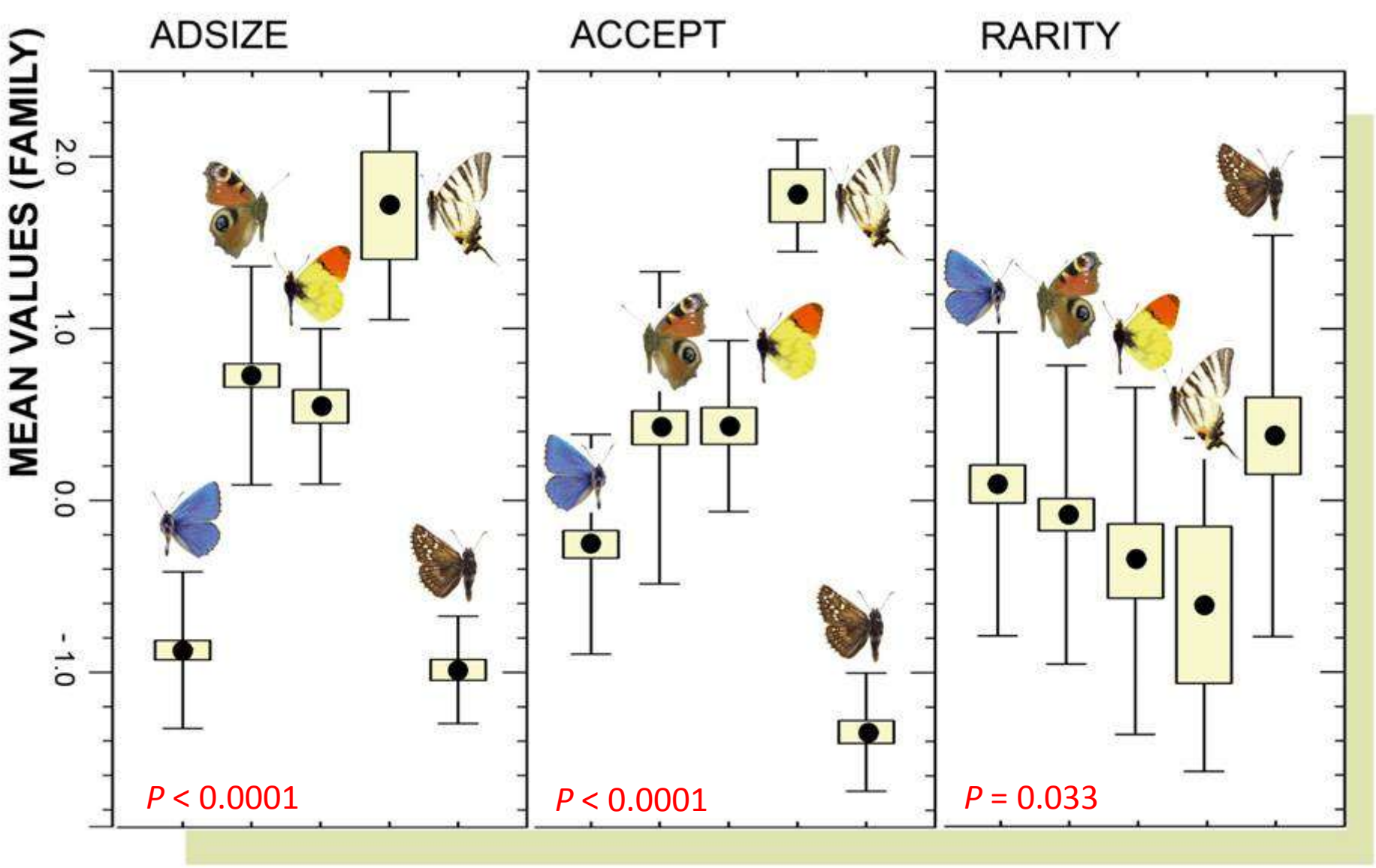

Factor 2 : 21.27%
1.0
0.5
0.0
-0.5
-1.0
CONCIB
RARITY
MARGN
MALTM
DSPNB
DSPVAR
ACCEPT
YMEAN
ADSIZE
-1.0
-0.5
0.0
0.5
1.0
Factor 1 : 30.02%


clustered
DSPNNB
dispersed
2
1
0
-1
-2
-3
-4
-1
0
1
2
widespread
RARITY
rare

Results:

TS-lists:	TISB85	TSIBRG	TSIB06	TSEU99	TSEU10
vars. (sign, Wald stat., P)					
RARITY	(+) 18.64***	(+) 18.18***	(+) 24.38***	(+) 8.94**	(+) 10.11**
YMEAN	(–) 5.88*	(–) 11.93***	——	——	——
DSPVAR	——	——	——	——	(+) 5.36*
MALTM	(+ –) 10.73**	——	——	——	(+ –) 7.09**
ACCEPT	——	——	——	4.05*	——
ADSIZE	——	(+) 4.06*	——	(–) 10.79**	——
MARGN	(+) 5.70*	——	——	——	——
Model, Log-likelihood	-64.81	-68.62	-40.86	-77.49	-89.47
Model, R^2	0.37***	0.22***	0.17***	0.14***	0.06**

but…



FAMILY EFFECTS: SMALL, NOT VERY HANDSOM= RARE

(LESS FREQUENTLY RECORDED)

TS-lists:	TISB85	TSIBRG	TSIB06	TSEU99	TSEU10
vars. (sign, Wald stat., P)					
FAMILY	14.14**	14.14**	12.45*	11.26*	——
RARITY	(+) 20.08***	(+) 19.66***	(+) 22.78***	(+) 8.07**	(+) 8.46**
YMEAN	(–) 4.20*	——	——	——	——
DSPVAR	——	——	——	——	(+) 4.39*
MALTM	(+) 10.24**	——	——	——	(+ –) 6.96**
ADSIZE	——	——	(+) 11.34***	——	——
MARGN	(+) 7.66**	——	——	——	——
Model, Log-likelihood	-57.24	-63.20	-33.94	-76.62	-86.25
Model, R^2	0.38***	0.28***	0.23***	0.19***	0.11***

Five CONCLUSIONS

(1) 'EXOTISM' **prevailed in the earliest selections, and:**

(2) 'DETECTABILITY' has / had a weight:

(?) taxonomic / expert biass, although:

(3) No model showed a very high fit

(4) Recent EU list: more difficult to explain

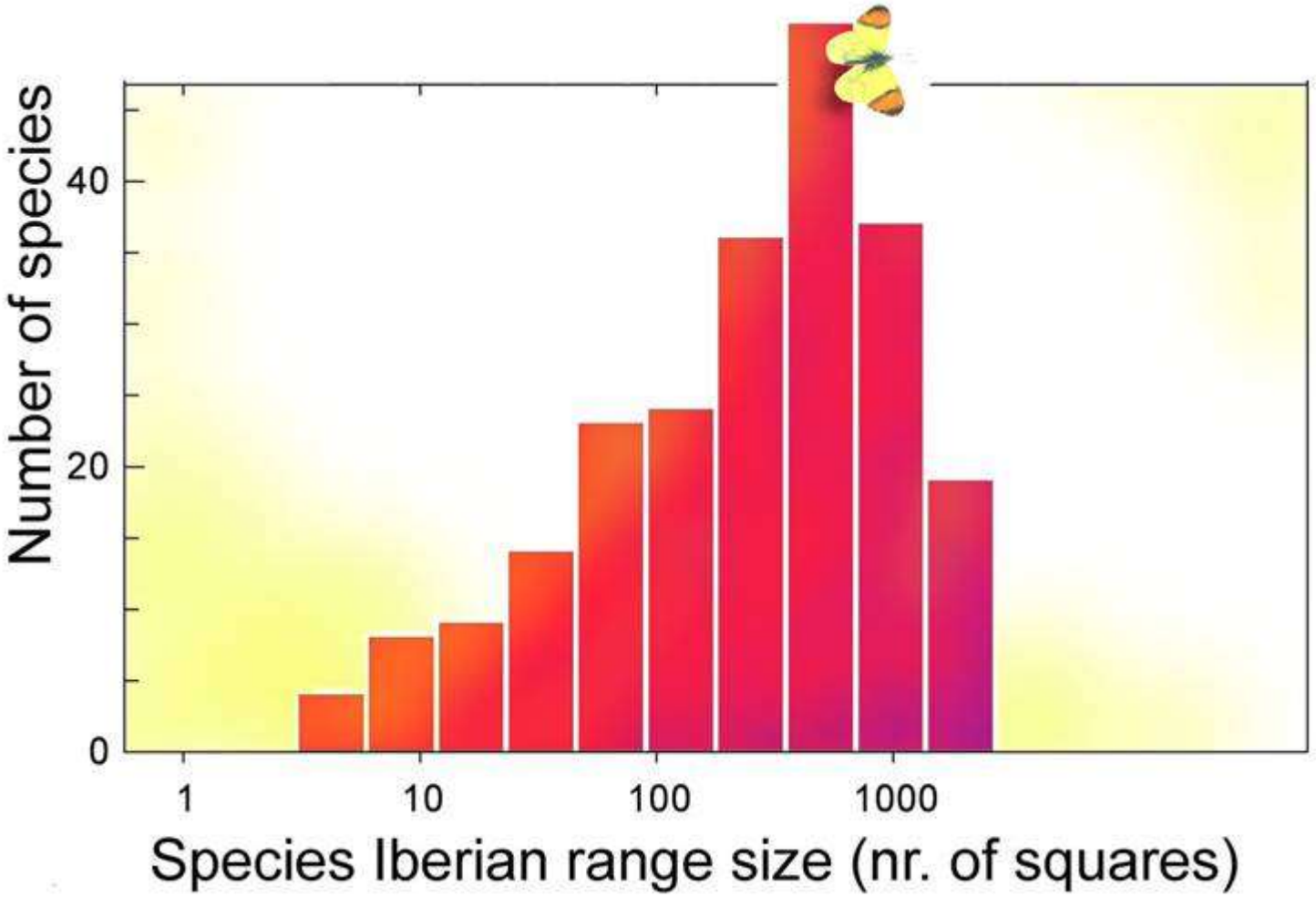
from the regional perspective

(?) rarity, dispersion / fragmentation, mountain species

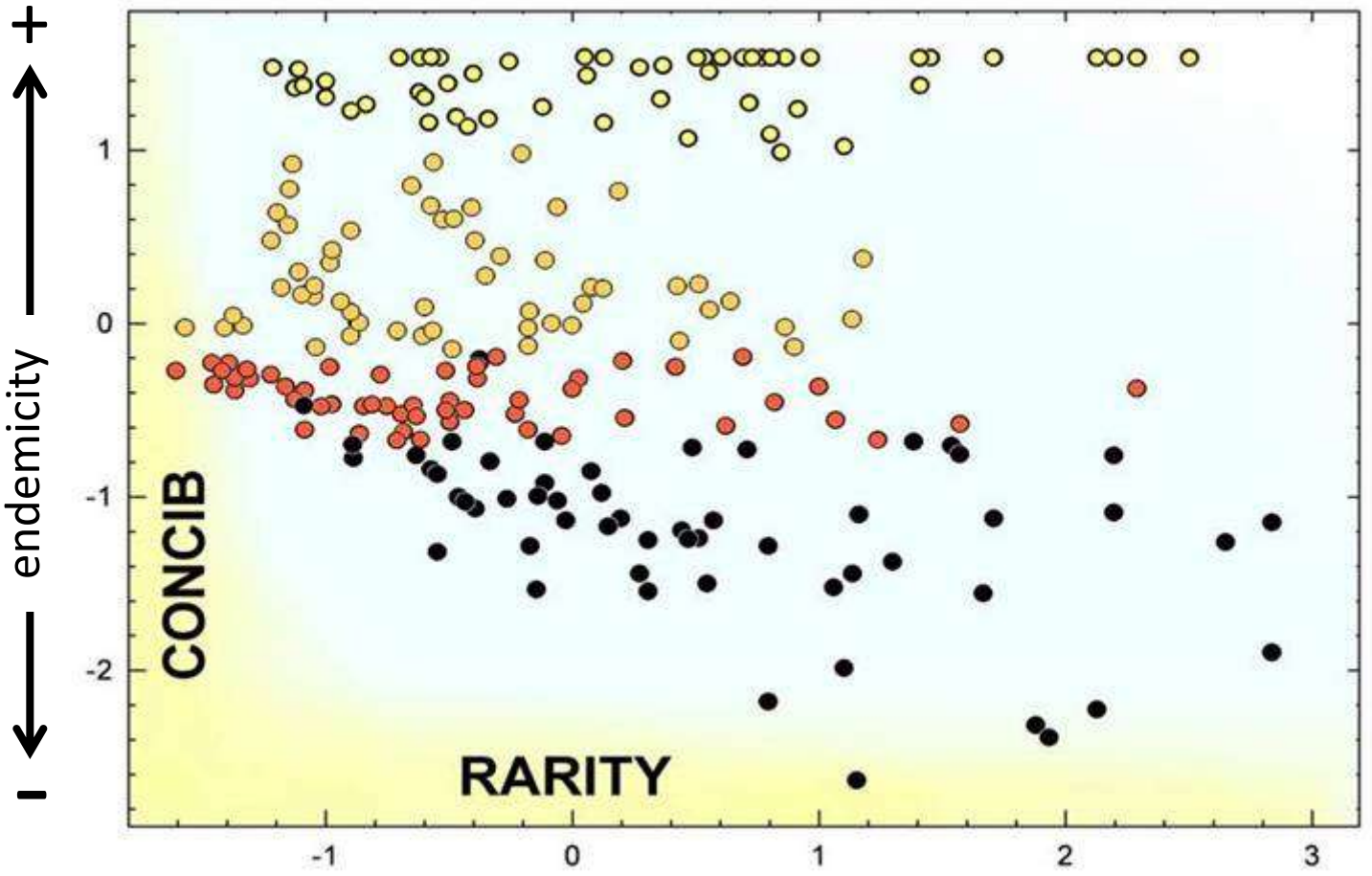
(5) GEOGRAPHIC RARITY: most universal criterion

(easily perceived without accurate data)

So, when dealing with the 'Iberian rarities':

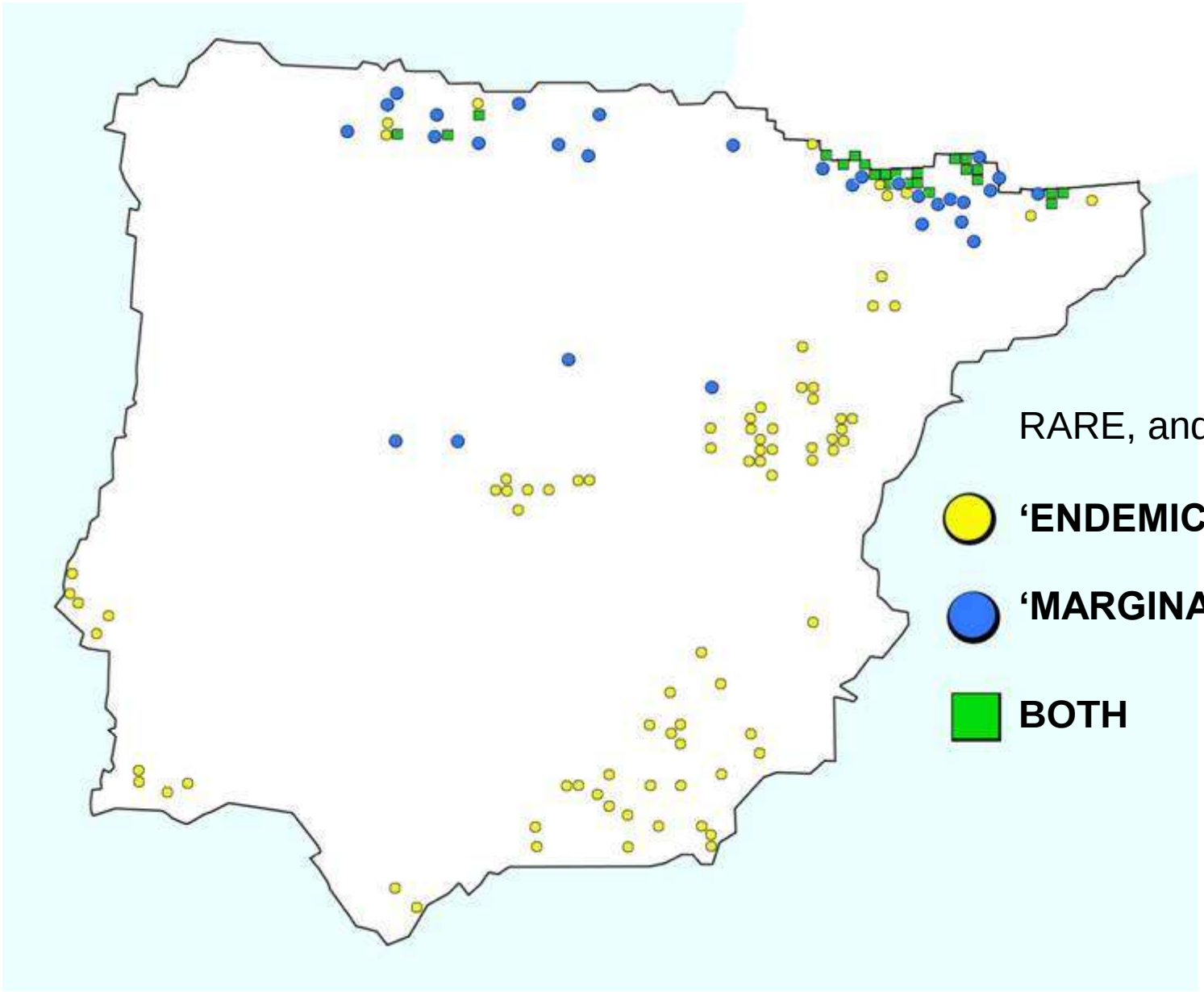


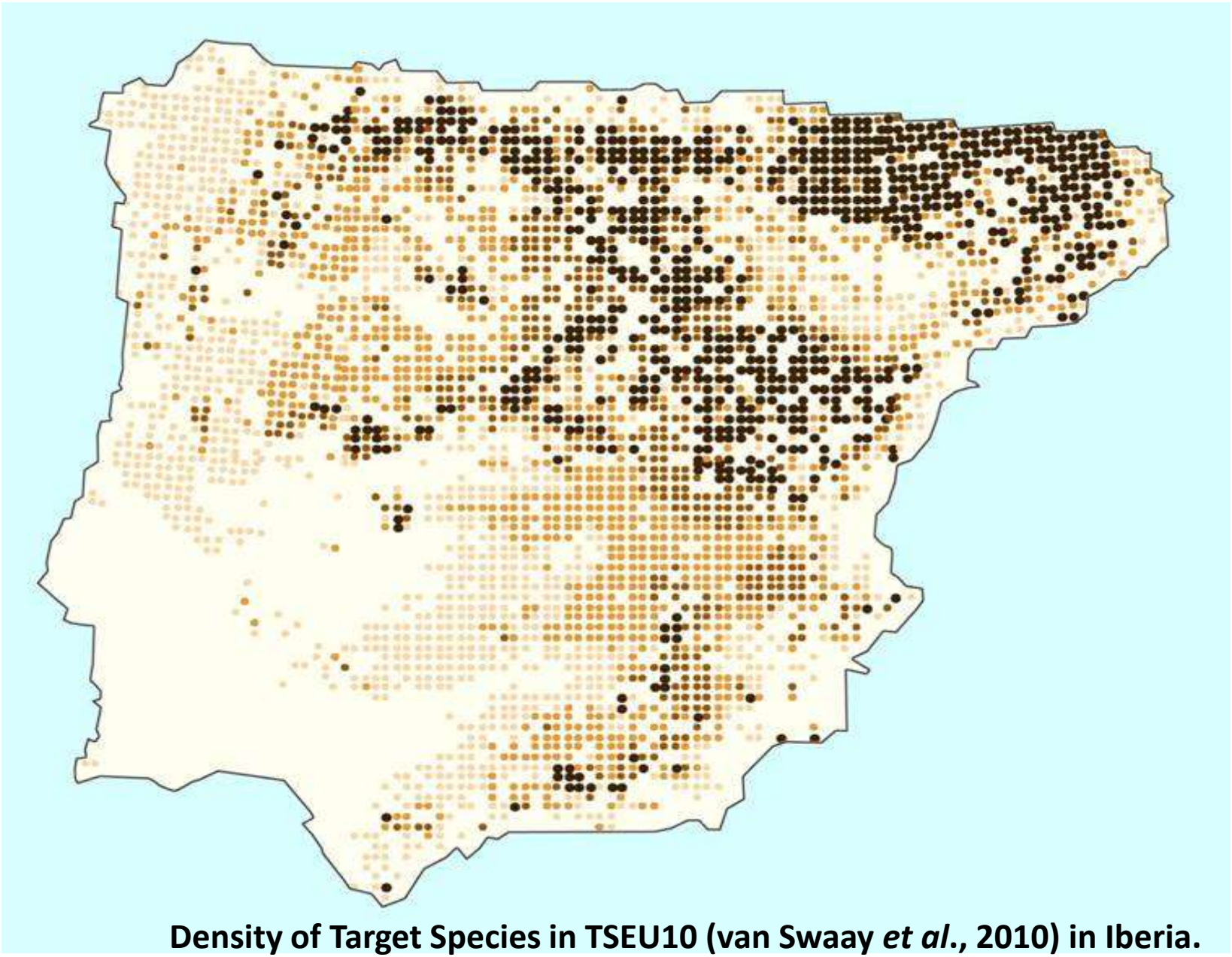
Too few rare endemisms, or too many widespread species?



‘rarest’ spp, 2 types

- ***ca*. Endemic** (high CONCIB)
- **Marginally Iberian** (low CONCIB)
  Habitat specialists in the Mediterranean?


RARE, and:
‘ENDEMIC’ (high CONCIB)
‘MARGINAL’ in Iberia
(low CONCIB)
BOTH



Density of Target Species in TSEU10 (van Swaay *et al*., 2010) in Iberia.

Values for blank cells predicted from TSA (lat., long., rainfall, temperature and altitude).

THANKS FOR YOUR ATTENTION

Further details in: *J. Insect Conserv*., 2012; DOI 10.1007/s10841-011-9421-8