FOOD HABITS AND TROPHIC NICHE OVERLAP OF THE WOLF *CANIS LUPUS*, L. 1758 AND THE RED FOX *VULPES VULPES* (L. 1758) IN A MEDITERRANEAN MOUNTAIN AREA

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Very few comparative studies have been carried out simultaneously on the diet of wolves and red foxes living in a same area (Macdonald *et al.*, 1980 ; Reig *et al.*, 1985).

While there is a wealth of data on the food habits of the Fox in a variety of Mediterranean areas (e.g. Amores, 1975 ; Reynolds, 1979 ; Braña & Del Campo, 1980 ; Prigioni, 1991), only very few and partial studies have been published on the diet of the Wolf in the Mediterranean basin (Italy : Boitani, 1982 ; Ragni *et al.*, 1985 ; Matteucci, 1987 ; Meriggi *et al.*, 1991 ; Portugal : Paixao de Magalhaes & Pettrucci Fonseca, 1982 ; Spain : Castroviejo *et al.*, 1981 ; Braña *et al.*, 1982 ; Salvador & Abad, 1987 ; Israel : Mendelsshon, 1982).

Macdonald *et al.* (1980) found out that some overlap in food habits occurred between the Wolf and the Red fox, especially in relation to the use of rubbish tips. They concluded that this was unlikely to be a key factor in limiting the population of either Carnivore because of the large quantity of garbage at dumps in their study area, i.e. the Majella massif. Conversely, Patalano (1991) showed that the Wolf and the Fox dependence on garbage tips was unimportant in the core area of the Abruzzo National Park, Central Apennines. She suggested that the well preserved ecosystems of the park should not provide any reason for these Carnivores to attend rubbish tips as regular food sources.

The aims of our research were the following :

A. to provide a qualitative and quantitative detailed study on the food habits of the Wolf and the Red fox in a Mediterranean mountain area where the natural ecosystems are relatively pristine (Locati, 1989).

B. to assess the extent of diet overlap in an area where the local dependence on rubbish tips is negligible for both species (Patalano, 1991).

MATERIAL AND METHODS

Between December 1981 and November 1983 a total of 136 scats of wolves (sample size : Dec. 1981-May 1982, N = 30 ; Jun.-Nov. 1982, N = 36 ; Dec.

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1982-May 1983, N = 42 ; Jun.-Nov. 1983, N = 28) and 264 Fox scats (sample size : Dec. 1981-May 1982, N = 26 ; Jun.-Nov. 1982, N = 63 ; Dec. 1982-May 1983, N = 72 ; Jun.-Nov. 1983, N = 103) were collected in monthly excursions along a ca. 25 km itinerary crossing the study area. We are aware that a diet analysis at intervals shorter than every six months (e.g. monthly or bi-monthly) would have provided more detailed information. This was impossible for two reasons in the case of the Wolf : (1) Wolf scats were uncommon (mode : 10 per month ; median : 7 per month), which ruled out a representative analysis of the diet unless data of several months were pooled together ; (2) severe winter conditions made it hard to collect scats in Jan.-Mar. ; Wolf droppings sank in the snow and were subsequently covered in the course of other snowfalls. Thus, most winter droppings could be recovered only in early spring, upon snow thawing : ageing of scats was then largely subjective. Therefore, six-month samples (warm season : Jun. through Nov. ; cold season : Dec. through May) were chosen as the most suitable compromise. Fox faeces were much more often encountered than the Wolf's, but they underwent the same analysis for comparative aims. A detailed report on Fox food habits will be published elsewhere (Patalano, *in prep.*). The altitude at which we collected scats ranged between approximately 1 200 and 2 000 m a.s.l. We did not take any sample at lower altitudes to reduce the possibility of gathering faeces of free roaming village dogs. Some Wolf scats were collected at marking sites of this species well over 1 500 m a.s.l. The excrements were stored in polythene bags, deep-frozen and later analyzed as described by Kruuk & Parish (1981) and Ciampalini & Lovari (1985). The samples were washed in a tea-sieve (1.3 mm mesh) and the sediment was examined under a binocular microscope to detect the presence of earthworm chaetae. This examination was carried out on all Fox scats, but only on one every five Wolf scats, as it was considered unlikely that such a large Carnivore might feed on earthworms. The food items in scats were identified by comparison with reference material (e.g. hair, bones, feathers, seeds). The recognition of hair was also based on the analysis of taxon-specific microscopical characteristics (Faliu *et al.,* 1980 ; Debrot *et al.,* 1982). The identification of the small mammals was made easier by their mandibles and teeth, when present in the excrements (Toschi, 1965 ; G. Amori, *in litt.*). We called « Unidentified material » what appeared in the scats as mostly homogeneous, often amorphous, components whose origin could not be traced. The few items (e.g. minute bone spikes, hair fragments) sometimes detected in such a matrix did not provide any useful clue for identification. Data were analysed as percentage of occurrence and estimated volume in total diet (cf. Kruuk & Parish, 1981 ; Ciampalini & Lovari, 1985). The trophic niche breadth of the Wolf and the Fox, as well as their overlap, were respectively evaluated through the Levins and Pianka indices applied to the percentage of occurrence and the volume of food categories in the whole diet (1) (Ricklefs,

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(1) Levins Index : $B = 1/\sum_{i=1}^{n} p_i^2$ where p_i is the proportion of records for a species in each category (i) of the food niche. Low niche breadth : 1 ; great niche breadth : n (number of food categories).

Pianka Index : $O_{jk} = \sum_{i=1}^{n} p_{ij}\, p_{ik} \Big/ \sqrt{\left(\sum_{i=1}^{n} p_{ij}^2 \sum_{i=1}^{n} p_{ik}^2 \right)}$ where p_{ij} (or p_{ik}) is the proportion of the food category i recorded in the diet of the species j (or k).

1980 : 745-746). The Pianka index was also used to calculate the degree of overlap of the diets of each species, in different seasons and years. The differences in diet of the food categories eaten by both species were evaluated using the Mann-Whitney U test, 2-tailed : since n_2 was always larger than 20, the value of z was computed (Siegel, 1956). The correlations between the mean body weight of prey species and their presence (occurrence, volume) in the diet of both Carnivores, as well as those between wild and domestic ungulates in the Wolf diet, were tested by the Spearman rank correlation coefficient, 1-tailed (Siegel, 1956). Mean body weights were obtained as follows : we weighed a sample of local invertebrates, reptiles and birds ; the mammal weights were taken from Toschi (1965) and Van den Brink (1969), whereas those of large wild and domestic mammals (calves) were respectively taken from Perco (1987) and provided by a local veterinarian (R. Fico, *ex verbis*).

STUDY AREA

The area where this study was conducted (ca. 17 km^2) lies in the core of the Abruzzo National Park, in the Apennines of Central Italy (41° 41′ N, 13° 50′ E). Mean temperatures (recorded at the Pescasseroli Meteorological Station) during the research period are shown on Fig. 1. The vegetation of the area consists of

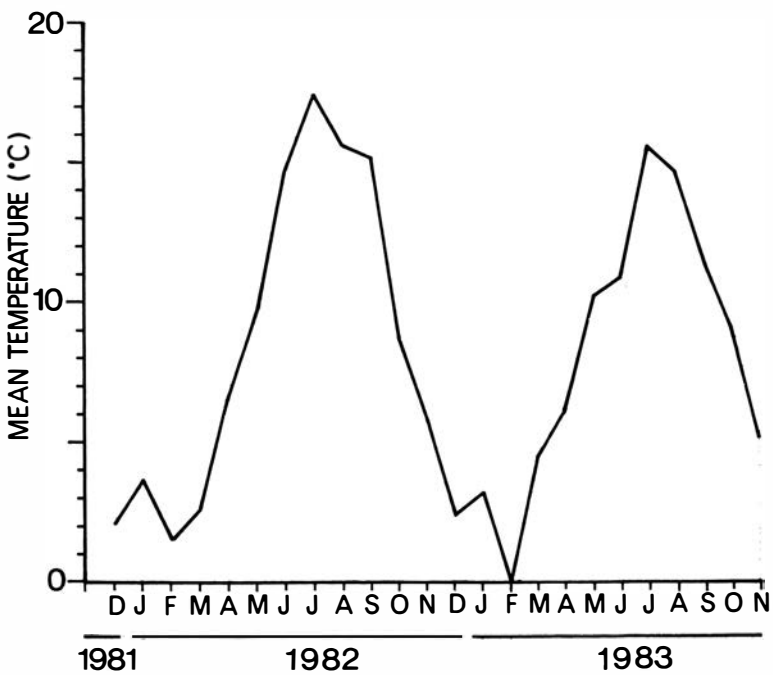

Figure 1. — Mean monthly variation of temperature (°C) in the study area throughout the research period.

small apple, pear and cherry trees orchards, mixed woodlands (*Quercus cerris, Ostrya carpinifolia, Fraxinus ornus, Cornus mas, Crataegus oxyacanta, Prunus spinosa*), beechwoods (*Fagus sylvatica*) and Alpine meadows. Two hundred chamois (*Rupicapra pyrenaica*), ca.one hundred red deer (*Cervus elaphus*), several tens of Roe deer (*Capreolus capreolus*) and of wild boars (*Sus scrofa*) were present. Red deer were reintroduced and the Roe deer population was reinforced in the Abruzzo National Park in 1970, and again from 1974 to 1976. Livestock raising is popular in our study area (about 1180 sheep and goats ; 250-300 cattle ; and almost 200 equids). Tourist activities are well developed during the summer period. Two rubbish dumps are located near two villages, inhabited by ca. 1940 people (at altitudes : 990 m and 1 000 m a.s.l., respectively).

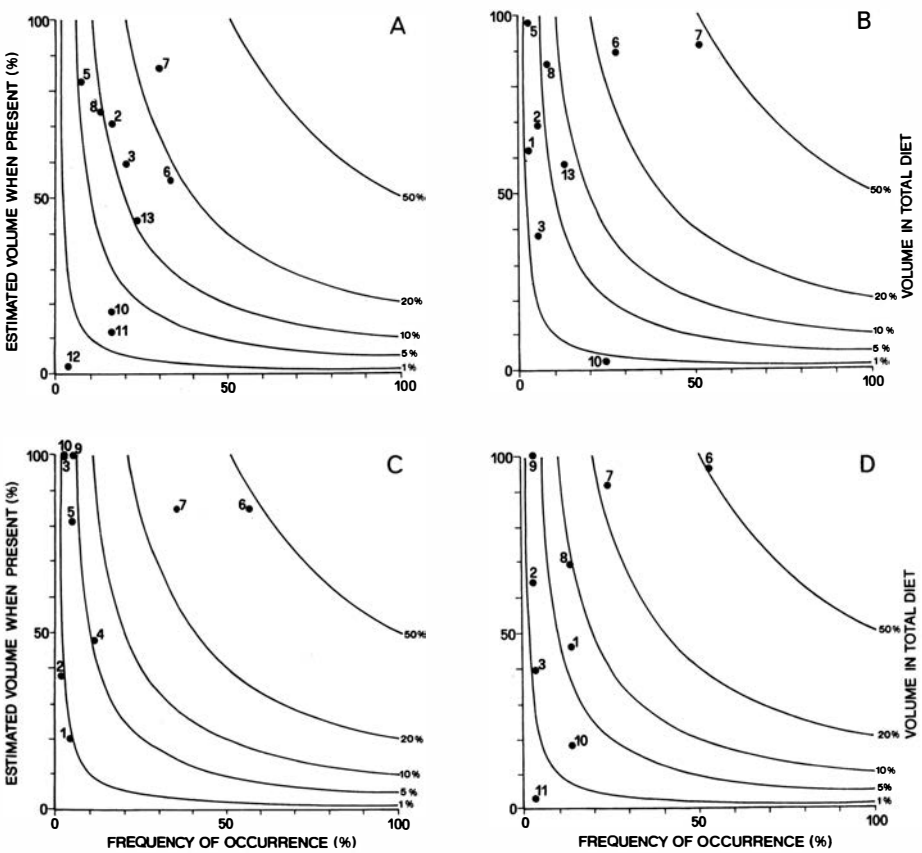

Figure 2. — Estimated volume of Wolf food categories versus their frequency of occurrence. Isopleths connect points of equal relative volume in the overall diet. 1 : Aves ; 2 : Rodentia ; 3 : Lagomorpha ; 4 : Ursidae ; 5 : Canidae ; 6 : Ungulata (wild) ; 7 : Ungulata (domestic) ; 8 : Unidentified mammals ; 9 : Unidentified material ; 10 : Graminaceae ; 11 : Other plant material ; 12 : Soil ; 13 : Garbage. *A.* Dec. 1981-May 1982 ; *B.* Jun.-Nov. 1982 ; *C.* Dec. 1982-May 1983 ; *D.* Jun.-Nov. 1983.

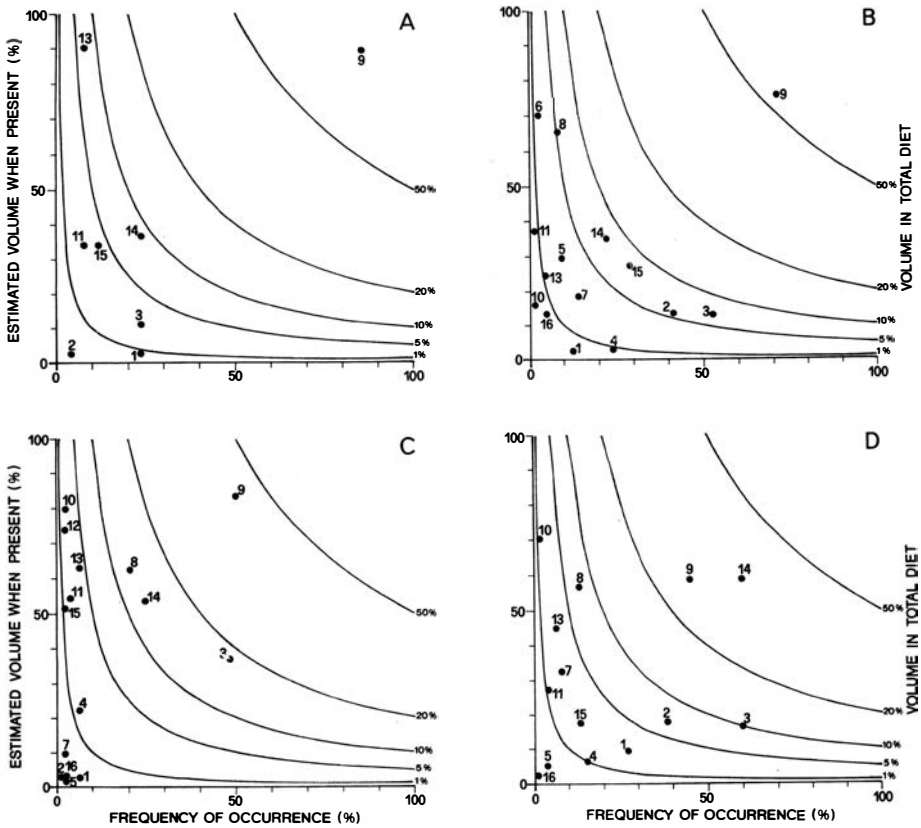

Figure 3. — Estimated volume of Red fox food categories versus their frequency of occurrence. Isopleths connect points of equal relative volume in the overall diet. 1 : Oligochaeta ; 2 : Orthoptera ; 3 : Coleoptera (imagines) ; 4 : Other Insects ; 5 : Coleoptera (larvae) ; 6 : Reptilia ; 7 : Aves ; 8 : Insectivora ; 9 : Rodentia ; 10 : Lagomorpha ; 11 : Ungulata (wild) ; 12 : Ungulata (domestic) ; 13 : Unidentified mammals ; 14 : Rosaceae ; 15 : Other plant material ; 16 : Garbage.
A. Dec. 1981-May 1982 ; *B.* Jun.-Nov. 1982 ; *C.* Dec. 1982-May 1983 ; *D.* Jun.-Nov. 1983.

RESULTS

WOLF

The staple diet of the Wolf in our study area is made of wild and domestic ungulates, the consumption of the former increasing notably throughout our study period (Fig. 2). The occurrence of Red deer in the Wolf scats (N = 34) exceeded that of Roe deer (N = 13), Wild boar (N = 5) and Chamois (N = 2) ; unidentified cervid hair was also found in seven scats. It has been asserted that the reintroduction of wild ungulates (i.e. deer) could reduce the Wolf predation on

livestock (e.g. Tassi, 1976 ; Boscagli, 1985). To help testing this assumption we calculated the correlations between the following components of the Wolf diet (% occurrence) : wild *vs.* domestic ungulates ; wild ungulates *vs.* sheep/goats ; wild ungulates *vs.* equids/cattle ; red deer *vs.* sheep/goats ; red deer *vs.* equids/cattle ; roe deer *vs.* sheep/goats ; roe deer *vs.* equids/cattle. None was significant (N. groups of six months = 4 ; r_s = from 0.1 to 0.75).

Little variation was noticeable in the Wolf diets of cold and warm months (Fig. 2). Rodents and Brown hare in the diet began decreasing sharply during the warm season of 1982, and slightly increased again in that of 1983 (Figs. 4 and 5).

The percentages of Graminaceae and other plant material in the diet (Fig. 4) were much greater than the corresponding volumes (%) (Fig. 5), suggesting that this material could have been ingested while swallowing other food or for curative purpose. The garbage, present in 1981-82, fell to very low levels in 1983 (Figs. 4 and 5). The category « Unidentified material » appeared in the Wolf diet in 1983, replacing rubbish. Such unrecognizable substances are likely to result from food found in dumps by the Wolf (cf. Boitani, 1982). If so, they could be pooled together with garbage (e.g. pig bristles, chicken bills and claws, bits of plastic, a small tea-cloth, charcoal), thus explaining the surprising disappearance of rubbish from the Wolf diet in 1983 (Figs. 4 and 5). The diet of the Wolf was more similar at different seasons of the same year (Dec. 1981-May 1982/Jun.-Nov. 1982, O = 0.84 ; Dec. 1982-May 1983/Jun.-Nov. 1983, O = 0.92) than at the same season of different years (Dec. 1981-May 1982/Dec. 1982-May 1983, O = 0.73 ; Jun.-Nov. 1982/Jun.-Nov. 1983, O = 0.77). The food niche breadth was unusually large in the cold months of 1981-82, falling down to about half of that level in the following periods (Table I). Interestingly, only minor differences were found in the values of Levins index calculated for occurrences and volumes (Table I).

TABLE I

Trophic niche breadth and overlap of the Wolf and the Red fox, based on percentage of occurrence and estimated volume.

Value of maximum overlap = 1. *F.C.* : food categories. See *Material and Methods* for statistics.

	Trophic Niche Breadth						Trophic Niche Overlap	
	Wolf			Red fox				
	B		F.C. (N)	B		F.C. (N)	O	
	Occ. (%)	Vol. (%)		Occ. (%)	Vol. (%)		Occ. (%)	Vol. (%)
Dec. 1981-May 1982	7.89	6.91	10	3.77	1.73	8	0.32	0.34
Jun. 1982-Nov. 1982	4.61	3.18	9	7.20	3.18	15	0.09	0.07
Dec. 1982-May 1983	3.34	2.97	9	5.57	4.78	15	0.08	0.07
Jun. 1983-Nov. 1983	4.43	3.01	9	7.31	4.86	14	0.09	0.06

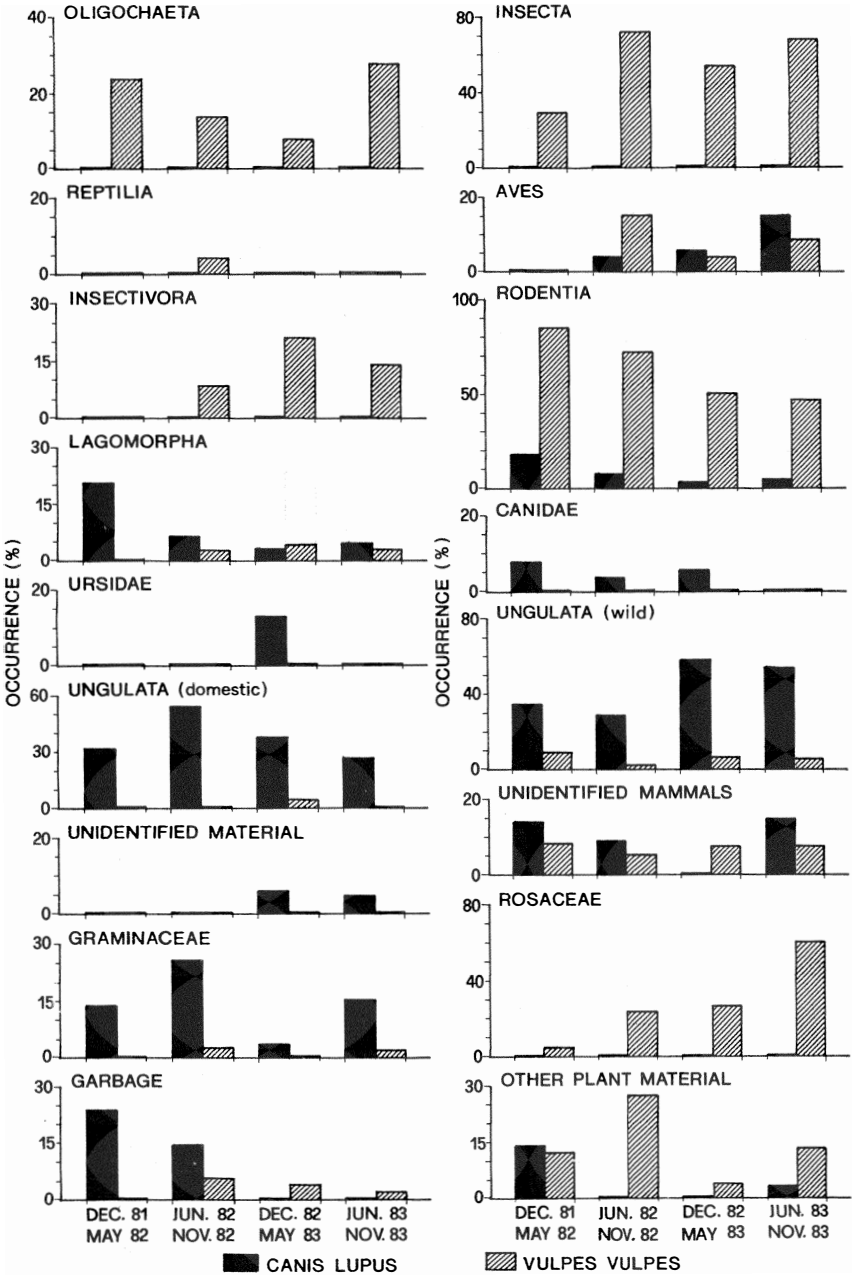

Figure 4. — Percentage of occurrence of food categories in the Wolf and Red fox diets throughout the research period.

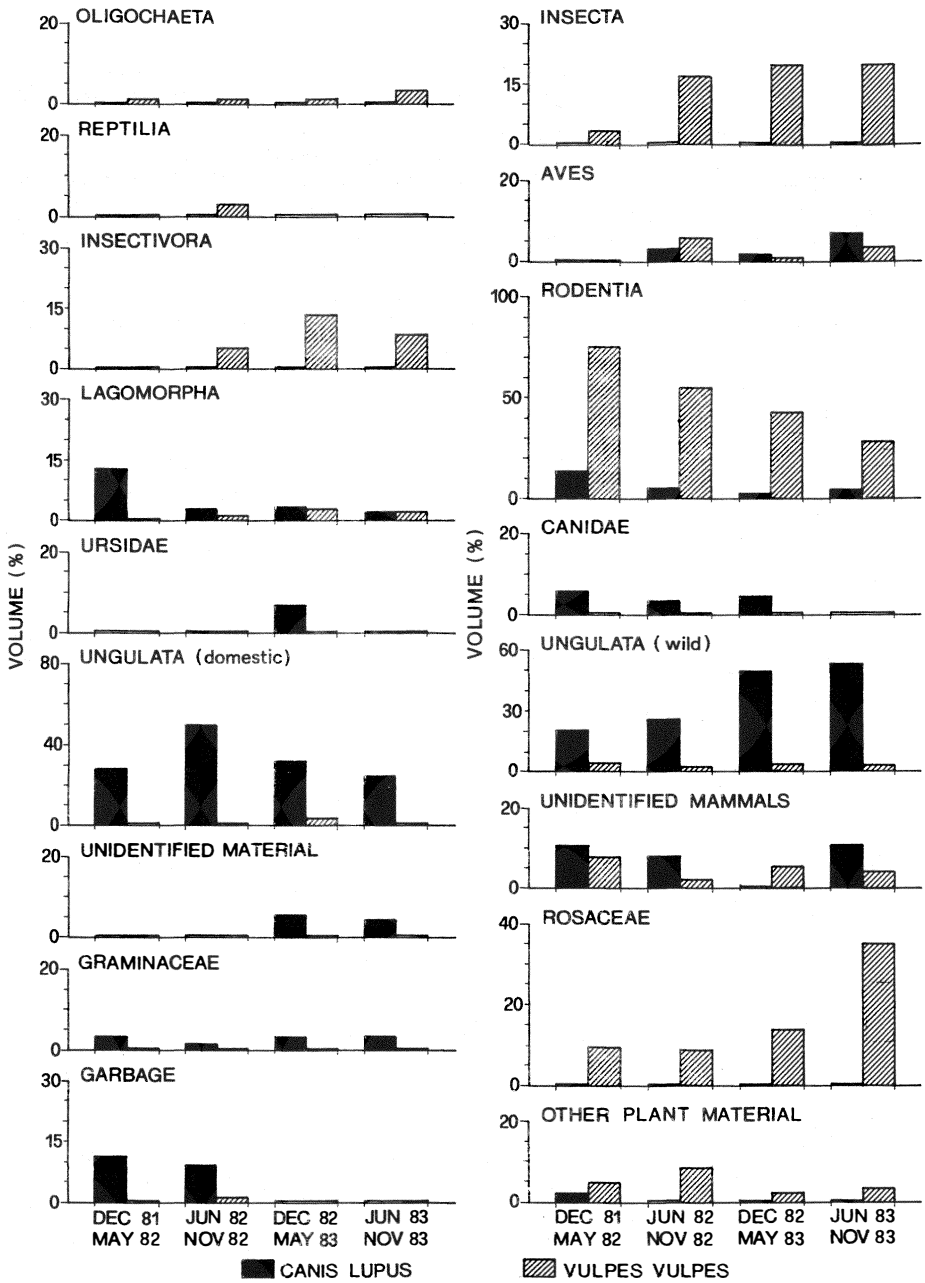

Figure 5. — Percentage of estimated volume of food categories in the Wolf and Red fox diets throughout the research period.

FOX

Rodents were the staple food of the Fox (Fig. 3), although their importance decreased throughout the study period (Figs. 3, 4, 5). While the number of food categories was unusually small (Table I) in the cold months of 1981-82, when rodents reached the 75 % isopleth in the diet (Fig. 3), it almost increased twofold in Dec. 1982-May 1983, as well as during the warm seasons of 1982 and 1983. The consumption of fruits (blackthorn cherry, wild pear and *Rosa* spp. fruits) increased as that of rodents decreased, becoming the Fox's staple food in Jun.-Nov. 1983 (Figs. 3, 4, 5). In Dec. 1982-May 1983 beetles reached almost 20 % of the volume of the total diet to fall back to 10 % in the following semester (Fig. 3). Surprisingly, the consumption of Insectivores (moles and shrews) increased sharply during the third semester, to become one of the main components of the diet (Fig. 3). This is unusual, as foxes seem to dislike these mammals (Macdonald, 1977). The values of Pianka index showed that differences in the diet of the Fox were smaller at the same season of different years (Dec. 1981-May 1982/Dec. 1982-May 1983, O = 0.83 ; Jun.-Nov. 1982/Jun.-Nov. 1983, O = 0.89) than at different seasons of the same year (Dec. 1981-May 1982/Jun.-Nov. 1982, O = 0.82 ; Dec. 1982-May 1983/Jun.-Nov. 1983, O = 0.86). The seasonal variation of Levins index (Table I) in the Red fox diet could probably depend on the seasonal availability of some food resources (cf. Cavallini & Lovari, 1991). No great variation of trophic niche was noticeable throughout the study period, but it may be worth noting that the Levins index for occurrences was almost twice as great as the one calculated for volumes, during the warm seasons, and in Dec. 1981-May 1982 (Table I).

TROPHIC NICHE OVERLAP

The Wolf and the Fox appeared to prey on animal species of different body size : larger species were significantly more common in the Wolf's diet than in the Fox's, and *vice versa* (Wolf : $N = 10$; $r_s = 0.75$; $p < 0.01$, for both occurrences and volumes ; Fox : $N = 10$; $r_s = -0.63$; $p < 0.05$, for occurrences ; $r_s = -0.50$; $0.05 < p < 0.10$, for volumes) (Figs. 4 and 5). Interestingly, while no canid remains appeared in the Fox diet (Figs. 4 and 5), the Wolf diet did include some of them (all dogs, but for a dubious case) (Figs. 4 and 5). This suggests an active predation by the Wolf on free roaming dogs, e.g. at dumps. While fruits and other plant material were used almost exclusively by the Fox (Figs. 4 and 5), the Graminaceae were present mainly in the Wolf diet (Fig. 4), but at very low volumes (Fig. 5).

On the whole, the diets of the Wolf and the Fox overlaped little, except in Dec. 1981-May 1982 (Table I). In the food categories shared by the Wolf and the Red fox, rodents, wild ungulates and livestock appeared in significantly different amounts (Table II).

DISCUSSION

The dependence of the Wolf on wild and domestic ungulates has been confirmed by our data (cf. Mech, 1970 ; Braña & Del Campo, 1982 ; Salvador &

TABLE II

Comparison (z values) between mean volumes of the food categories common to the diet of the Wolf and the Red fox.

A dash indicates that the food category on top of the corresponding column has been used by neither species in that semester. * : $p < 0.05$; ** : $p < 0.01$; N.S. : not significant. See *Material and Methods* for statistics.

	AVES	RODENTIA	LAGO-MORPHA	UNGULATA (wild)	UNGULATA (domestic)	GAR-BAGE
Dec. 1981-May 1982	—	4.75**	—	2.39*	—	—
Jun. 1982-Nov. 1982	NS	5.87**	NS	4.02**	4.79**	NS
Dec. 1982-May 1983	NS	5.20**	NS	6.53**	—	—
Jun. 1983-Nov. 1983	NS	3.92**	NS	6.83**	—	—

Abad, 1987). On the other hand, garbage was shown not to represent an important food item in our study area, only just exceeding the 10 % isopleth in Dec. 1981-May 1982. This is not consistent with the results of a number of other studies (Castroviejo *et al.,* 1981 ; Reig *et al.,* 1985 ; Salvador & Abad, 1987). In Italy, Boitani (1982) reported a heavy dependence of the Wolf on rubbish tips in Abruzzo, whereas Matteucci (1987) stated that wild ungulates were the staple food of this species in the Casentino Forests Reserve (Central Apennines). Ragni *et al.* (1985) showed that livestock made up most of the Wolf's diet in Umbria (Central Italy).

Meriggi *et al.* (1991) found a surprisingly large proportion (almost 30 %, in volume of total diet) of *Rosa* spp. fruits in the Wolf diet, in North Apennines. They also reported an almost equal percentage of livestock, and over 10 % of wild ungulates, mainly Wild boar. These reports and our data suggest that the Wolf is an opportunistic species, with a preference for medium-sized and large mammals. The dependence on rubbish dumps may be a local habit (Macdonald *et al.,* 1980 ; Boitani, 1982) developed in areas where alternative food resources are scarce, or dumps are particularly rich. This relatively flexible feeding behaviour has probably also been one of the main reasons explaining the survival of the Wolf in areas intensively used by man, e.g. in Italy (Boitani, 1982).

One could expect a reduction of the predation on livestock when wild ungulates are (re)introduced into an area inhabited by the Wolf. This view (Boitani, 1976 ; Tassi, 1976 ; Boscagli, 1985) assumes that wild ungulates are easier to catch than livestock, the hunting success of predators being in any case usually low (see Curio, 1976, for a review). When reviewing a number of relevant papers dealing with Wolf hunting wild prey, Mech (1970) states that « all these studies lead to the conclusion that wolves generally have a low hunting success rate, and that, to obtain enough food, they must hunt often and test many animals before finding one they can catch and kill ». We are not aware of any study reporting on the success rate of wolves hunting livestock. However, our data (showing no inverse correlation between consumption of wild and domestic ungulates, following the reintroduction of Red and Roe deer) would suggest that livestock and wild ungulates may be equally difficult prey, although for different reasons. Therefore, unless the numbers of wild ungulates grow so much as to

provide a substantial proportion of easy prey (e.g. carcasses, as well as diseased, old, crippled individuals), wolves are unlikely to stop — or even to considerably reduce — preying on livestock. One could also assume that most livestock consumed by the Wolf came from dumps (i.e. were a particularly easy « prey »), but actual predation on domestic equids and bovids has been documented for the study area (Patalano, 1989). Furthermore, no reduction of Wolf attacks on livestock (i.e. sheep/goats ; equids ; cattle) was recorded in the years 1980-1988, in Abruzzo (Fico *et al., in press*). Apparently, the relationship between the availability of both livestock and wild prey and Wolf predation is more complex than previously stated. The strong reduction of trophic niche noted after May 1982 (Table I) might result from another cause : spring rainfall was about 1/3 higher in 1982 than in 1981 and 1983 (Fig. 6), thus probably leading to increased Hare mortality (Meriggi & Verri, 1990). Such a reduction of the Hare population may have led to an increase in the use of other food resources, e.g. wild ungulates (Figs. 2, 4, 5).

Rodents and, to a lesser extent, fruits characterized the diet of the Fox. Especially during the first semester of our study (Fig. 3) rodents nearly made up the entire diet of the Fox, parallel to the peak reached in the diet of the Wolf (Figs. 2, 4, 5, 6), thus suggesting an unusual abundance of these small mammals

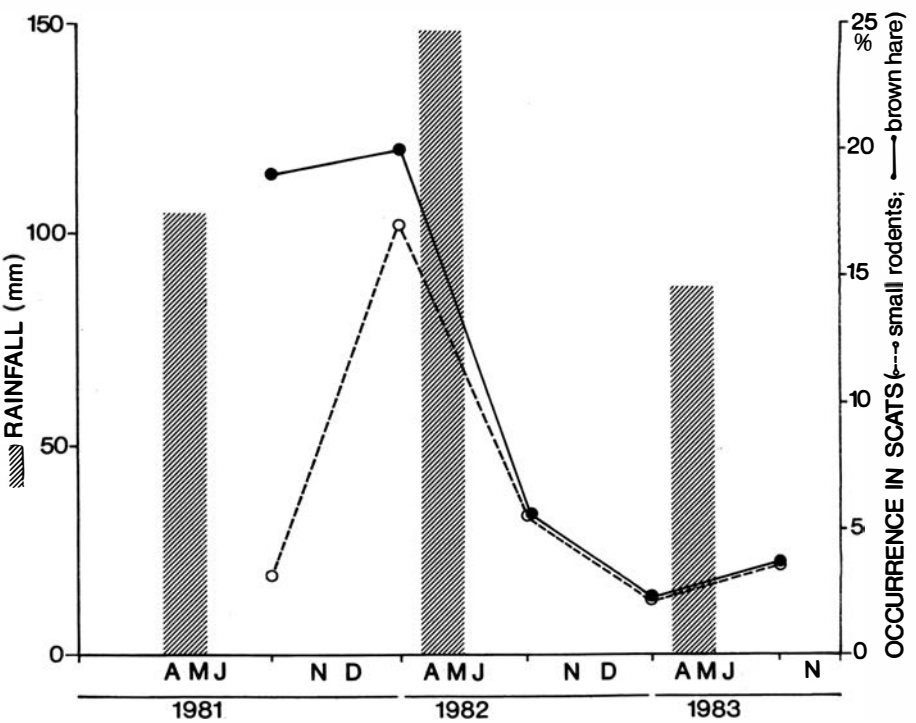

Figure 6. — Spring rainfall and occurrence of Brown hares and Rodents in Wolf scats (1981-83). Data relevant to the diet of the Wolf in the warm months of 1981 have not been used in other parts of this paper, as no comparable data were available for the Fox.

in the course of that year. Rodent populations are indeed subject to cycle, thus sharply decreasing after reaching maximum densities. One could therefore predict that a decrease of rodent availability should generate an increase of consumption of less preferred prey. The increased occurrence of Insectivores in the Fox's diet (Figs. 3, 4, 5, 7) during the following semesters confirms this interpretation. The sharp increase of fruits (mainly pears and cherries) during the warmer months of 1983 may also have been determined by their abundance during that year. Regretfully, we did not collect relevant data on their availability.

Our data are not consistent with the strong dependence of Fox food habits on garbage, as reported by Macdonald *et al.* (1980) for a neighbouring area. Rubbish never exceeded 1 % of the volume of its total diet (Fig. 3) in our sample, although dumps existed within easy reach (500-1 000 m) of the foxes whose scats were collected. At least three reasons may explain such a discrepancy : (1) our study area, located in the core of a national park, could have provided a better preserved habitat, i.e. natural food resources (e.g. rodents other than *Rattus* spp., hares, wild fruits), than in the area studied by Macdonald *et al.* (1980) ; (2) social reasons, i.e. territoriality of resident foxes, could have prevented access to rubbish tips to foxes living at higher elevations. In our study area, however, most foxes sighted at dumps were subadults (cf. Patalano, 1992), and this would not support this hypothesis ; (3) different rubbish tips may provide food resources of different quality, e.g. in areas where pig or dog keeping is popular, edible refusal is usually

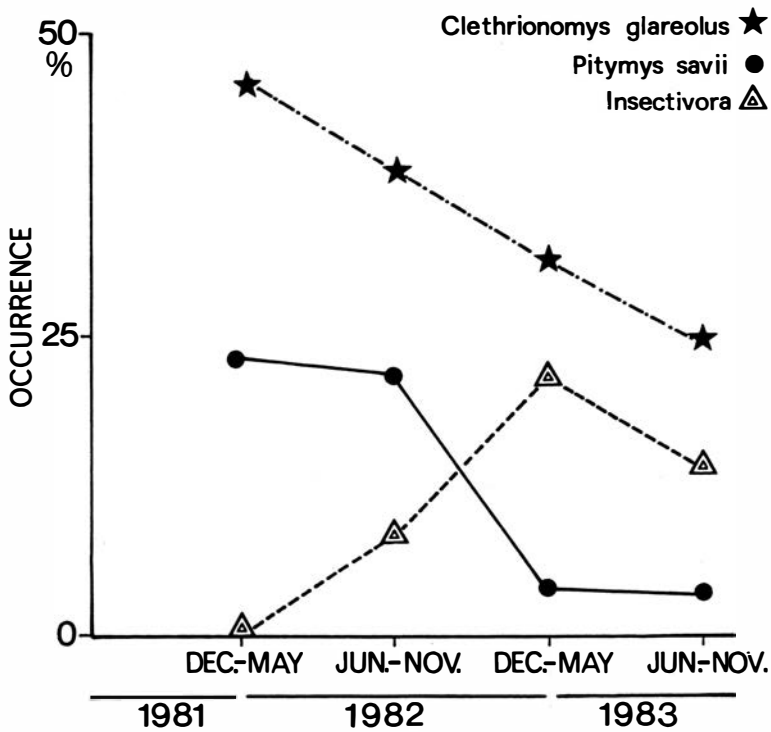

Figure 7. — Percentage occurrence of some small mammals in the Red fox diet.

given to them (Gigante, 1983), and consequently does not occur in dumps. Pig keeping was rare and dogs were commonly left unattended in our study area, but Herrero (1985 : 231) estimated that, for some reason or another, edible garbage was scant in the Abruzzo National Park dumps.

Foxes tend to use a variety of food resources, most of which providing little bulk (e.g. beetles, grasshoppers, earthworms, cherries, juniper berries) (Macdonald, 1980 ; Ciampalini & Lovari, 1985 ; Calisti *et al.*, 1990) which sometimes are taken in large numbers. This may explain the smaller breadth of the Fox trophic niche in volume, rather than in occurrence, as well as the greater variation of the latter.

The absence of competition between Wolf and Fox is suggested by the low values of the Pianka index (Table I). The high consumption of rodents by both species may explain the great overlap of the Dec. 1981-May 1982 semester. Food habits overlap may not only be expected in species of the same body size and diel activity (e.g. the Red fox and the Badger, Ciampalini & Lovari, 1985), but it can also occur in other cases (e.g. the Red fox and the Stone marten, O = 0.6-0.8, Serafini & Lovari, *in prep.*). In the case of the Red fox and the Wolf, the two species apparently occupied well separate niches in our study area : the Fox fed chiefly on small mammals (Rodents) and fruits, while the Wolf preyed on larger species (wild and domestic ungulates).

The values of the Pianka index for the Wolf showed a greater similarity of the diet during two consecutive semesters of the same year, than during the same semester of different years. This may reflect the sustained availability of its main food resources throughout the year.

Conversely, the seasonal availability of different trophic resources could explain the high degree of overlap of the Fox diet during the same semester of different years. Reig *et al.* (1985) showed that the Fox is less dependent on the anthropogenic components of its diet than the Wolf. Our data confirm this conclusion. While we recorded some dependence of the Wolf on rubbish tips (cf. also Boitani, 1986 : 101), the dependence of the Fox on garbage was very small.

Contrary to what has been suggested elsewhere (Boscagli 1985 : 56), the Wolf did not seem to prey on foxes in spite of their local abundance. Predation attempts have actually been reported (Boscagli, 1985 : 56 and 144-145), but most foxes are too wary to be taken by a Wolf.

SUMMARY

The food habits and dietary overlap of the Wolf and the Red fox were studied in an area of the Abruzzo National Park, Central Apennines (Italy), over a period of two years. The Wolf preyed mainly upon wild and domestic ungulates. The occurrence of Red deer in diet exceeded that of the Roe deer, parallel to the relative local abundance of these species. Although the consumption of reintroduced deer species increased during the study period, no corresponding decrease of predation on livestock could be assessed. The diet of the Wolf did not show seasonal variations in the study area, whereas that of the Fox did. The use of different trophic resources by these two Carnivores was likely to generate such a difference, the former taking prey steadily available throughout the year, while the latter makes use of seasonally fluctuating food resources (e.g. rodents and fruits). The dependence on anthropogenic food resources was noticeable for the

Wolf, but mainly restricted to domestic ungulates, and negligible for the Fox. Food competition between these two Carnivores is unlikely in well preserved habitats, where they can fill different trophic niches.

RÉSUMÉ

Les régimes alimentaires du Loup *Canis lupus* et du Renard roux *Vulpes vulpes* ont été étudiés par analyse de leurs fecès au Parc National des Abruzzes, dans l'Apennin central (Italie), de 1981 à 1983.

Les Ongulés sauvages et domestiques constituent l'essentiel du régime du Loup, et l'augmentation de la consommation des espèces sauvages (renforcées par réintroductions dans le parc) ne s'est pas accompagnée d'une diminution de la prédation sur les espèces domestiques. Les ordures ne constituent pas un élément important du régime du Loup dans la région considérée ; ce n'est qu'entre décembre 1981 et mai 1982 qu'elles atteignirent 10,25 % du régime (en volume).

Les rongeurs sont les proies principales du Renard dans notre zone d'étude, bien que leur consommation ait diminuée pendant la période de nos observations. A cette réduction a correspondu une augmentation de la capture des Insectivores, proies pourtant peu recherchées, en général, par le Renard. Ces Insectivores constituèrent une part importante du régime de nos renards de décembre 1982 à mai 1983. Les fruits représentent également un élément important du régime du Renard dans cette région ; ils en constituèrent même l'essentiel de juin à novembre 1983. Pendant toute la durée de notre étude, les ordures n'apparurent guère dans le régime des renards.

Le chevauchement des régimes alimentaires du Loup et du Renard s'avère donc faible en milieu intact et protégé, ces Carnivores prélevant des proies de taille différente.

ACKNOWLEDGMENTS

The Abruzzo National Park Agency allowed us to carry out our study and provided some practical facilities. G. Amori, F. Comandini, G. Franzini, E. Piattella and O. Picariello helped greatly in the identification of some food items.

Monica Bucciarelli prepared the French summary. P. Cavallini, A. Meriggi, B. Ragni and particularly L. Boitani and an anonymous referee made useful comments on this paper. We are grateful to all of them.

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