

COMMENTARY

## Are predator diets a consequence of human disturbance in central Chile? —a reply to Simonetti

¿Son las dietas de los predadores una consecuencia de la perturbación humana en Chile central? —Una réplica a Simonetti

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### ABSTRACT

The hypothesis that guild structure of predatory vertebrates in central Chile is a consequence of human disturbance can be refuted by empirical evidence available from recent studies comparing predator diets to prey abundance in a number of disturbed and undisturbed communities in central and northcentral Chile.

Key words: Human disturbance, predator diet, guild structure, *Octodon degus*, *Dusicyon culpaeus*.

### RESUMEN

La hipótesis que la estructura gremial de los vertebrados predadores en Chile central es una consecuencia de la perturbación humana puede ser refutada con evidencia empírica entregada por estudios recientes que comparan las dietas de predadores con la abundancia de presas en algunas comunidades perturbadas y no perturbadas del norte y centro de Chile.

Palabras claves: Perturbación humana, dieta de predadores, estructura gremial, *Octodon degus*, *Dusicyon culpaeus*.

Recently, Simonetti (1988) suggested that the guild structure of predatory vertebrates in central Chile was a consequence of opportunistic feeding which in turn was strongly influenced by human disturbance opening up matorral and altering small mammal prey abundances. He cited the increased abundance of the degu (*Octodon degus*) in disturbed habitat, and its high occurrence rate in the diets of several predators including three large raptors and the culpeo (*Dusicyon culpaeus*; cf. Jaksić *et al.* 1981a) as support for his contention.

In my opinion, this argument should be viewed with extreme caution since by implication, Simonetti is essentially saying that predator diets and guilds are structured by human activities. Put another way, if factor A is determined by B, and B by C, Simonetti is concluding that A is determined by C (*i.e.* predator diets by human disturbance). This leap in logic

seems unwarranted. Further, it denies that there are any intrinsic aspects to predator-prey relationships including optimal diet selection by predators involving such factors as relative body size, predator handling and searching times and energy, and hunting success. Finally, it suggests that predators are simply passive components of the interaction responding only opportunistically to prey availability. Needless to say, the general literature is replete with frequent examples of many factors being important in diet selection by predatory vertebrates (most notably, raptorial birds) of their prey. Many of these are mentioned in two comprehensive reviews (*i.e.* Jaksić & Simonetti 1987, Marti 1987). Certainly, there seems no inherent reason for Chilean predator-prey relationships to be fundamentally different than those elsewhere.

More specifically, it is difficult to evaluate this hypothesis in the geographical context

that Simonetti poses it since it is limited to human disturbed communities in central Chile, and indeed the degu does appear to be the most ubiquitous and abundant rodent in these areas. Thus, Simonetti's suggestion falls into the realm of an *ad hoc* hypothesis lacking the crucial condition of falsifiability. Additionally, Simonetti seems to be confusing the evidence for a significant *rank* correlation between prey abundance and their utilization by various predators at central Chilean localities (*i.e.* Jaksic 1986) with the presence of specific predator responses to *absolute abundances* of prey. The response of the predatory guilds could simply be an epiphenomenon reflecting the high abundance of degu at many localities; however, this interpretation ignores that individual predators may strongly select prey based on certain inherent characteristics. In order to evaluate the generality of Simonetti's hypothesis, we need to expand the geographical scale of comparison, and in particular, examine predator diets in relatively undisturbed habitats within Chile where the degu may not be the most common small mammal prey. If indeed predator diets remain substantially the same in spite of changes in the relative abundance of the degu, then there would be evidence for some form of prey size or type selection by the predator, and this would represent a direct refutation of Simonetti's hypothesis.

Two recent studies perhaps not available to Simonetti at the time of the writing of his commentary have done just that (*i.e.* Meserve *et al.* 1987, Iriarte *et al.* in press). Both examined the diets of *D. culpaeus* in relatively undisturbed scrub habitat, one in the thorn scrub community of Parque Nacional Fray Jorge in north central Chile (first study), and the second in valley and montane matorral communities in central Chile near Santiago (second study). In spite of the fact that in both studies the degu was *not* the most numerically abundant species in the communities, diets of *D. culpaeus* were dominated by the degu along with a second rarer caviomorph, the chinchilla rat (*Abrocoma bennetti*). These rodents made up a significantly greater proportion of culpeo diets than expected by field abundance determinations—up to 98% of the diet (Meserve *et al.* 1987). Bozinovic & Medel (1988) provided an illuminating third study by utilizing a bioenergetic approach

and the data of Jaksic *et al.* (1981a) to demonstrate that even in central Chile predators exhibit strong diet selection on the basis of prey size rather than abundance. Interestingly, with the exception of the introduced European rabbit (*Oryctolagus cuniculus*) present in the study area of Iriarte *et al.* (in press), these rodents were the largest available prey in the areas of the first two studies mentioned above. Thus, similar to raptorial birds, body size may be a crucial factor in prey utilization by the culpeo. On the basis of these results, then, it can be concluded that Simonetti's hypothesis is falsified by the available empirical evidence. Parenthetically, it should also be noted that earlier Fulk (1976) had found some evidence for a similar degree of selectivity for younger individuals and males of *Akodon olivaceus*, and an underrepresentation of *A. longipilis* in diets of nocturnal owls in Fray Jorge; thus, age and sex as well as species-specific characteristics influence prey selection by the predators. Jaksic & Simonetti (1986) mentioned other examples in their review paper.

It appears that Simonetti's hypothesis lacks validity because he is attempting to generalize from findings on the overall guild structure of predatory vertebrates to specific relationships between predators and prey. Therefore, it should be cautioned that his interpretation assuming only opportunistic predation would not be likely to constitute a reliable basis for future work. Parenthetically, however, it should be noted that degus like other small mammal prey species undergo yearly fluctuations even in the central Chilean region (*i.e.* Jaksic *et al.* 1981b, Meserve *et al.* 1984, Iriarte *et al.* in press). Thus, even here it should be possible to test the degree of prey selectivity by predators at times when degu abundance is not high. I do agree with Simonetti (1988: 24) that future work towards elucidating "the causal relationship between the dominance of *O. degus* and the degree of human disturbance" is needed. As an extension of this, it would also seem constructive to examine the ways in which degu exploit disturbed habitats and perhaps further alter community structure (*cf.* Fuentes & Le Boulengé 1977). Additionally, how predators are affected by differing prey availabilities, microspatial distribution and behavior, and in turn, alter components of their time and energy budgets would a valuable focus of future work; Jaksic *et al.*

(1987) provides an illustrative example of the latter type of study with the Black-shouldered Kite (*Elanus caeruleus leucurus*). Finally, *because* predators and prey are not simply passive components of the community, we must be cautious about generalizing from local guild structure and relative prey abundances, and making conclusions about the factors influencing specific predator strategies for utilizing prey. Ironically, in some cases we may often find ourselves examining (to rephrase a classic ecological expression) the "ghost of predation past"!

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