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An Exceptionally Rare Predation on a Chameleon Species (Squamata: Chamaeleonidae) by a Eurasian Eagle-Owl (Aves: Strigidae)

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Abstract: The Eurasian eagle-owl (*Bubo bubo*) is a large, generalist predator widely distributed across Eurasia, including mainland Greece, where it occupies a broad range of habitats. Its diet is known to consist primarily of mammals and birds, with reptiles occasionally included. However, to date, chameleons have not been documented among its prey. Here, we report the first confirmed case of *B. bubo* preying on an African chameleon (*Chamaeleo africanus*) in the western Peloponnese of southern Greece—a region where the two species occur in limited sympatry. *C. africanus*, native to North Africa and introduced to Greece since antiquity, is a diurnal, slow-moving, arboreal lizard with highly cryptic behavior and specialized anti-predator strategies. Despite these traits, our observation highlights its potential vulnerability to nocturnal avian predators. This rare predation event offers novel insights into the trophic ecology of *B. bubo* and raises important considerations for the conservation of *C. africanus*, a species listed as Critically Endangered in Greece and increasingly threatened by habitat loss, illegal collection, and road traffic collisions.

Keywords: *Chamaeleo africanus*; species interactions; Greece; Strigiformes; sympatric species

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Predator–prey interactions represent fundamental ecological processes that regulate population dynamics, shape community structure, and influence evolutionary trajectories. In avian predator guilds, owls (Order: Strigiformes) are recognized as key components of terrestrial food webs due to their broad dietary plasticity, nocturnal activity patterns, and widespread geographic distribution. Among them, the genus *Bubo* Duméril, 1805 (Strigidae Leach, 1819), comprises ten species that are globally distributed across a variety of biogeographic regions [1]. Of particular taxonomic importance, the Eurasian eagle-owl *Bubo bubo* (Linnaeus, 1758) is the type species of the genus and exemplifies its ecological versatility. As one of the largest owl species globally, *Bubo bubo* reaches a body length of 56 to 75 cm and occupies a broad geographic range spanning much of Eurasia, where it is a non-migratory resident [2]. The species demonstrates a high degree of ecological adaptability, occupying a broad range of environments such as open woodlands, shrublands, agricultural mosaics, rocky outcrops, and mountainous regions. This habitat flexibility is closely reflected in its generalist feeding strategy, which enables it to function as an apex predator across a variety of landscapes, including those found in the Mediterranean region. In Greece, the species ranges throughout the mainland and a few islands, inhabiting a wide

array of environments, with a preference for open treeless areas, agricultural mosaics, shrublands, light forests, and rocky terrain such as gorges and cliffs [3,4].

The dietary habits of the Eurasian eagle-owl have been widely documented across its distribution, consistently classifying the species as a generalist predator with marked dietary plasticity. This trophic flexibility enables it to exploit a broad spectrum of prey types and adapt its foraging behavior according to regional and seasonal prey availability [5–11]. In the Mediterranean Basin, the species primarily preys upon small- to medium-sized mammals and birds, whereas other taxa—such as amphibians, reptiles, fish, and invertebrates—are consumed in lower proportions [12–17]. This pattern is mirrored in Greece, where regional studies confirm the predominance of mammals and birds in the species' diet, with amphibians, reptiles, and invertebrates playing a comparatively minor role [3,18,19]. Among these less frequently consumed groups, reptiles appear to serve primarily as complementary prey, typically consumed in areas or seasons where their local abundance permits, thereby reflecting the opportunistic foraging behavior of the species [20]. This reliance on locally abundant prey highlights the species' opportunistic foraging strategy and underscores the ecological importance of regional prey composition in shaping diet breadth.

Yet, despite the broad taxonomic diversity observed in the Eurasian eagle-owl's diet, certain vertebrate groups remain conspicuously underrepresented or entirely absent from its known prey spectrum. One such group is the Chamaeleonidae (Squamata: Iguania), a morphologically and behaviorally specialized lineage of lizards that comprises 234 species across 12 genera, distributed throughout Africa, the Indian Ocean islands, Asia, and parts of the Mediterranean Basin. Among these, the genus *Chamaeleo*—which includes 14 species—is the most widespread [21]. In Europe, Greece is the only country that hosts two species from this family: the African chameleon (*Chamaeleo africanus* Laurenti, 1768), which is native to Africa (Sahel and Nile Valley), and the Mediterranean chameleon (*Chamaeleo chamaeleon* Linnaeus, 1758) [22]. However, these two species are not sympatric in Greece; *C. africanus* is confined to the western Peloponnese, while *C. chamaeleon* is present on Samos Island in the eastern Aegean Sea [23]. In addition, a small urban population of *C. chamaeleon* has recently been established in the metropolitan area of Athens, attributed to human-mediated translocation [24].

The African chameleon, believed to have been introduced to southern Greece during the Homeric era [25,26], is a diurnal, arboreal species that reaches a total length of 370–460 mm. It is active for most of the year but enters hibernation during the winter months [22,24,25]. Although predominantly tree-dwelling, individuals may occasionally descend to the ground, particularly during periods of dispersal or reproduction, when gravid females seek sandy soils for oviposition [22,25]. Despite its long-standing presence in Greece, predation on *C. africanus* is rarely recorded. Only two confirmed cases exist in the literature: one involving domestic dogs [22] and another by a scorpion [27].

Here, we report, for the first time across the entire distribution range of the species, a previously undocumented predator–prey interaction involving a Eurasian eagle-owl and an African chameleon.

During a pre-dawn field survey targeting the Eurasian eagle-owl, our team conducted systematic observations in the broader Pylos area, Messenia, western Peloponnese, Greece. On 17 July 2024, at approximately 06:24 EEST, we observed an individual *B. bubo* perched on a utility pole before it flew to a nearby rocky outcrop, located roughly 50 m from what appeared to be its nesting site After several moments of scanning behavior, the eagle-owl initiated a rapid, low-altitude flight and disappeared from sight. Shortly thereafter, it returned to the same rocky perch holding a prey item. At the time of observation, we were unable to identify the prey species, but based on its size and shape, we presumed it to be

a lizard. Moments later, the eagle-owl flew behind the rocky formation and disappeared from our field of view. Subsequent examination of a photograph taken by L.C. (Figure 1) confirmed that the prey was an adult African chameleon (*Chamaeleo africanus*).



Figure 1. Predation event involving a Eurasian eagle-owl (*Bubo bubo*) and an African chameleon (*Chamaeleo africanus*) documented in the Pylos area, Messenia, western Peloponnese, Greece: (**a**) the eagle-owl perched on a rocky outcrop moments after capturing the prey; (**b**) close-up showing the chameleon held in the eagle-owl's talons.

To the best of our knowledge, this observation represents the first documented case of a chameleon species being predated upon by the Eurasian eagle-owl across its entire distribution range. The event occurred during the early morning hours, a transitional period when *C. africanus* may briefly descend to the ground after nocturnal roosting—potentially increasing its vulnerability to opportunistic predators.

Although *B. bubo* is widely recognized as a generalist apex predator, chameleons have remained conspicuously absent from both regional dietary studies and anecdotal predation reports. This gap is likely attributable to a combination of ecological and observational factors, including the chameleon's antipredator behavior, the rarity of such encounters, and the limited areas where these two taxa occur in sympatry.

Biogeographically, only two species of chameleons fall within the range of *B. bubo*: the Mediterranean chameleon, found in Syria, Lebanon, Jordan, Israel, Mediterranean Turkey, southern Italy, and the southern Iberian Peninsula [28], and the African chameleon, which is restricted in Europe to the western Peloponnese [22]. In regions where *C. chamaeleon* occurs, dietary studies on *B. bubo* have failed to report any evidence of chameleon predation [29–33]. Moreover, no published studies to date have assessed the diet of *B. bubo* in the Peloponnese,

leaving the trophic dynamics of this system in southern Greece entirely undocumented until now.

Beyond geographic factors, the behavioral ecology of chameleons may also help in explaining the rarity of such interactions. As slow-moving, primarily arboreal, and highly cryptic reptiles, chameleons are inherently difficult for both predators and researchers to detect. Their most common anti-predator strategies include facultative crypsis, minimal motion, and nocturnal roosting off the ground [34–36]. Nonetheless, they are not exempt from natural predation: birds, arboreal snakes, and mammals have all been reported as chameleon predators in various parts of their range [37–43].

These combined ecological, behavioral, and geographic factors render the observed predation event exceptionally rare. The nocturnal activity patterns of *B. bubo* make direct observations inherently difficult, and the low local density and restricted distribution of *C. africanus* in the western Peloponnese further reduce the likelihood of detecting such interactions [44]. Additionally, the chameleon's cryptic behavior and limited terrestrial activity outside of specific contexts, such as breeding or locomotion, contribute to the underreporting of such events.

Nevertheless, isolated observations like this one are valuable. They provide novel insights into poorly understood ecological relationships and highlight subtle interactions within local trophic networks that may otherwise go undetected. In this context, even single predation events can be ecologically meaningful, particularly when they involve vulnerable or range-restricted species. Understanding the feeding ecology of *B. bubo* in areas of sympatry with *C. africanus*—such as the western Peloponnese—may offer critical information on the pressures faced by declining reptile populations in Mediterranean landscapes. Given that *C. africanus* is listed as Critically Endangered in *The Red Data Book of Threatened Animals of Greece* [44], documenting all potential threats to its survival, including opportunistic predation, is important for informing conservation strategies; for this reason, we have chosen not to disclose the precise geographic coordinates of the observation in order to minimize the risk of disturbance, illegal collection, or road-related mortality. Integrating data from avian predator surveys with herpetological monitoring may offer new opportunities to detect overlooked ecological pressures and support targeted conservation efforts. Furthermore, future dietary studies employing molecular techniques, such as DNA barcoding, may enhance the detection of elusive prey species like *Chamaeleo africanus* and improve our understanding of their contribution to the Eurasian eagle-owl's trophic ecology.

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