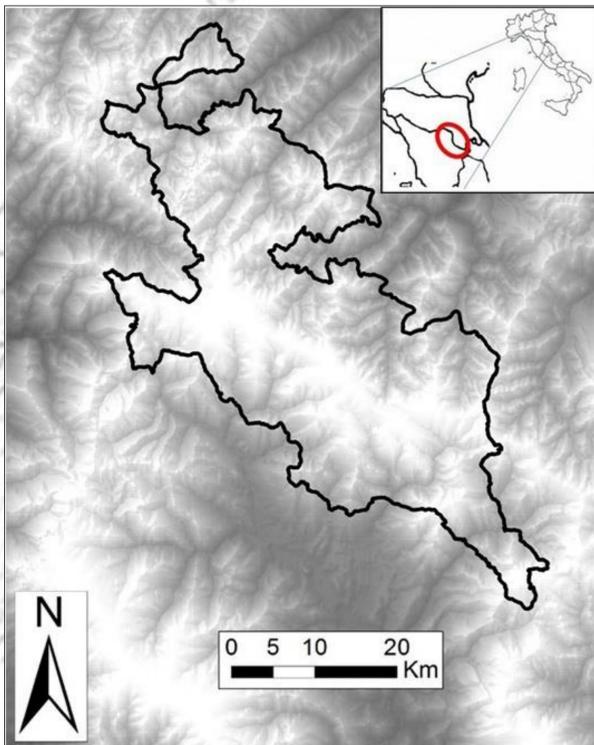




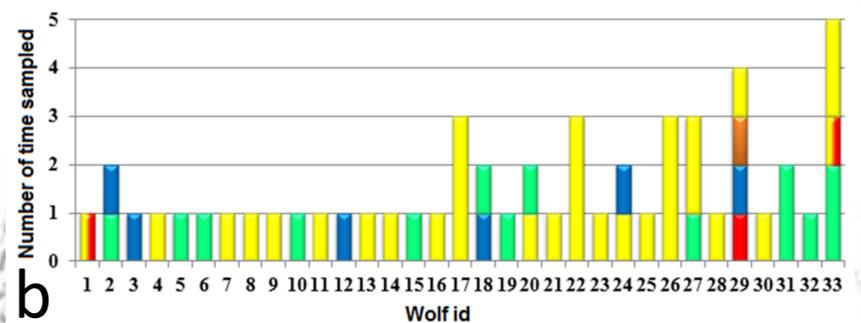
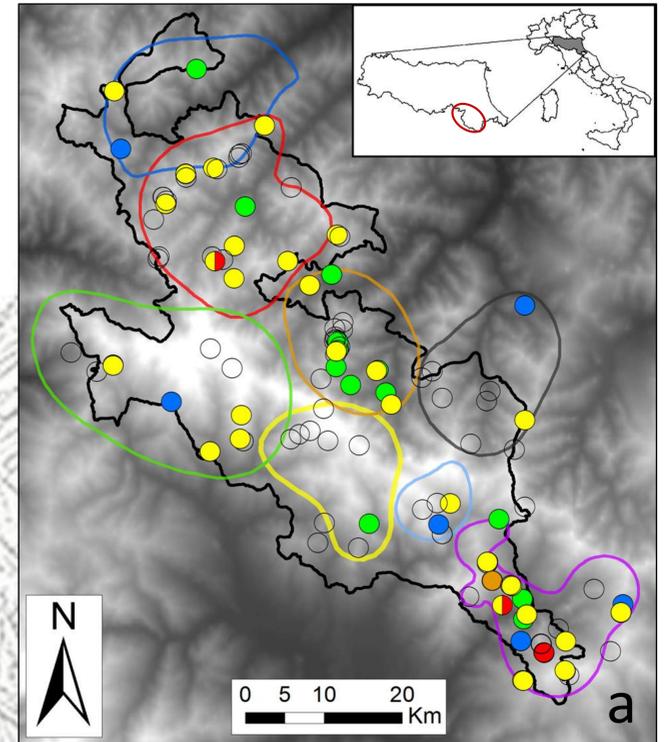
Italian wolves (*Canis lupus italicus* Altobello, 1921) and molecular detection of taeniids in the Foreste Casentinesi National Park, Northern Italian Apennines

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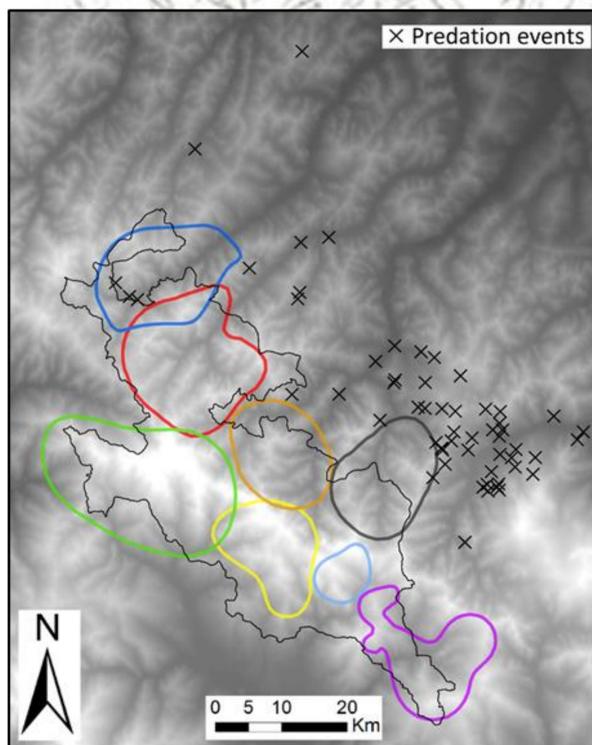
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The study area is located on the two sides of the Apennine watershed between Romagna and Tuscany, including the whole territory of the Foreste Casentinesi, Monte Falterona and Campigna National Park (FCNP).



a) Boundaries of eight wolf packs in blue, red, green, orange, gray, yellow, light blue and purple lines. Occurrence of species of parasites in wolf scats in red (*Echinococcus granulosus*), yellow (*Taenia hydatigena*), green (*T. krabbei*), orange (*T. polyacantha*) and blue (non-*Echinococcus* cestodes including *Taenia* spp. no sequence). Yellow-red dots indicate the occurrence of both *E. granulosus* and *T. hydatigena*. Empty dots indicate the absence of parasites. b) Frequency of sampling in positive animals.



Distribution of attacks on livestock in the Emilia-Romagna region, near and inside the FCNP wolf packs. (Data from Emilia-Romagna attacks control program).

Total samples n = 130	Taeniid species	Number of positive samples (Frequency %)	Confidence interval (95%)
	<i>Taenia hydatigena</i> (Pallas, 1766)	31 (23.8)	16.5–31.1
	<i>Taenia krabbei</i> (Moniez, 1879)	14 (10.7)	5.4–16
	<i>Taenia polyacantha</i> (Leuckart, 1856)	1 (0.7)	0.0–2.1
	<i>Echinococcus granulosus</i> (G1-G3)	3 (2.3)	0.0–4.8
	non- <i>Echinococcus</i> cestodes including <i>Taenia</i> spp.	6 (4.6)	1–8.2
Total	4 Taeniid species	55 (42.1)	33.7–50.5

Total wolves n = 54	Taeniid species	Number of positive animals (Prevalence %)	Confidence interval (95%)
	<i>Taenia hydatigena</i>	22 (40.7)	27.6–53.8
	<i>Taenia krabbei</i>	12 (22.2)	11.2–33.2
	<i>Taenia polyacantha</i>	1 (1.8)	0.0–5.3
	<i>Echinococcus granulosus</i> (G1-G3)	3 (5.5)	0.0–11.5
	non- <i>Echinococcus</i> cestodes including <i>Taenia</i> spp.	6 (11.1)	2.8–19.4
Total		33 (61.1)	48.1–74.1

Our 130 fecal wolf samples showed a taeniid prevalence close to 60%. None of the eight family packs presented the same composition of taeniid fauna, and only one had all four isolated species. As expected, since no sample was positive for *E. multilocularis*. From a public health perspective, it is important to emphasize the absence of *E. multilocularis* in the Apennines. The prevalence of *E. granulosus* (G1-G3), is not surprising because of its wide diffusion in Italy. In fact, when slaughterhouse data were matched with the national ovine registry to identify the geographical origin of animals all over the country, Cystic Echinococcosis (CE) prevalence was at least 40% in adult sheep. The low prevalence of *E. granulosus* is further confirmation of the absence of a wild cycle of this parasite. In Italy, CE is widely prevalent in livestock, making wolf infection a negligible aspect in the public health context. The involvement of wolves in Italy in *E. granulosus* transmission in the absence of a wild animal parasite cycle can be considered a downstream phenomenon of the domestic cycle.

Our global approach involved collaboration with theriologists and genetists expert in the Italian wolf population sharing our parasitological expertise.

Nature is a complex mosaic and in-depth study of one tile alone will not shed light on the whole picture. Tutor: Prof. Giovanni Poglayen