

Variation in body temperatures of the Common Chameleon *Chamaeleo chamaeleon* (Linnaeus, 1758) and the African Chameleon *Chamaeleo africanus* Laurenti, 1768

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Introduction

- ✧ Data on the thermal ecology of the African Chameleon *Chamaeleo africanus* Laurenti, 1768 and the Common Chameleon *Chamaeleo chamaeleon* (Linnaeus, 1758) are reported from Greece. The African Chameleon is a new species for Greece (Böhme et al., 1998).
- ✧ There are few field records of Chameleon body temperatures. Stebbins (1961) gives body temperatures records of captive *Chamaeleo dilepis* and *C. namaquensis*. Burrage (1973) has done most of the work on both field and laboratory thermoregulation of *C. pumilus* and *C. namaquensis*.
- ✧ The preferred body temperatures in a laboratory temperature gradient of the African Chameleon and the Common Chameleon were measured and compared with field body temperatures. A comparison was made between spring and summer and between the two sexes.

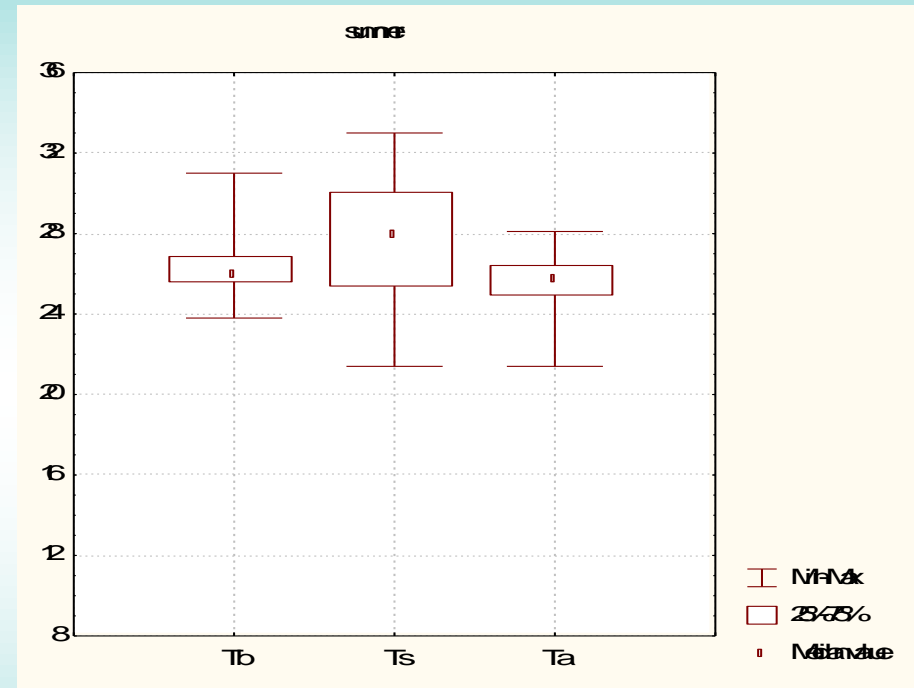
Distribution

- ✧ The distribution of the African Chameleon ranges from the Red Sea to western Mali (Central Africa) (Böhme, 1985). To the north it has reached Egypt (Joger, 1981). The presence of the species at Ramleh, close to Alexandria in Egypt, was first recorded by Anderson (1898).

Methods

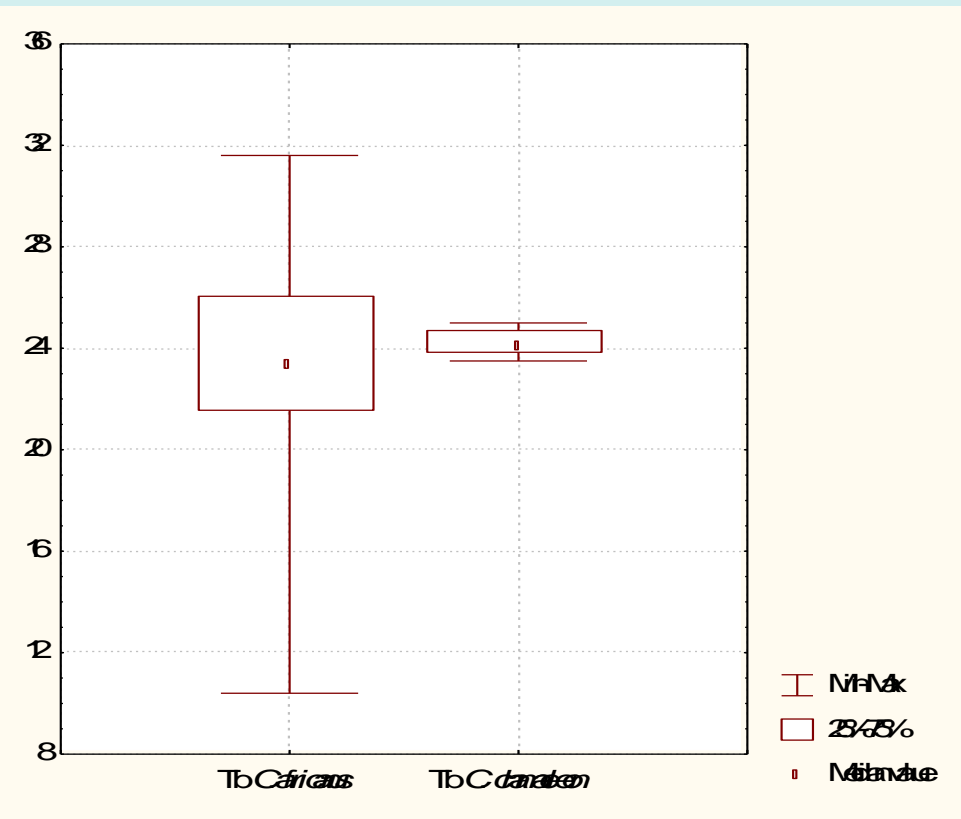
- ✧ A total of 78 body temperatures were taken in the field. Body temperatures (T_b) were obtained using Weber quick-reading cloacal thermometer. Air temperature (T_a) 1-1.5m above the ground and substrate temperature (T_s) were measured at the site of capture. T_b was measured within 10 seconds of capture.
- ✧ Fieldwork at Pylos was carried out in August 1997 and April, May, June and August 1998. At Samos island, fieldwork was done in May 1997, October 1997 and June 1998. Most of the fieldwork was undertaken between 18:30 - 3:00 while few data were collected during the daytime. When it is dark it is more effective to find the animals using flashlights (Cuadrado, 1997).
- ✧ For analysis of the data, the year was divided into two seasons: spring (April- May-June) and summer (August).
- ✧ Seven individuals of the African Chameleons (2 males and 5 females) and two of the Common Chameleon (males) were housed in temperature gradient for studying the preferred body temperatures. Four hundred and sixteen cloacal temperatures were recorded in individuals from laboratory.

Seasonal variation in body (Tb), substrate (Ts) and air temperatures (Ta) for *Chamaeleo africanus*



- ✧ Cloacal temperatures differed significantly between spring and summer and so did substrate temperatures and air temperatures. As the months became hotter the animals reached higher temperatures (t-test, $p < 0.05$).

Body temperatures of *Chamaeleo chamaeleon* and *Chamaeleo africanus*



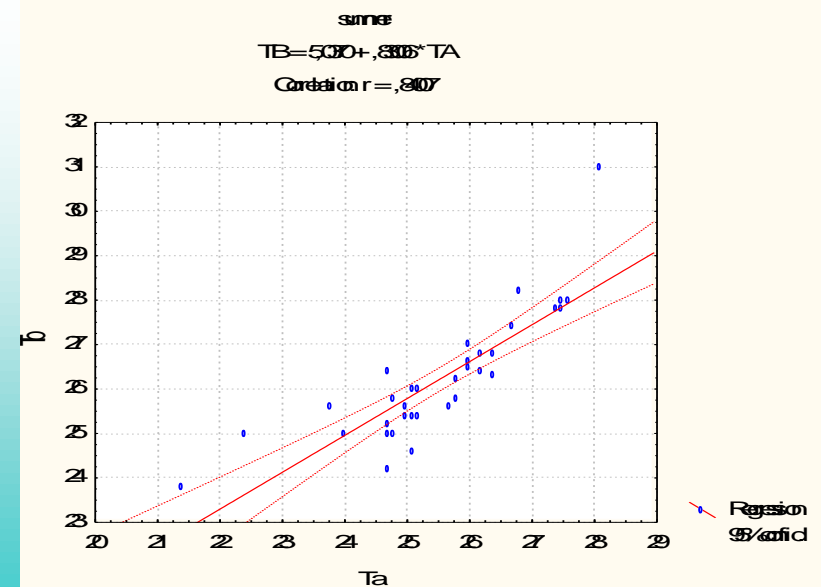
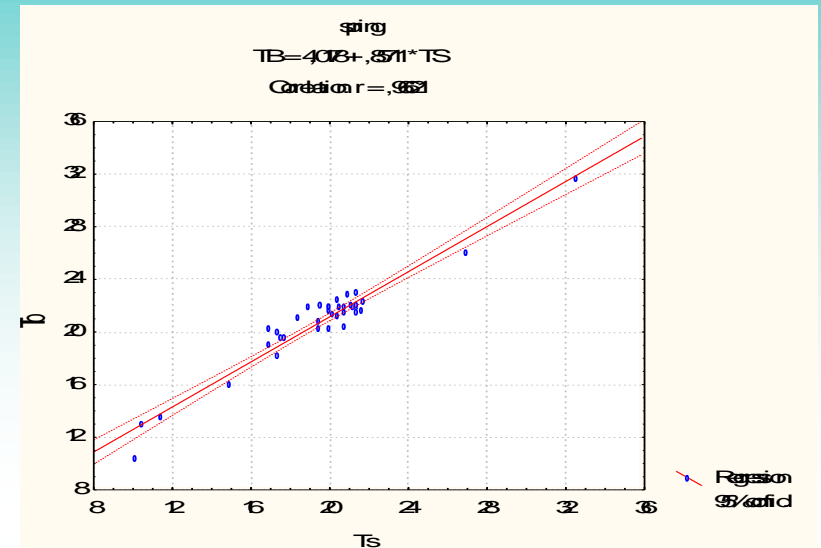
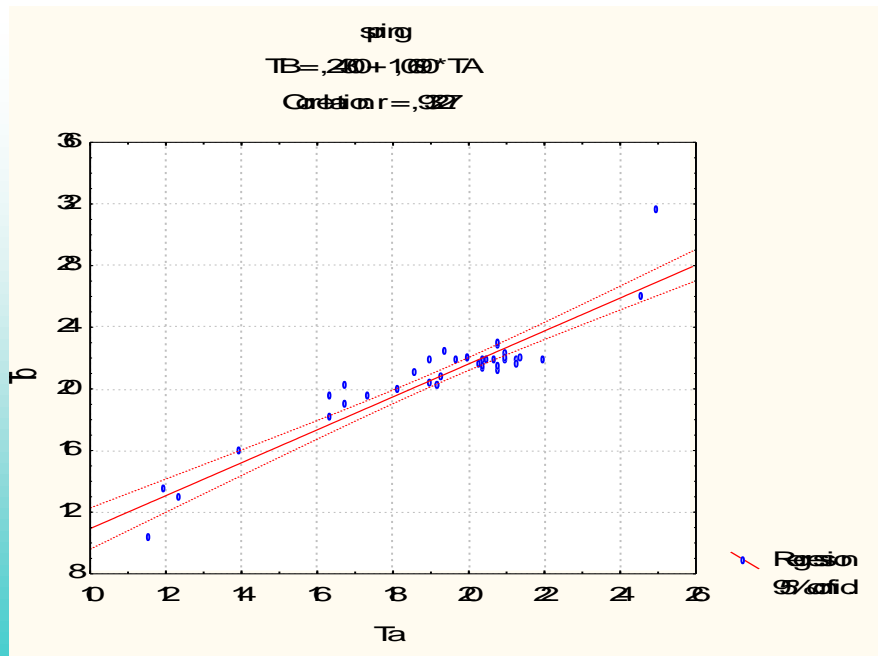
- ✧ The Tb of the chameleons at the field ranged from 10.4°C to 31.6°C while associated substrate temperatures varied from 10.2°C to 33°C and air temperatures varied from 11.6°C to 28.1°C. The minimum temperature we measured was 10.4°C in *C. africanus* in April at 24:40, and the maximum was 31.6°C in *C. africanus* in June.
- ✧ The mean Tb -at the field- of *C. africanus* was 23.4°C while for *C. chamaeleon* it was 24.2°C.

SUMMER

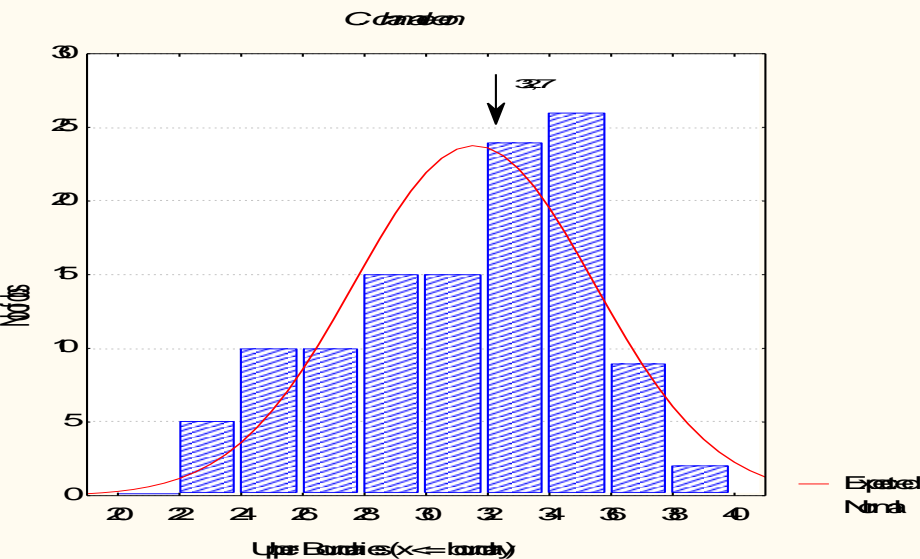
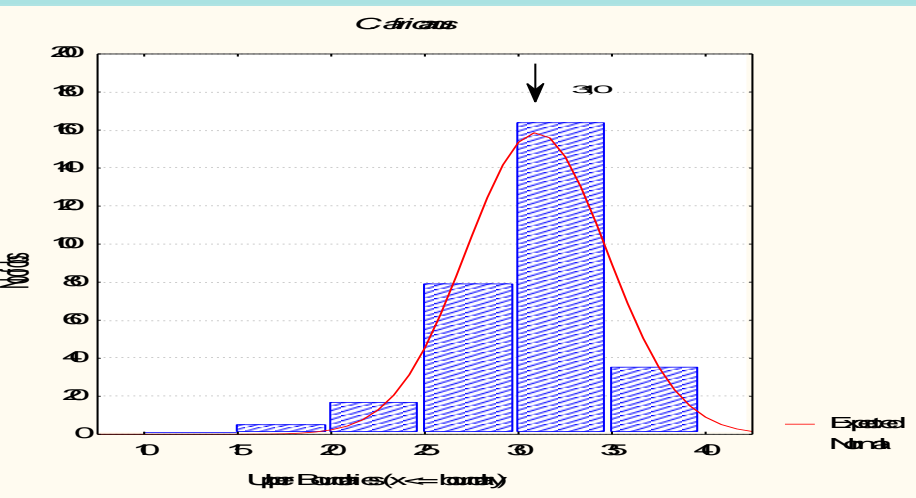
Valid	N	Mean	Minimum	Maximum	Std.Dev.
TB	35	26,23429	23,80000	31,00000	1,376044
TS	35	27,62286	21,40000	33,00000	2,903151
TA	35	25,53714	21,40000	28,10000	1,392646
SPRING					
TB	43	21,11163	10,40000	31,60000	3,368779
TS	43	19,78837	10,20000	32,60000	3,717283
TA	43	19,49535	11,60000	25,00000	2,958760

Field temperatures of *Chamaeleo africanus*

- ✧ There was a significant correlation between Tb and Ts only in the spring. The slope of the equation was 0,85.
- ✧ There was a significant correlation between Tb and Ta in spring and summer. The slope of the equation was 0,83 in the summer and 1 in the spring.



Laboratory temperatures of *C. africanus* & *C. chamaeleon*



- ✧ The preferred body temperature at the laboratory gradient ranged from 26.0°C to 36.0°C for *C. chamaeleon* and from 25.0°C to 35.0°C for *C. africanus*.
- ✧ The median Tb for *C. africanus* was 31°C while for *C. chamaeleon* was 32.7°C.
- ✧ The mean Tb for *C. africanus* was 31°C while for *C. chamaeleon* was 31.6°C.

Discussion

- ✧ There was no difference between the two sexes neither between the two species, both in field and laboratory.
- ✧ The Tb at the field ranged from 10.4°C to 31.6°C for *C. africanus* and from 23.5 °C to 25.0 °C for *C. chamaeleon*. Stebbins (1961) gives 21.0-36.5°C for *C. dilepis* from South West Africa. For *C. pumilus* the annual range was 3.5-37.0°C and for *C. namaquensis* was 14.0-39.7°C (Burrage, 1973).
- ✧ The mean Tb -at the field- of *C. africanus* was 23.4°C while for *C. chamaeleon* it was 24.2°C, similar to other chameleon species. For *C. pumilus* it was 22.4°C and for *C. namaquensis* 28.7°C (Burrage, 1973). For *C. dilepis* from South West Africa the mean Tb was 31.2°C (Stebbins, 1961).
- ✧ The mean Tb -at the lab- for *C. africanus* was 31°C while for *C. chamaeleon* was 31.6°C, which is similar to other chameleon species. For *C. pumilus* body temperature ranged from 7.0-30.0°C (mean 25.0°C), while for *C. namaquensis* was 18.5-36.2°C (mean 29.3°C) (Burrage, 1973). Stebbins (1961) gives a preferred body temperature range of 28.5-36.5°C (mean 33.5°C) for *C. namaquensis*.
- ✧ According to Huey and Slatkin (1976) both chameleon species are thermoconformers because the slope of the equation Tb vs Ta is near to 1.

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Acknowledgments

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The African Chameleon *Chamaeleo africanus* from Pylos (photography: M. Dimaki).

The Common Chameleon *Chamaeleo chamaeleon* from Samos (photography: M. Dimaki).