FEEDING ECOLOGY OF THE COMMON CHAMELEON *Chamaeleo chamaeleon* (Linnaeus, 1758) AND THE AFRICAN CHAMELEON *Chamaeleo africanus* Laurenti, 1768.

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C. africanus

INTRODUCTION

➢In this work the results of the comparative food analysis of the Common Chameleon *Chamaeleo chamaeleon* (Linnaeus, 1758) and the African Chameleon *Chamaeleo africanus* Laurenti, 1768 are presented. This is the first time that information on the diet of Greek specimens of the Common Chameleon are presented.

➢The distribution of the Common Chameleon in Greece includes the Aegean islands of Samos, Chios, and Crete. The African Chameleon is found in Greece only at Gialova near Pylos (Böhme *et al.*, 1998; Dimaki *et al*., 2001).

➢A comparison of the two species, among seasons and between sexes is presented, also a comparison of our results with those on the literature is made.

MATERIALS & METHODS

➢The stomach and faecal contents of 136 specimens were examined: 71 of the Common Chameleon (36 males and 34 females) and 65 of the African Chameleon (29 males and 29 females). The remaining specimens are of unidentified sex. Most of the specimens were from Greece and had been found killed by cars. We also had some museum specimens from Africa, Asia, and the Iberian Peninsula.

➢Thirteen of the specimens of the Common Chameleon were found in the spring, 4 in the summer, and 21 in the autumn. One specimen of the African Chameleon was found in the spring, 31 in the summer, 19 in the autumn, and 2 in the winter. The rest were of unknown season.

➢The stomach and faecal items of each specimen were counted and examined under a dissecting microscope provided with a micrometer scale in the objective lens. We identified whole prey items and recognizable body parts to order level. Each lizard's sex was recorded on the basis of the presence of hemipenes in males or ovaries in females.

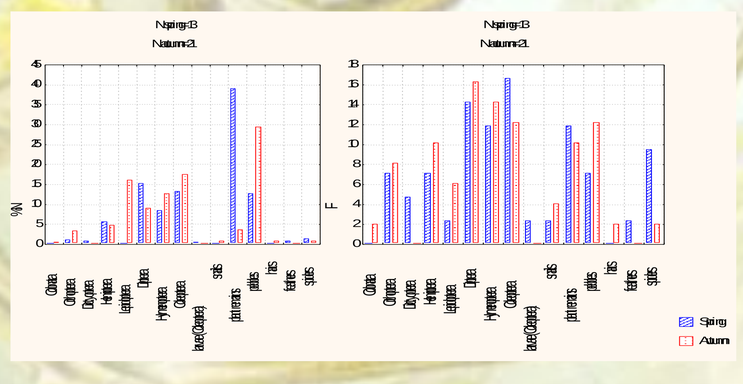
➢Diet was summarized in two ways: a) as a proportion of the total number of prey items in all the stomachs examined (%N) and b) as a proportion of individuals eating a certain prey category (F).

➢Feeding niche breadth (H') was calculated using the Shannon-Wiener index: $H' = -\Sigma p_j \log p_j$ (where p_j is the proportion of individuals using prey category j)

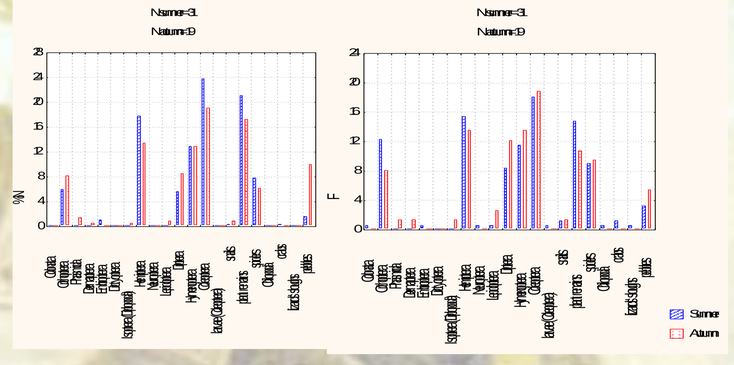
RESULTS

Comparison between seasons

Chamaeleo chamaeleon

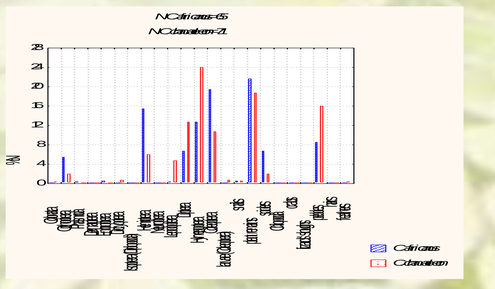


Chamaeleo africanus



In autumn more Lepidoptera and pebbles were found in the stomachs of *C. chamaeleon*, while in the spring more plant remains and spiders. In autumn more pebbles were found in the stomachs but the arthropod diet of *C. africanus* does not seem to cha
However, there is no difference between the number of each prey category items in the two examined seasons (t-test, p>0.05).
The niche breadth does not seem to change between the examined seasons (H' autumn= 0.859, H' spring=0.787 for *C. chamaeleon* and H' summer= 0.875, H' autumn=0.944 for *C. africanus*).

A comparison of the two studied species

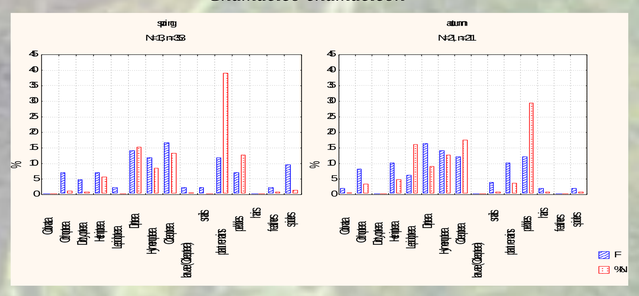


➢The composition of the diet of the two species tends to differ. However there is no statistically significant difference between the total number of prey items of the two species (t-test, p>0.05). The niche breadth does not seem to change between the two species (H' *C. chamaeleon* = 0.902, H' *C. africanus* = 0.921). These values indicate that both species use a wide variety of prey.

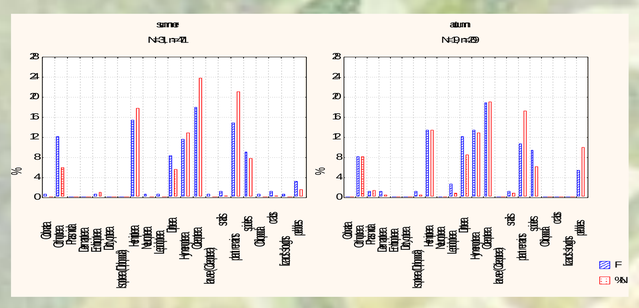
➢The most frequent category taken by *C. chamaeleon* was Hymenoptera (24.07%) followed by plant remains (18.72%), and Diptera (12.67%). The most important prey taxa for *C. africanus* were plant remains (21.61%), Coleoptera (19.43%), and Hemiptera (15.40%).

Proportion of each prey category in the examined stomachs (% N) and proportion of chameleon individuals having eaten the same prey category (F) during spring and autumn

Chamaeleo chamaeleon

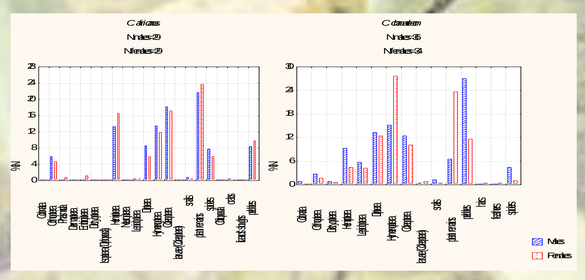


Chamaeleo africanus



N: number of examined specimens
n: number of prey items

Prey composition of the two sexes during the examined seasons



➢The composition of the diet of *C. chamaeleon* tends to differ between the two sexes. However, this is not the case for *C. africanus.* There is no statistically significant difference between the total number of each prey category items of the two sexes for both the examined species (t-test, p>0.05).

➢The niche breadth does not seem to change between the two sexes (H' male=0.917, H' female=0.923for *C. africanus* and H' male=0.921, H' female=0.840 for *C. chamaeleon*).

➢The most frequent category taken by both sexes of *C. africanus* were plant remains (21.62% in males and 23.62% in females) followed by Coleoptera (18.18% in males and 17.09% in females) then Hymenoptera in males (13.51%), Hemiptera in females (16.58%) and Hemiptera in males (13.27%). Hymenoptera in females (11.81%).

➢The most important prey taxa taken by males of *C. chamaeleon* was Hymenoptera (15.32%) followed by Diptera (13.31%) and Coleoptera (12.50%). The most frequent food category for females were Hymenoptera (27.68%), plant remains (23.72%) and Diptera (12.52%).

DISCUSSION

➢The composition of the diet of the two examined species tends to differ. Differences in the prey composition among different chameleon species have been reported {*C. pumilus* and *C. namaquensis* (Burrage, 1973), *C. chamaeleon* (Blasco *et al*., 1985)}. However, it is not certain whether these differences are due to the preference of the species, the composition and availability of the local prey fauna or the season.

➢Stomach content is a measure of the food amount which has been ingested at the time of a lizard's capture (Jameson *et al.*, 1980). The mean and range of item number found in each examined stomach (13 items, 0-50) in *C. africanus* and (12 items, 0-210) in *C. chamaeleon*, falls within the range of other chameleon species {*C. pardalis* (Bourgat, 1971), *C. namaquensis* (Burrage, 1973), *C. chamaeleon* (Blasco *et al*., 1985), and Pleguezuelos *et al*. (1999)}.

➢Many plant remains were found in the stomach and feces of *C. africanus* and *C. chamaeleon* which is in accordance with the presence of plant material in the stomach contents of other chameleon species {*C. namaquensis* (Burrage, 1973) and *C. pardalis* (Bourgat, 1972)} and of *C. chamaeleon* (Burmeister, 1989) in northern Libya but not in Spain (Blasco *et al*., 1985), and Pleguezuelos *et al*. (1999), also in *C. calyptratus, C. parsoni, C. dilepis, C. senegalensis* and *C. jacksoni* (Sullivan & Tremper 1991; Abate, 2002) . We presume that plant material is a regular dietary component of *C. africanus* and *C.chamaeleon*.

➢The diet varies slightly with the season in both the studied species and this is in accordance with Blasco *et al*. (1985), Pleguezuelos *et al*. (1999), and Dimaki *et al*.(2001).

➢According to our results the most frequent category taken by *C. chamaeleon* was Hymenoptera, plant remains, Diptera and Coleoptera. In Spanish population of *C. chamaeleon* the dominant prey taxa during all year are Orthoptera, Lepidoptera, Hymenoptera, Diptera and Hemiptera (Blasco *et al*., 1985), while according to Pleguezuelos *et al*. (1999) are Diptera, Hymenoptera, Orthoptera and Heteroptera. In Northern Libya the dominant taxa of prey items for *C. chamaeleon* are Hymenoptera, Coleoptera and Diptera (Burmeister, 1989) and in Malta are Orthoptera, Cicadidae and Cimicomorpha (Luiselli and Rugiero, 1996).

➢The presence of food items such as crab legs, snails, bird feathers, and lizard sloughs is not uncommon in chameleons { *C. namaquensis* (Burrage, 1973)}.

➢Many worms (Cestoda, Nematoda and Trematoda) were found and is likely to have been parasites.

➢The composition of the diet of *C. chamaeleon* tends to differ between the two sexes, however this is not the case for specimens from Spain (Pleguezuelos *et al*., 1999).

➢We found pebbles and sand at a noticeable percentage for both examined species. This seems to be common for a chameleon, as *C. namaquensis* has been observed having ingested small stones, gravel and sand (Burrage, 1973). Johnson (1966) and Sokol (1971) suggest that deliberate lithophagy is common in lizards because it hastens the penetration of digestive juices into the bodies of the ingested insect prey and plant materials. Faecal analysis of 3 chameleon individuals that were kept in terraria revealed the presence of a leaf piece and two small stones, not present in their food container but in the terraria.

C. chamaeleon

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