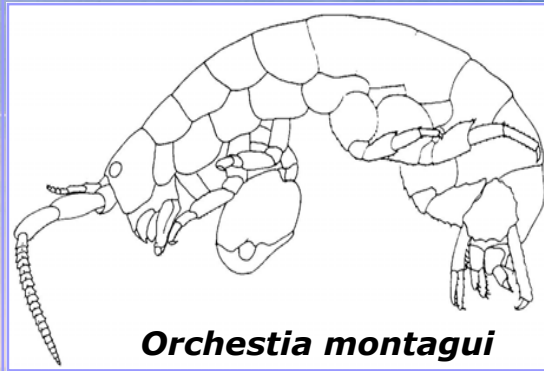


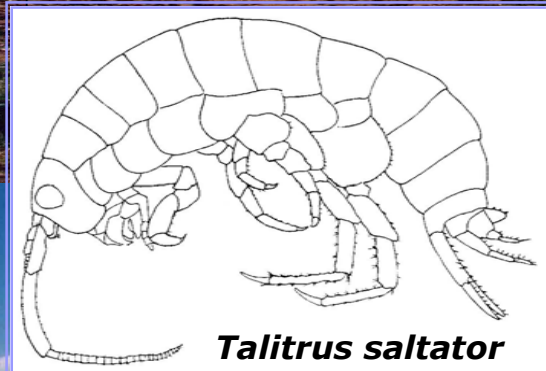


**MEDCORE International Congress  
Florence 10th-14th November 2005  
C.Rossano, E.Morgan and F.Scapini**

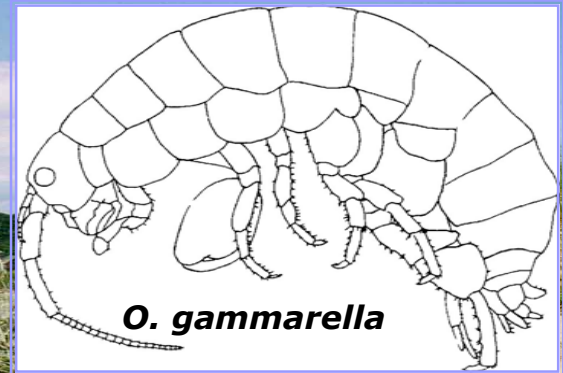
**Locomotor activity rhythms in three  
species of talitrid amphipods  
colonizing different habitats in the  
Maremma Regional Park  
(Tuscany, Italy)**



*Orchestia montagui*



*Talitrus saltator*



*O. gammarella*


















21 days in dark  
in constant T


Free -running experiments

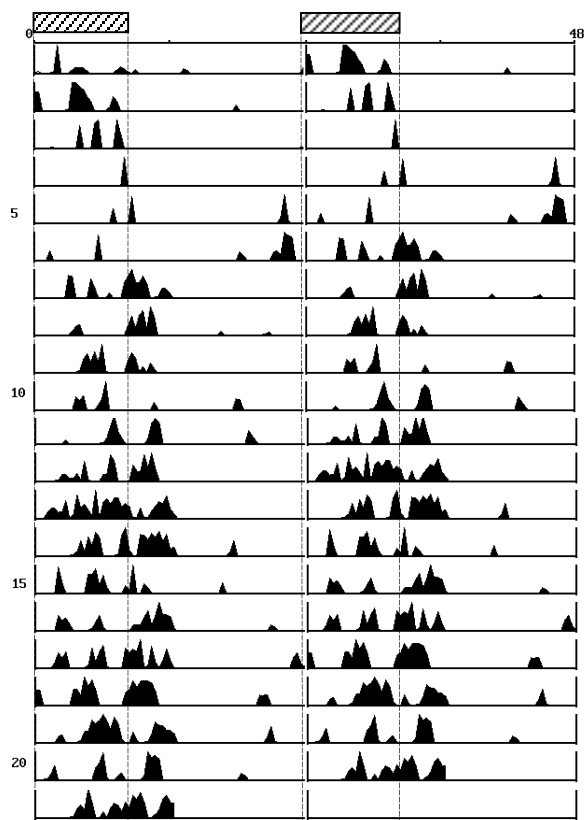
Experiment	Population	Beginning	T°C
30 -Apr -02	Collelungo	30 -4-02	18
24 -May -02	Collelungo	24 -5-02	18
19 -June -02	Collelungo	19 -6-02	18
16 -Oct -02	Omr/Talm	16 -10 -02	18
7 -Dec -02	Omrone	7 -12 -02	15,5
21 -Feb -03	Omrone	21 -02 -03	18
23 - May -03	Omr/Talm	23 -05 -03	18
18 - June -03	Omr/Talm	18 -06 -03	18
11 -July -03	Omr/Talm	11 -07 -03	18
12 -Aug -03	Omr/Talm	12 -08 -03	18
4 -Sept -03	Omr/Talm	04 -09 -03	18 (24x6 dd)
4 -Nov -03	Omrone	04 -11 -03	18
16 - June -04	Omr mouth/Cave	16 -06 -04	18
13 - July -04	Omr mouth/ Cave	13 -07 -04	18
2 -Sept -04	Omr mouth/ Cave	2 -09 -04	18
18 -Oct -04	Omr mouth/ Cave	18 -10 -04	18



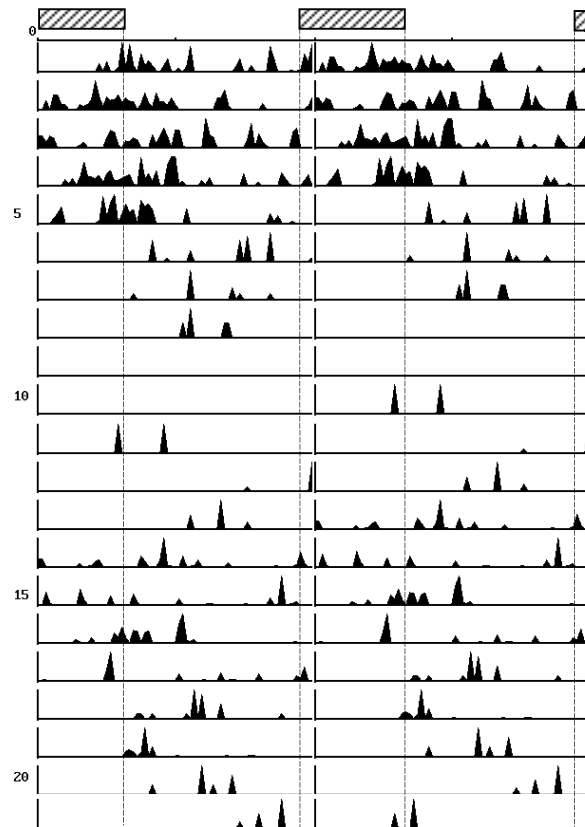


**Individual Features  
of the Locomotor Activity Rhythm**

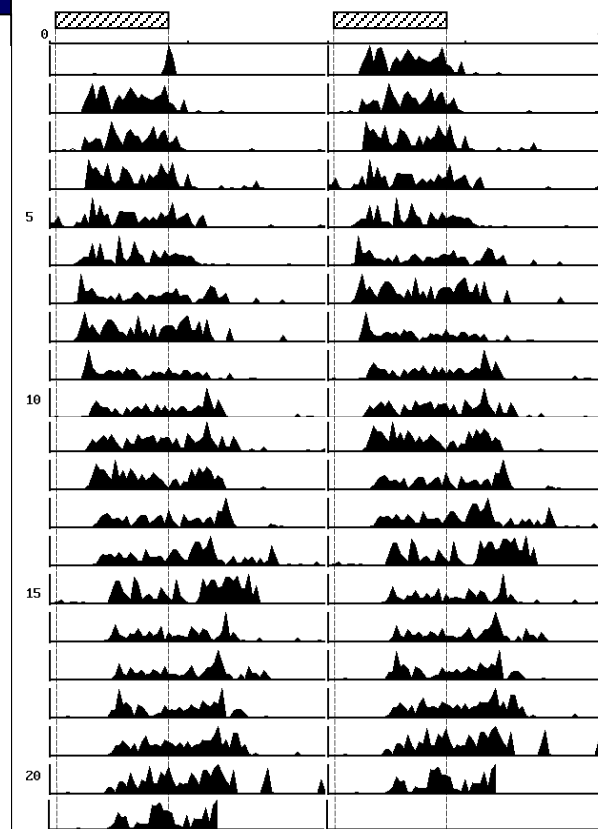




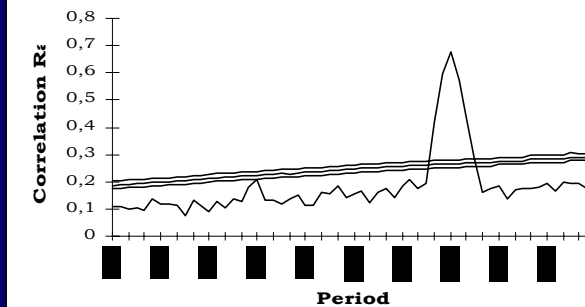
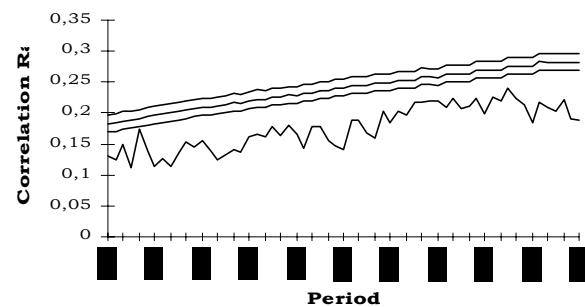
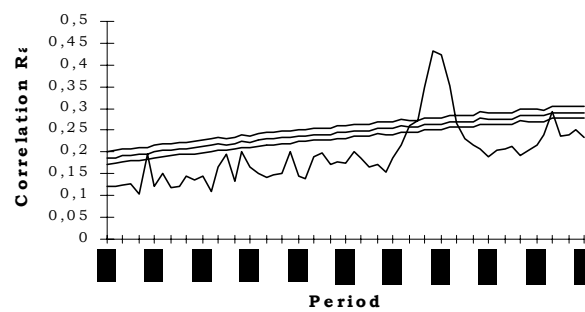
19 giugno 02.021 *Talitrus saltator*

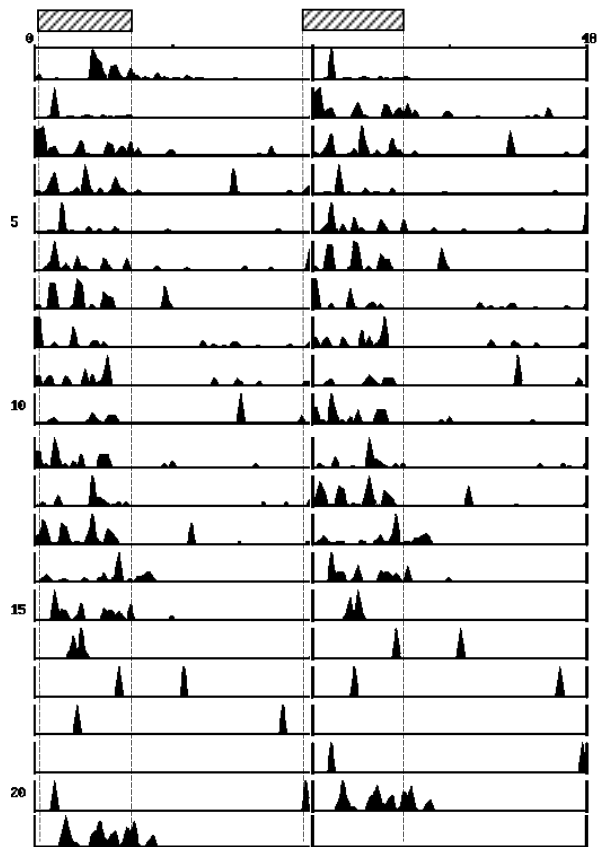


11 luglio 03.010 *O. gammarella*

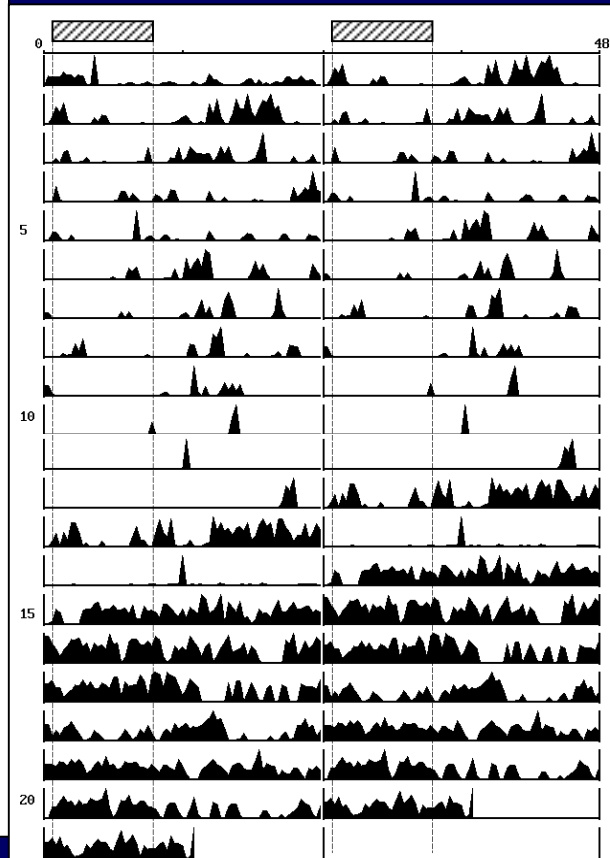


12 agosto 03.011 *Orchestia montagui*

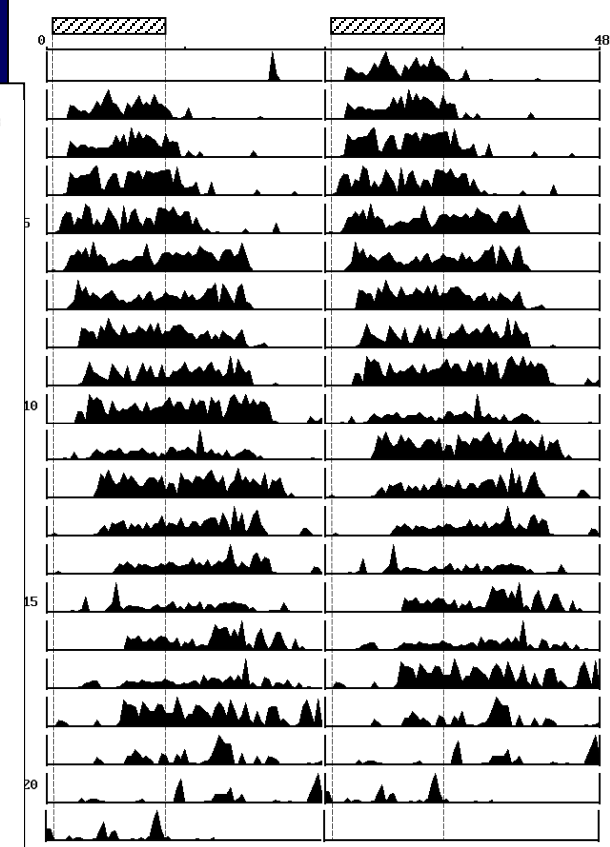




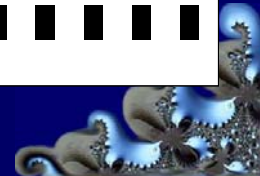
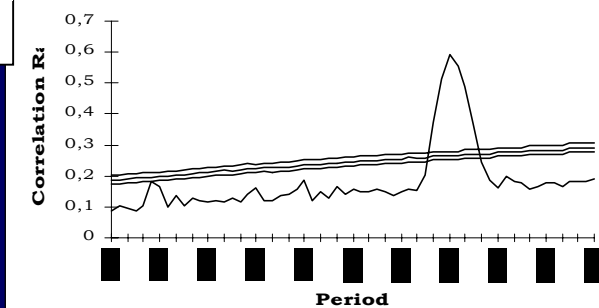
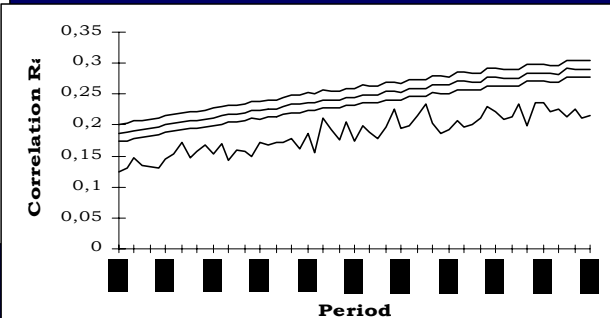
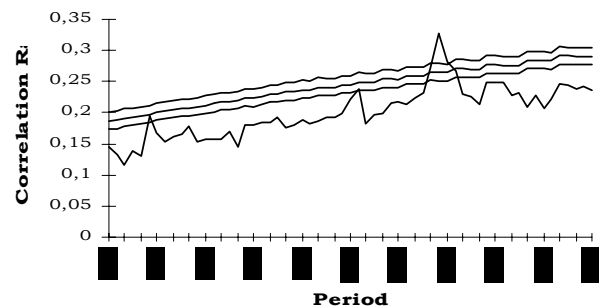
19 giugno 02.004 *Talitrus saltator*

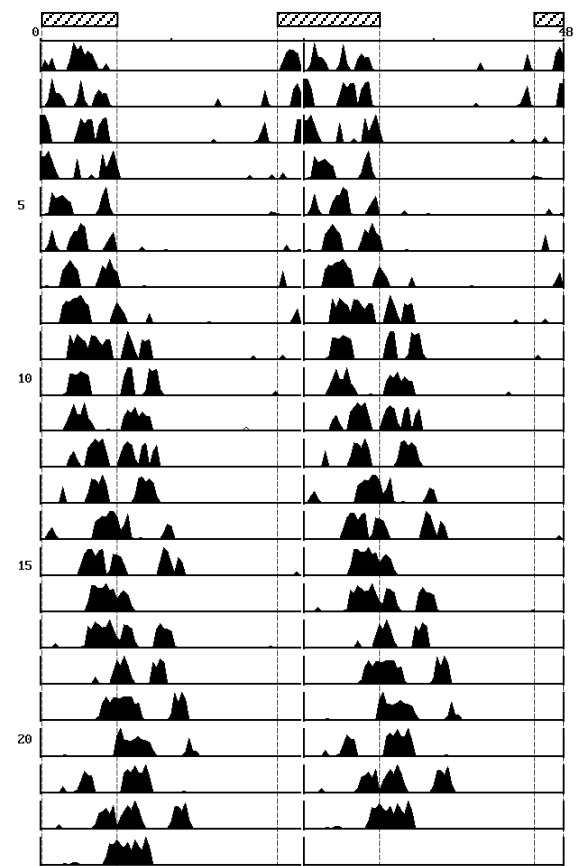


18 giugno 03.020 *O. gammarella*

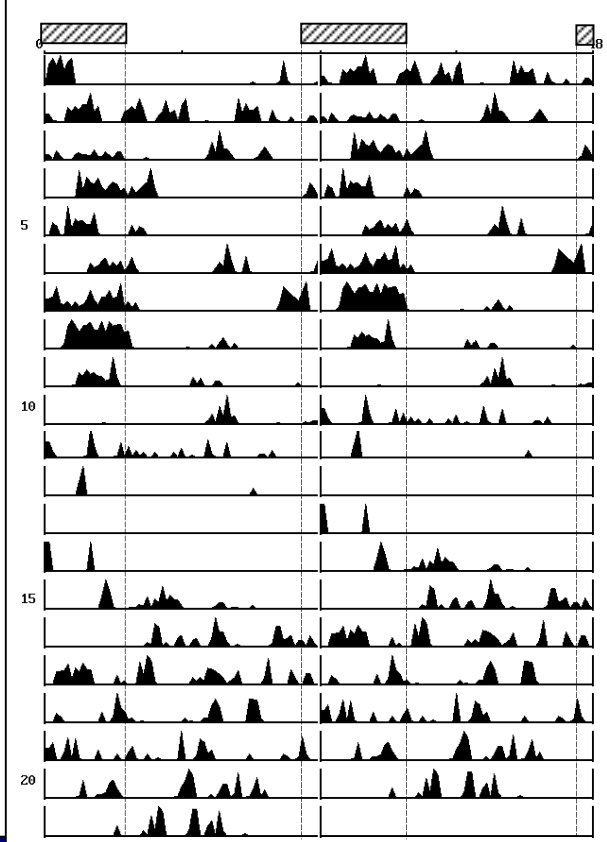


12 agosto 03.006 *Orchestia montagui*

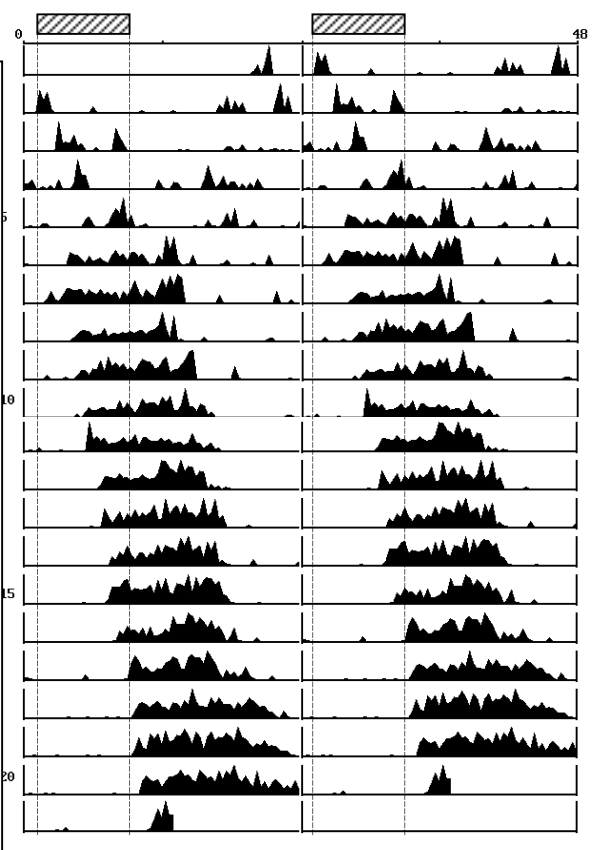




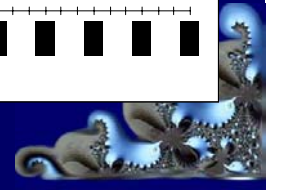
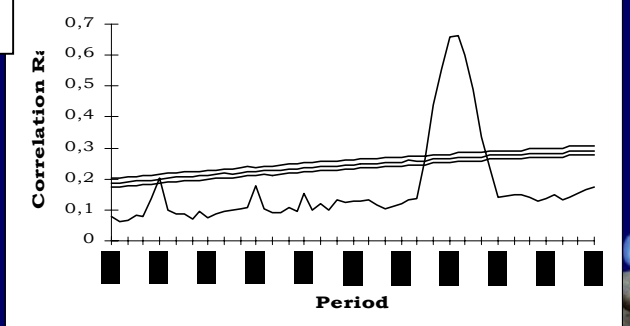
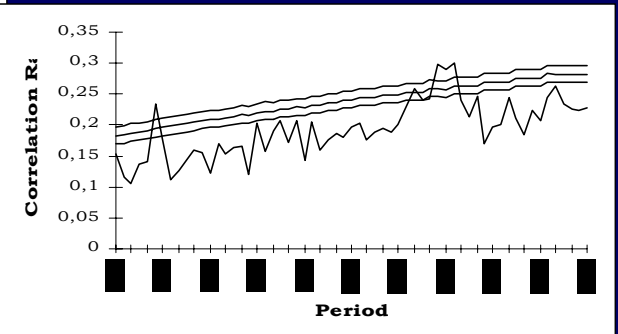
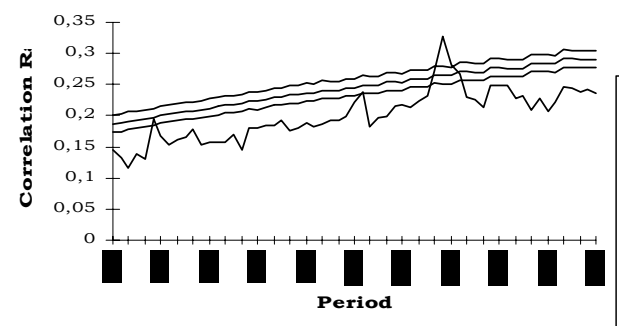
16 giugno 04.033 *Talitrus saltator*



11 luglio 03.009 *O. gammarella*



18 giugno 03.006 *Orchestia montagui*





**Population Features**  
**...and some Intra-Specific Comparisons**



## Talitrus saltator

	Collelungo	Casello I	Comparison
	%	%	
n	69	78	
Survival	97	95	° n.s.
Active	83	69	* n.s.
Periodic(CD)	79	95	° p = 0,0378
Mean $\tau_{CD}$	24h 12' ± 4'	24h 12' ± 5'	# n.s.
SNR	0,475 ± 0,059	0,484 ± 0,059	# n.s.

\* Pearson's chi-square test with Yates correction

° Fisher exact test

# Wilcoxon rank-sum test

## Orchestia montagui

	Talamone
	%
n	75
Survival	89
Active	94
Periodic (CD)	92
Mean $\tau_{CD}$	24h 15' ± 6'
SNR	0,617 ± 0,070

## Orchestia gammarella

	Ombrone	Grotta	Comparison
	%	%	
n	62	78	
Survival	85	94	* n.s.
Active	53	83	* p = 0,0005
Periodic(CD)	38	46	* n.s.
Mean $\tau_{CD}$	24h 4' ± 19'	24h 31' ± 18'	
SNR	0,186 ± 0,041	0,151 ± 0,024	

\* Pearson's chi-square test with Yates correction



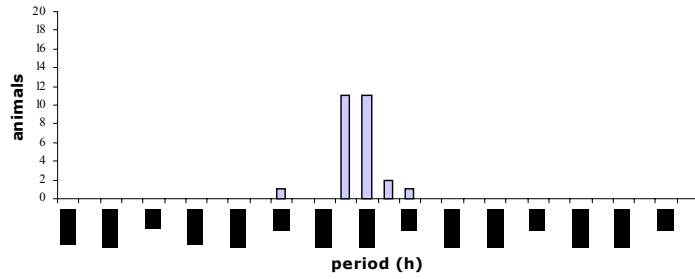


# Differences Among Populations

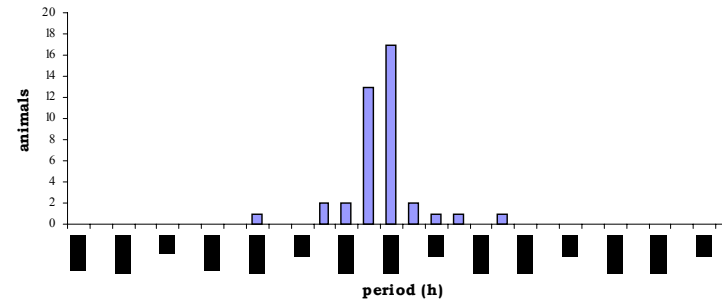




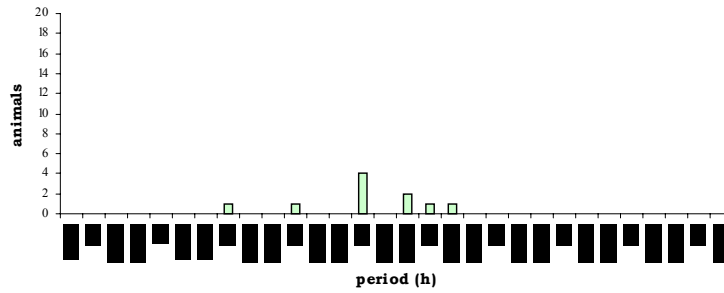
*Talitrus saltator*  
Collelungo sandy beach (n=26/33)  
April-June



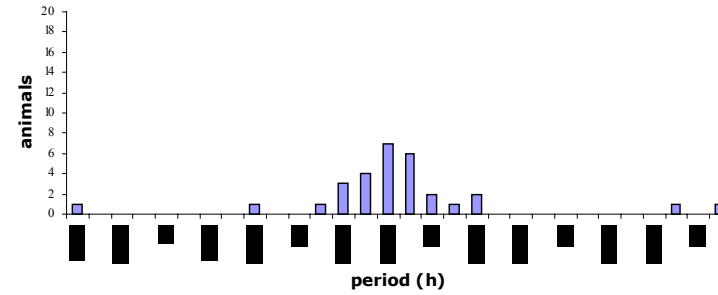
*Talitrus saltator*  
Casello Idraulico Ombrone mouth (n=40/42)  
May-October



*Orchestia gammarella*  
Ombrone river shore (n=10/26)  
Summer 2002-2003

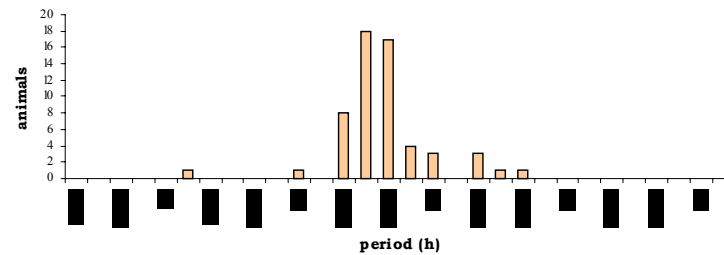


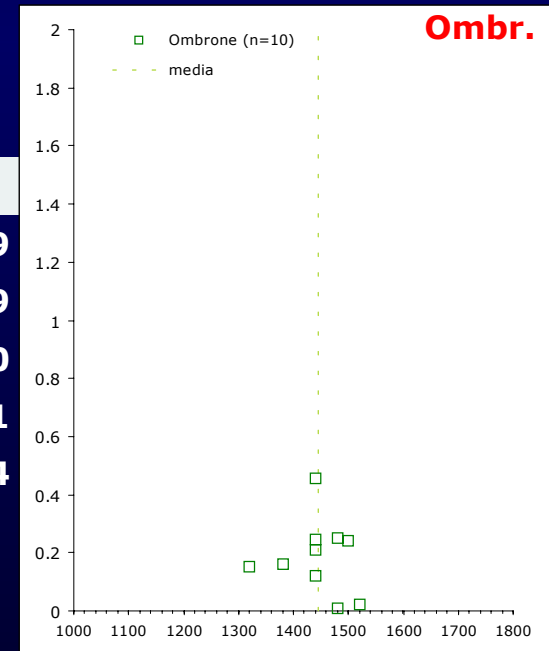
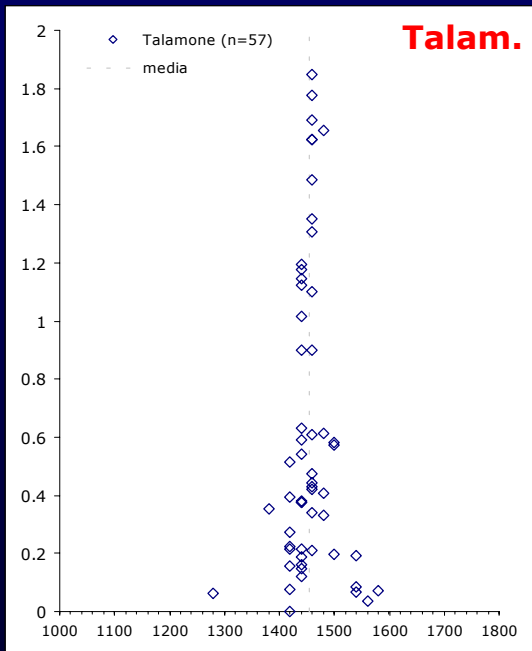
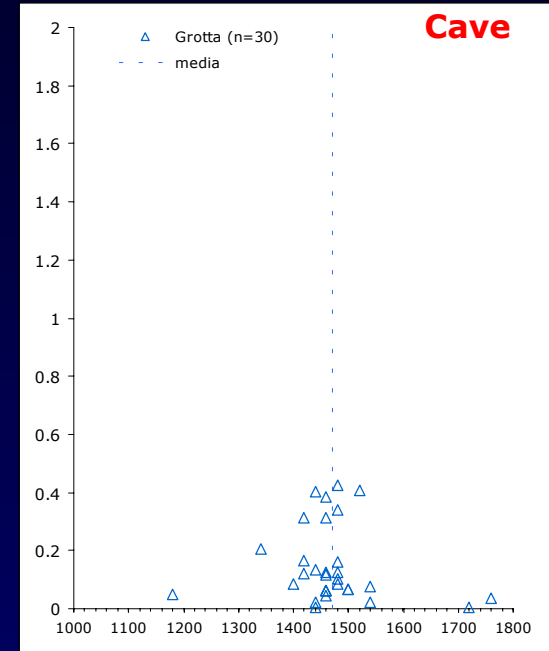
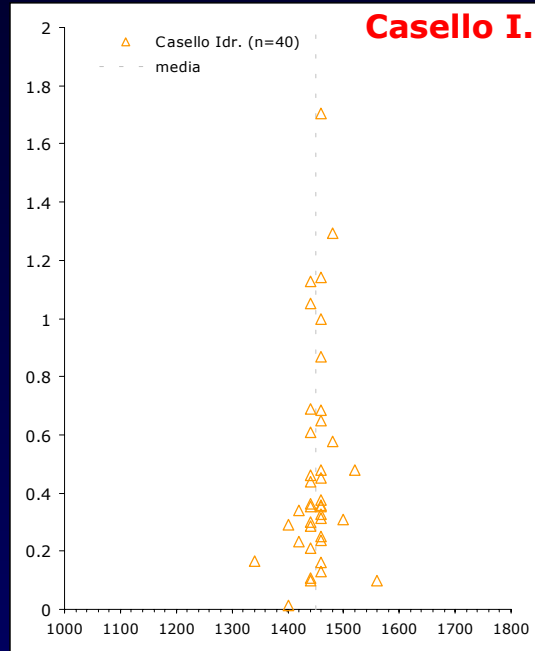
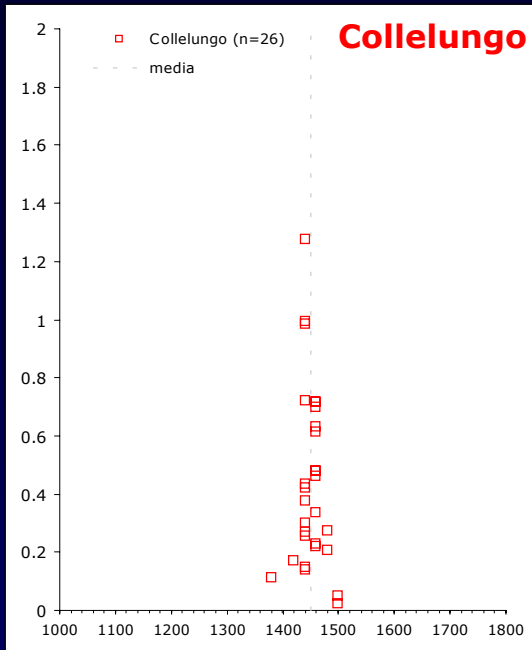
*Orchestia gammarella*  
La Buca Cave (n=30/65)  
May-October



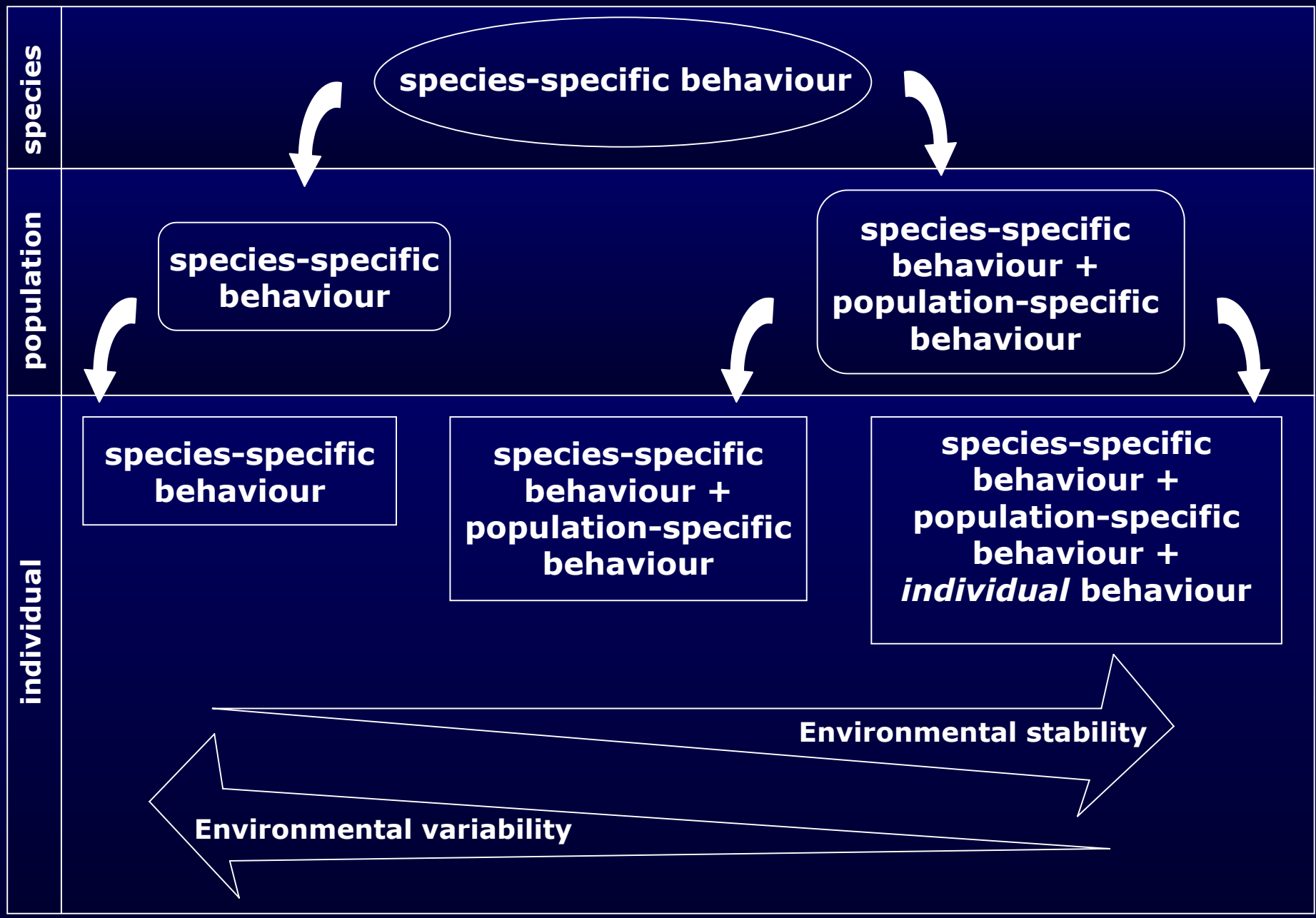
# Period distributions

*Orchestia montagui*  
Talamone sea shore (stranded Posidonia) (n=57/62)  
2002-2003





	Mean Per	Mean Def
<b>Collelungo</b>	<b>24h12'±4'</b>	<b>0,475±0,059</b>
<b>Casello I.</b>	<b>24h12'±5'</b>	<b>0,484±0,059</b>
<b>Talamone</b>	<b>24h15'±6'</b>	<b>0,617±0,070</b>
<b>Ombrone</b>	<b>24h4'±19'</b>	<b>0,186±0,041</b>
<b>Coll.Cave</b>	<b>24h31'±18'</b>	<b>0,151±0,024</b>





**Biological Clocks express circadian rhythmicity in all the three studied species  
with an evident **individual variability****

**The characteristics of the rhythm mainly depends on species:**

**O. Gammarella**

**has weak rhythms and high variability in circadian period**

**T. Saltator**

**has intermediate rhythm features between O. gammarella and**

**O. Montagui**

**that has well defined rhythms with respect to both the other species**

**a certain **plasticity** exist **inside each species** and emerges from intra-specific differences due to the colonized habitat**

**Rhythms are differently expressed depending on how much they are adaptive in the locality where the organism lives**



**Thanks to:**

- **MEDCORE PROJECT, UE contract ICA3-CT2002-1003.**
- **The Maremma Regional Park**
- **The Workshop of the School of Biosciences, University of Birmingham (UK)**
- **The Scapini group**

