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SHORT-TERM POST-FIRE MONITORING ON A CALABRIAN POPULATION OF *TESTUDO HERMANNI*: PRELIMINARY DATA

SUMMARY

A population of *Testudo hermanni* from southern Italy (Calabria), localized following a fire, was investigated for two years (2019-2020). The population is characterized by small-sized adults, if compared with those of other Italian populations, by the occurrence of all age categories with a percentage of juveniles of 24.5%.

Keywords: Tortoise, census, Calabria, fires.

RIASSUNTO

Monitoraggio post-incendio a breve termine su una popolazione calabrese di Testudo hermanni: dati preliminari. Una popolazione calabrese di *Testudo hermanni*, localizzata in seguito ad un incendio, è stata studiata per due anni (2019-2020). La popolazione è caratterizzata da adulti di piccole dimensioni, se comparati con altre popolazioni italiane, dalla presenza di tutte le categorie di età e da una percentuale di giovani del 24,5%.

Parole chiave: Testuggine, censimento, Calabria, incendi.

INTRODUZIONE

Tortoises (family Testudinidae) are one of the most threatened groups of vertebrates in the world (STANFORD *et al.*, 2018). Fire is a process that plays a key role in ecosystems' functioning especially in the Mediterranean region

(PAUSAS & KEELEY, 2009); but when its frequency is high it becomes a major threat to wild tortoises and their habitats. Despite the importance of fire as a driving force for the decline of Hermann's tortoise populations, few studies were carried out in Italy and no one in Calabria. The populations of *Testudo hermanni* that occur in this area belong to a unique genetic cluster (BIELLO *et al.*, 2021), different from all other populations within the distribution range of the nominal subspecies *T. b. hermanni*. In this context, we report preliminary information on the presence of free-ranging Hermann's tortoises from Calabria (Southern Italy), in a site impacted by a bush fire on the northern Ionian coast.

MATERIALS AND METHODS

Field activity was carried out in a hilly area near Catanzaro (38°91' N, 16°59' E) in Calabria (Southern Italy). The surveyed area is approximately 3 ha, and the altitude ranges from about 100 to 135 m a.s.l.; it is characterized by an open uncultivated area within a small valley, periodically affected by fires of anthropogenic origin, probably to keep the area suitable for grazing.

The tortoise population was localized in July 2019, after a fire devastated the area. Nineteen sampling sessions were carried out from July to September 2019 (thirteen sampling sessions), in May 2020 and from September to October 2020 (six sampling sessions), with an effort of one person per two hours per session. Field activities were carried out under clear sky conditions with weak or no wind. Surveys took place during the first or last hours of the day in Summer and during the central hours of the day in Spring and Autumn. Tortoises were spotted using the "visual encounter survey" technique by random walking (CRUMP & SCOTT, 1994). For each tortoise the following data were recorded: date and time of capture, coordinates, weather conditions, sex, straight carapace length, carapace width, carapace height, plastron length, plastron width, pectoral plate length, femoral plate length, tail length and body mass. All individuals found measuring at least 10 cm in straight carapace length, were considered adults according to STUBBS *et al.* (1984) and STUBBS & SWINGLAND (1985). Recaptures were verified by comparing the dorsal and ventral photos of the shells.

RESULTS

During the monitoring activities a total of 65 tortoises were detected: 15 were dead (burned corpses, empty shells or parts of shells), 22 were females, 15 males, 12 juveniles and 1 undetermined (hidden in a large and dense bush

of *Rubus* sp.). In 2019, we found 14 dead tortoises and 39 living tortoises: 1 undetermined, 11 juveniles, 11 males and 16 females. In 2020, we found 1 dead tortoise and 11 living tortoises: 1 juvenile, 4 male and 6 females. There were three re-captures (1 juvenile captured 2 times, 1 male 3 times and 1 female 2 times). The percentage of observed juvenile individuals was 24.5% (not considering the undetermined tortoise). Carapace length averaged 118.14 ± 9.23 mm in males, and 140.5 ± 14.36 mm in females. Body mass averaged 346.58 ± 61.76 g in males, and 618.3 ± 144.47 g in females. As well known for the species males were smaller than females in all considered parameters (except for the total tail length); as a rule in the subspecies *T. b. hermanni* the length of pectoral plate was found to be less than the length of the femoral plate in 94% of cases (only in two females the lengths were the same).

DISCUSSION

Considering tortoises' size, the population target of this survey results to be among the smallest in Italy (CORTI *et al.*, 2005; LOY *et al.*, 2007; GIACALONE *et al.*, 2008; FILIPPI *et al.*, 2010; DI TIZIO *et al.*, 2013; LEONETTI *et al.*, 2016). The relatively high percentage (24.5%) of juveniles found in our survey is related to the alteration of the vegetation due to the fire. In several studies carried out in the Italian Peninsula, the percentage of juveniles found was below 7% (TOMMASETTI & BOSSUTO, 2000; CORTI & ZUFFI, 2003; LOY *et al.*, 2007; CUTULI *et al.*, 2013). Considering that fires are among the most catastrophic events that can affect the habitats of tortoises and negatively affect juveniles much more than adults (HAILEY, 2000), their occurrence is quite high in the surveyed area. Although the dead tortoises belonged to all age and size categories, the juvenile's category was the most affected (40%). In previous years the site had probably been hit by other fires, as evidenced by the burns of varying degrees of healing observed on the shells of some adult tortoises during the first sessions of the survey.

The low number of recaptures (3), the homogeneous vegetation cover (secondary grassland) for several hectares and the presence in the nearby hills of portions of well-preserved Mediterranean scrub could identify the study area like a transit area suitable for grazing, due to the high number of herbaceous species, and for laying, due to the presence of a sandy soil.

Preliminary results suggest that this is an open and well-structured population. Its vitality is demonstrated not only by the high frequency of tortoise's observations in the surveyed area and by the percentage of juveniles, but also by the occurrence of all age categories, from newborns to old tortoises. Further studies aimed at detailing the population dynamics are necessary to

implement proper conservation measures for a population that is part of a unique genetic cluster (BIELLO *et al.*, 2021).

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REFERENCES

- BIELLO R., ZAMPIGLIA M., CORTI C., DELI G., BIAGGINI M., CRESTANELLO B., DELAUGERRE M., DI TIZIO L., LEONETTI F.L., CASARI S., OLIVIERI O., PELLEGRINO F., ROMANO A., SPERONE E., HAUFFE H.C., TRABALZA-MARINUCCI M., BERTORELLE G. & CANESTRELLI D., 2021. Mapping the geographic origin of captive and confiscated Hermann’s tortoises: a genetic toolkit for conservation and forensic analyses. *Forensic Sci. Int. Genet.*, 51: 102447.
- CORTI C. & ZUFFI M.A.L., 2003. Aspects of population ecology of *Testudo hermanni hermanni* from Asinara Island, NW Sardinia (Italy, Western Mediterranean Sea): preliminary data. *Amphibia Reptilia*, 24: 441-447.
- CORTI C., ZUFFI M.A.L., BASSU L., FRESI C. & SATTÀ M.G., 2005. Preliminary data on body size differences in adults of *Testudo hermanni hermanni* Gmelin, 1789: Comparison between two western Mediterranean insular populations and the continental population of southern Tuscany. Pp. 27-28 in: Ananjeva N. & Tsinenko O. (eds), Herpetologia Petropolitana. *Proc. 12th Ord. Gen. Meet. Soc. Eur. Herpetol.*, Saint Petersburg, Russia.
- CRUMP M. & SCOTT N.J., 1994. Visual encounter surveys. Pp 84-92 in: Heyer W.R., Donnelly M.A., McDiarmid R.W., Hayek L.A.C. & Foster M.S. (eds.), Measuring and monitoring biological diversity. Standard methods for amphibians. *Smithsonian Inst. Press*, Washington & London.
- CUTULI G., VANNINI M. & FRATINI S., 2013. Demographic structure and genetic variability of a population of *Testudo hermanni hermanni* (Reptilia: Testudines: Testudinidae) from Southern Tuscany (Central Italy): a case of “happy-ending” uncontrolled reintroduction. *Ital. J. Zool.*, 80: 552-559.
- DI TIZIO L., DI FRANCESCO N., ALESSANDRELLI R., BRUGNOLA L., CAMELI A., DI CERBO A.R. & FERRI V., 2013. Action Plan per la conservazione di *Testudo hermanni* Gmelin, 1789 in Abruzzo. Pp: 177-185 in: Ottonello D., Oneto F., Piccardo P. & Salvidio S. (eds.), Atti II Congresso SHI Abruzzo e Molise “Testuggini e Tartarughe”. *Ianieri Ed.*, Pescara.
- FILIPPI E., RUGIERO L., CAPULA M., BURKE R.L. & LUISELLI L., 2010. Population and thermal ecology of *Testudo hermanni hermanni* in the Tolfa mountains of central Italy. *Chelonian Conserv. Biol.*, 9: 54-60.
- GIACALONE G., ABBATE M., FRITZ U. & LO VALVO M., 2008. Preliminary data on distribution, morphometric and genetic characterization of Hermann’s tortoise in Sicily. Pp. 282-286 in: Corti C. (ed.), Herpetologia Sardiniae, Le Scienze. *Ed. Belvedere*, Latina.
- HAILEY A. & WILLEMSEN R.E., 2000. Population density and adult sex ratio of the tortoise *Testudo hermanni* in Greece: evidence for intrinsic population regulation. *J. Zool.*, 251: 325-338.
- LEONETTI F.L., GIGLIO G., TRIPEPI S., CORTI C. & SPERONE E., 2016. Caratterizzazione fenotipica delle popolazioni calabresi di *Testudo hermanni*. Pp. 311-317 in: Menegon M., Rodriguez-Prieto A. & Deflorian M.C. (eds.), Atti XI Congr. Naz. Soc. Herpetol. Ital. *Ianieri Ed.*, Pescara.
- LOY A., RAMACCIATO V., CAPULA M. & GENTILOTTI F., 2007. Demography of *Eurotestudo hermanni* in a mesic area of Central Italy. *Amphibia Reptilia*, 28: 87-95.

- PAUSAS J.G. & KEELEY J.E., 2009. A burning story: the role of fire in the history of life. *Bioscience*, 59: 593-601.
- STUBBS D., HAILEY A., PULFORD E. & TYLER W., 1984. Population ecology of European tortoises: review of field techniques. *Amphibia Reptilia*, 5: 57-68.
- STUBBS D., SWINGLAND I.R. & HAILEY A., 1985. The ecology of the Mediterranean tortoise *Testudo hermanni* in northern Greece: the effects of a catastrophe on population structure and density. *Biol. Conserv.*, 31:125-152.
- TOMASETTI G. & BOSSUTO P., 2000. Dati preliminari sulla struttura di una popolazione di *Testudo hermanni hermanni* dei Monti Nebrodi di Sicilia. Pp. 553-558 in: Giacomina C. (ed.), Atti I Congr. Naz. Soc. Herpetol. Ital. *Mus. reg. Sc. nat.*, Torino.

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