Growth rate of the lizard *Acanthodactylus schreiberi schreiberi* in a dune ecosystem in Cyprus

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Abstract: The growth rate of a population of the lacertid *Acanthodactylus schreiberi schreiberi* was studied during three consecutive years (2007-2009) in a dune ecosystem on Akrotiri Peninsula, Cyprus. This study adds valuable data on the limited existing information regarding the ecology and life history traits of *Acanthodactylus schreiberi*.

Methods: The growth rate of adult and subadult lizards was studied from individuals captured in the field. Lizards were permanently marked with the toe clipping method and their snout-vent length (SVL) was monitored during consecutive monthly recaptures (October 2007-September 2008 for subadults; March 2007-July 2009 for mature lizards). The growth rate of hatchlings was studied during the first two months of their life under controlled conditions in the laboratory. Growth rate was calculated through weekly measurements of their SVL (length-specific growth rate) and mass (mass-specific growth rate).

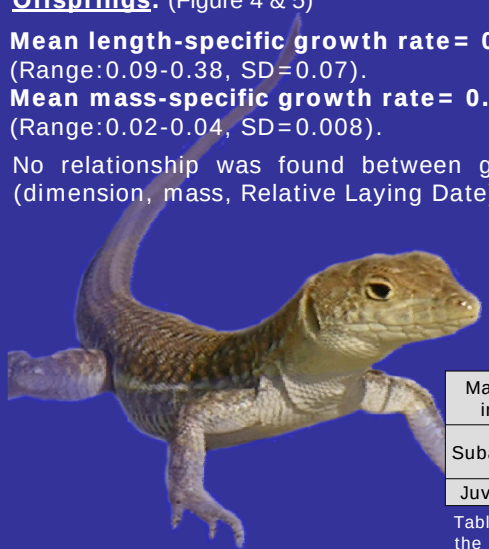
Results:

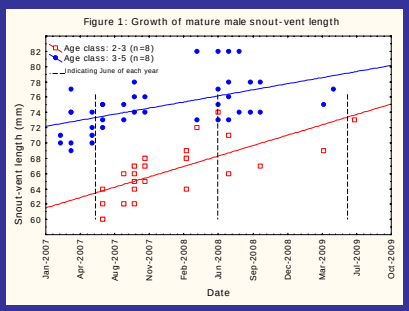
Mature individual: (Figure 1 & 2)
Mean growth rate of mature males=0.02 mm/day (n=16, Range: 0.008-0.036, SD=0.007)
Mean growth rate of mature females=0.01 mm/day (n=18, Range: 0.006-0.019, SD=0.004).

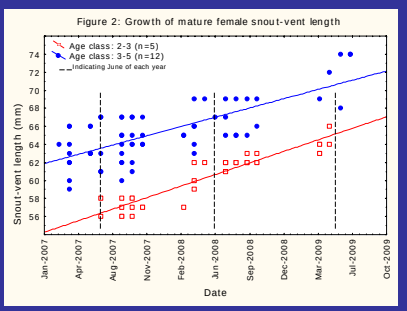
No statistical difference was observed between the growth rate of the two sexes (Mann-Whitney U test: p>0.05).

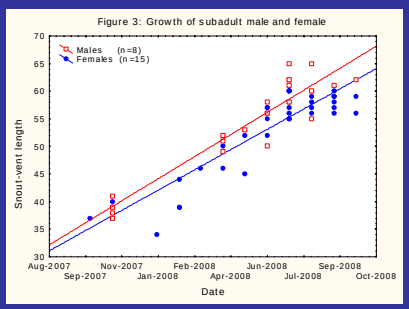
Subadult: (Figure 3)
Mean male growth rate= 0.10 mm/day (N=8, Range: 0.07-0.14, SD=0.02)
Mean female growth rate=0.08 mm/day (n=15, Range:0.02-0.11, SD=0.02)
Male subadults had higher growth rate than females (Mann-Whitney U test: p=0.045, U=29, z=-2).

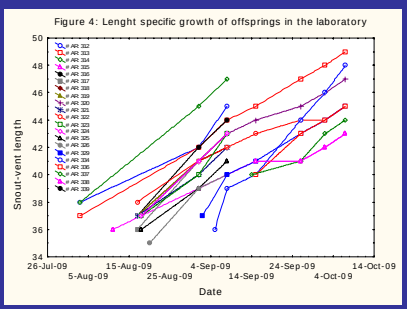
Offsprings: (Figure 4 & 5)
Mean length-specific growth rate= 0.23 mm/day (Range:0.09-0.38, SD=0.07).
Mean mass-specific growth rate= 0.03 gr/day (Range:0.02-0.04, SD=0.008).







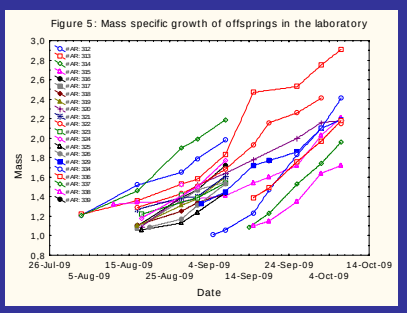




No relationship was found between growth rate and several hatchling (SVL, mass, Relative Hatching Date) or egg (dimension, mass, Relative Laying Date) characteristics. (Multiple Linear Regression analysis: p>0.05 in all cases).

		Growth rate (mm/day)			
		A. schreiberi	*A. erythrurus*	*A. cantoris*	*A. boskianus*
		Cyprus	Spain	Pakistan	Egypt
		This study	Busack and Jaksic (1982)	Rehman et al. (2002)	Darwish & Hussein (2000)
Mature ind.	Male	0.02		0.16	
	Female	0.01			
Subadults	Male	0.10	0.06		
	Female	0.08	0.05		
Juvenile	Together	0.23			0.1 – 0.15

Table 1: Overall data regarding growth rate of *Acanthodactylus* species from the present study and the bibliography.



Discussion:

Information regarding the growth rate of *Acanthodactylus* sp. is very scarce. Relevant data could be found for *A. erythrurus*, *A. cantoris cantoris* and *A. boskianus* (Table 1). As shown by several researchers, growth rate of reptiles is not only genetically determined but it is also highly influenced by environmental conditions (5,6,10), while at the same time is an important component of the life history of animals (1,2,7,8,11). Knowing that, we realize that in an effort to understand the life history evolution of the *Acanthodactylus* species, further research on its growth rate in combination with the ecological parameters affecting it and comparison with populations of its subspecies in neighboring countries are needed. Furthermore understanding the growth rate patterns of *A. schreiberi* in Cyprus along with information on its reproduction strategy and ecology will provide an important tool for the conservation of the species.

References

1- Andrews, R.M., 1982, Patterns of growth in reptiles, *Biology of Reptilia*. Vol. 13 (eds. Gans, C. and Pough, F.H.) pp. 273-320. Academic Press, New York, New York.
2- Avery, R.A., 1984, Physiological aspects of lizard growth: the role of thermoregulation. *Symp. Zool. Soc. Lond.*, 52: 407-424
3- Busack, D.S. & Jaksic, M.F., 1982, Autoecological observation of *Acanthodactylus erythrurus* (Sauria: Lacertidae) in southern Spain, *Amphibia-Reptilia*, 3: 237-255.
4- Darwish, A.D.M. & Hussein, H.K., 2000, Ecological significance of geographic differences in growth rate of the sand lizard, *Acanthodactylus boskianus*, *Pakistan Journal of Biological Sciences*, 3(12): 2154-2158.
5- Dunham, A.E., 1978, Food availability as a proximate factor influencing individual growth rates in the iguanid lizard *Sceloporus merriami*. *Ecology*, 59: 770-778.
6- Lorenzon, P., Clobert, J. & Massot, M., 2001, The contribution of phenotypic plasticity to adaptation in *Lacerta vivipara*. *Evolution*, 55: 392-404.
7- Lorenzon, P., Clobert, J., Oppliger, A. & John-Adler, H., 1999, Effect of water constraint on growth, activity and body temperature of yearling common lizard (*Lacerta vivipara*). *Oecologia*, 118: 423-430.
8- Niewiarowski, P.H. & Roosenburg W.M., 1993, Reciprocal transplant reveals sources of variation in growth rates of the lizard, *Sceloporus undulatus*. *Ecology*, 74(7): 1992-2002.
9- Rehman, H., Ahmen, I.S. & Fakhri, S., 2002. Home range and growth rate of fringe-toed sand lizard (*Acanthodactylus cantoris cantoris*) at Hawksbay area, Karachi. *Records of Zoological Survey of Pakistan*, 14: 49-54.
10- Sinervo, B. & Adolph, S.C., 1994, Growth plasticity and thermal opportunity in *Sceloporus* lizards. *Ecology*, 75: 776-790.
11- Stearns, S.C., 1992, *The evolution of Life Histories*. Oxford University Press, Oxford.

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