



CURRENT STATUS AND COMMENTS ON THE BIOLOGY OF THE IBERIAN GREY SHRIKE *LANIUS MERIDIONALIS* IN THE COUSSOUL (OR DRY CRAU) IN SOUTHERN FRANCE, BOUCHES-DU-RHÔNE

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Abstract.

This paper addresses the conservation status and biology of the Iberian Grey Shrike in a unique habitat: the Coussoul, a stony desert in southern France covering approximately 12,000 ha. It is well known among bird watchers as it is rich in wildlife and is home to the country's only Pin-tailed grouse population. Surveys from 1994, 2009 and 2023 showed that the shrike population exhibited a certain degree of stability in this relatively stable habitat, over the periods examined. In 2023, the total density was 0.75 occupied territories/100 ha. The main nest-sites are *Rubus* bushes, which punctuate the arid steppe. Some details are given about the species' diet which shows significant seasonal variations. The Coussoul *Lanius meridionalis* population represents between 5 and 10% of the total French population and we recommend that it be given more attention within the framework of the future management plan (2025-2034) of the existing National Nature Reserve created in 2001 and extending over 7,400 ha.

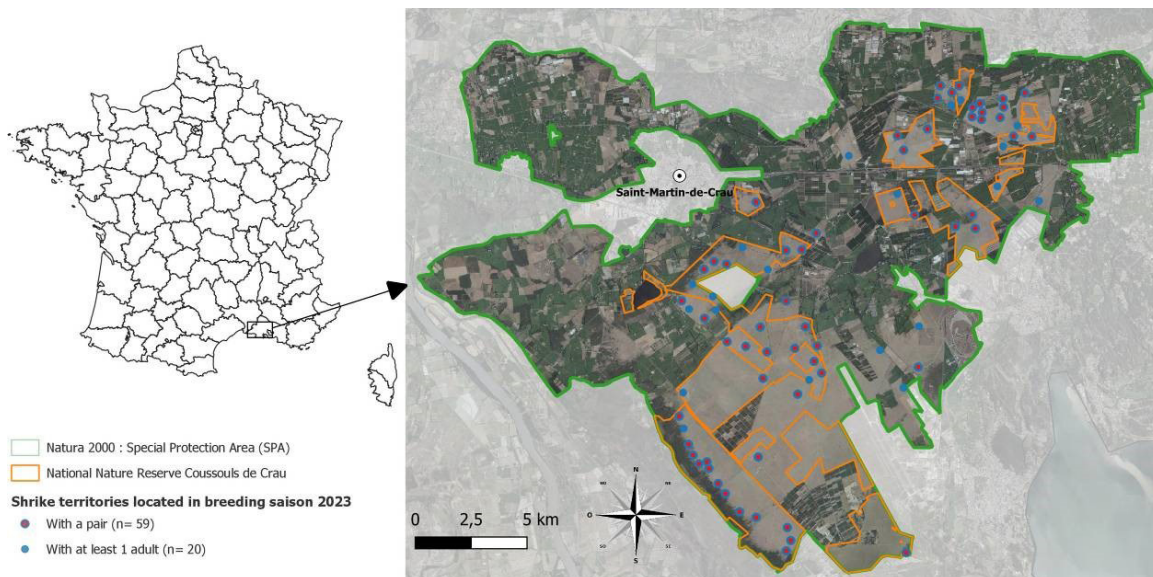


Figure 1. Map showing the location of the Crau in southern France.

INTRODUCTION

Lanius meridionalis, now generally recognized as a monotypic species, is a breeding bird restricted to the Iberian Peninsula and Mediterranean France. Its English name seems justified since about 95 % of the world's population lives in Spain and Portugal.

In France, the *Pie-grièche méridionale* is a regular breeder in 13 southern "départements" and its global population is estimated at 650 to 1150 pairs. In France it breeds in a wide range of landscapes, particularly in open *garrigue*, scrubland dominated by *Quercus coccifera*, including well-exposed and relatively rolling mountainous areas, generally below 1000m. It is also found in less natu-

ral, extensively cultivated areas, which often include vineyards, provided that there are some trees, but especially thorn bushes (*Prunus spinosa*, *Rubus* sp., *Rosa* sp.) and insect-rich dry pastures, fallow areas and abandoned fields (Lefranc & Worfolk 2022).

Here we provide information about the current status and biology of the species in a unique habitat in the Crau plain: the Coussoul, the only French desert, a stony desert. It has a Mediterranean climate and lies east of the Rhône Valley and the Camargue Delta. The main town with access to both the Camargue in the southwest and the Crau in the southeast is the historic city of Arles (Fig. 1).

MAIN CHARACTERISTICS OF THE CRAU PLAIN AND OF THE COUSSOUL

The Crau, a 600 km² plain in southeastern France, is roughly triangular in shape and lies between the cities of Arles (northwest), Lamanon (northeast) and Fos-sur-Mer (south). It is the ancient delta of the Durance River, and the stones that cover the very flat ground surface were transported by this river between approximately 650,000 and 35,000 years BC. The Coussoul or *Crau sèche* (dry Crau) is a semi-arid steppe consisting mainly of *Brachypodium retusum* and *Thymus vulgaris* in association with *Asphodelus fistulosus* and *Stipa capillata*. In Council Directive 92/43 EEC it is the priority habitat 6320: “Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*”. It has been shaped by climatic conditions, the soil structure (the presence of conglomerate prevents the root growth of woody species over most of the steppe) and not forgetting sheep grazing that it has supported for 4000 years (Tatin *et al.* 2013 which see for more details).

The almost intact Coussoul covers slightly less than 12,000 ha (Fig. 2). Now fragmented into several patches, several different “coussouls” of different sizes and with different names, it is the remainder of the ca. 50,000 ha that existed in the 18th century before the area was progressively degraded, initially by agricultural activities that irrigated *Crau verte* (now known for the quality of its hay) and later, especially after the 1960s, by the Fos-sur-Mer industrial complex, the development of the motorway network, military areas, airports, quarries and industrial types of agriculture including shifting melon cultivation and large peach orchards (Cheylan 1998). Even though large parts of the plain are now part of the Natura 2000 network, which also includes a national nature reserve, serious threats remain.



Figure 2. The Coussoul. View of the northern limits with the Alpilles in the background. Good *meridionalis* habitats. Olivier Hameau.

The Coussoul is home to the only French population of the Pin-tailed Sandgrouse (*Pterocles alchata*; 400 to 800 individuals, CEN-PACA report 2016) and almost two-thirds of the national population of the Lesser Kestrel *Falco naumanni*. Other typical birds include the Little Bunting *Tetrax tetrax*, the Stone Curlew *Burhinus oedicnemus*, and the Calandra Lark *Melanocorypha calandra* (95 % of the national population; Tatin & Wolff 2015). Note that the characteristics of the Coussoul are well presented in an excellently illustrated book by Schall (2017).

CURRENT STATUS AND POPULATIONS TRENDS OF THE IBERIAN GREY SHRIKE

Historical data

The occurrence of the *Pie-grièche méridionale* in the Crau was mentioned as early as in the mid 19th century by Jaubert & Barthelemy (1859), but the Crau vertebrate fauna only gained particular attention in 1965 with the publication of a first list by Otto von Frisch, who mentions some “*Lanius excubitor*” observations and a nest with seven nestlings ready to fledge in a dry bush on 27th May. Cheylan (1975), in his *Esquisse écologique de La Crau*, is the first to give some details about “*Pie-grièche grise*”: “its density is low in the (presumably central) coussouls (10 to 15 pairs), but higher in the peripheral areas (presumably in the western and northern parts) where potential nest sites are more numerous”.

The recent surveys

Not a single *Lanius meridionalis* pair has ever been found nesting in the Crau plain outside the dry Crau, and so the surveys were limited to the 11,854 ha of the Coussoul, which consists of a central core of about 6,500 ha (Centre-Crau) and a series of satellite areas (particularly in the northern part of the plain) covering between 10 and 600 ha.

As part of a national survey of shrike populations launched by the *Ligue pour la Protection des Oiseaux* (LPO), a first survey of the Coussoul *meridionalis* population took place in 1994, carried out by the *Conservatoire et Etudes des Ecosystèmes de Provence* (C.E.E.P). It lasted five days in early May with the participation of 25 people (Lefranc & Lepley 1995). This was followed by another in 2009: 11 (mostly windy, rainy) days in May and six people (Lefranc & Vincent-Martin, *unpubl.*) and a more sophisticated one in 2023, when the Coussoul was divided into 26 survey areas with an average 456 ± 227 ha, and with the participation of 27 people: first passage at each site between 3rd March and 12th April (date chosen by the observer) and second passage between 19th and 27th April (mainly in the form of a prospecting camp (Hameau 2023).

In all cases, the main field work began at dawn and lasted approximately 5 hours. Access to State land (includ-

ing military areas), local authority land, private property, etc., as well as the use of cars on normally closed roads or tracks had been ensured well in advance by the organizers. Observers were advised to stop periodically and scan the landscape for at least 15 minutes. Each shrike observation was detailed on a 1/25000 map and assigned a number; behavioral observations (song, capture or carrying prey, nest location, etc.) were recorded in a special file.

The following results emerged with regard to the number or specific breeding pairs and territories:

1994 : 46-66 ; **2009** ; 35-45 ; **2023** : 59-79.

The 2009 survey provides minimal results as it was conducted primarily by only one person with only one passage per site and in sometimes unfavorable weather conditions. By extrapolation the number of occupied territories that year was estimated between 56 and 66.

The years 1994 and 2023 are more comparable and it seems reasonable to assume that the population of dry Crau *Lanius meridionalis* shows at least some stability over the time considered.

Habitat, densities and nesting sites.

In the flat stony landscape of Coussoul (between 1 and 9 meters a.s.l.), only a few vertical features catch the eye: especially the one-story sheepfolds (there are 24 *bergeries* within the boundaries of the nature reserve alone), a few old wells and of course the ca. 40,000 sheep present from February or March to mid to late June (Fig. 3). Another very striking feature: thousands of cairns, remnants of World War II, built by prisoners in July 1944, when the German command decided to prevent Allied aircraft from landing on the seemingly ideal terrain that the dry Crau offered.



Figure 3. Sheep grazing in the Coussoul. Photo by Norbert Lefranc

The cairns, sometimes mixed with soil, are not very high but provide important perches for the shrikes, which often fly very low before sweeping up to a new vantage point, often a stone. Bramble *Rubus* sp. and *Phyllirea angustifolia* bushes, important nesting sites, develop well among the stones, especially between the cairns (Fig. 4).

They punctuate almost the entire Coussoul and are rare, small or absent only in their central part. In peripheral areas in the north and southwest, Holm oak *Quercus ilex* offer important nesting sites.



Figure 4. Typical nesting site (*Rubus* bush) in the foreground. Cairns and bushes in the steppe: good habitat for *meridionalis*. Note a distant *Bergerie*. Norbert Lefranc.

The density of breeding pairs obviously depends on the availability of suitable nesting sites. In 2023, the total density was 0.75 occupied territories/100 ha. Locally it reached 1.73/100 ha or was only 0.35/100 ha as in the case of “Centre Crau” (Hameau 2023). Lepley *et al.* (2000) studied a breeding population for two years, 12 pairs each time, in a ca. 1,000 ha area. The density was ca. 1 pair/100 ha and the distances between nests (first clutches) varied somewhat between years: mean of 938m (750-1225) in the first year and a mean of 710m (250-1125) the second year.

Of 67 nests, 42 (62%) were in bramble *Rubus* sp, 7 (10%) in *Phillyrea angustifolia*, and 18 (26%) in Holm oak *Quercus ilex*. (Lepley *et al.* 2000; Lefranc, *unpubl.*). In *Rubus* bushes, nests are generally about 1m above the ground (0.4-1.1 m; Fig. 5). In the “Centre Crau”, where shrike density is low, bushes are relatively numerous but small, nests are sometimes clearly visible and appear vulnerable. In other areas, nests are concealed in large bushes, and are potentially less accessible to predators.



Figure 5. A shrike near its nest in a *Rubus* bush. Olivier Hameau.

The shrike's habitat in this stony desert is stable, but important changes can also occur locally within a short period of time. Comparisons between the 1994 and 2009 surveys showed that a relatively large area in the north-east (coussoul du Grand-Brahis and La Tapie) had become largely unsuitable as a foraging habitat. This was apparently due, at least in part, to the lack of grazing, which led to the development of tall vegetation, in the form of an "ocean" of bramble bushes. The shrike population fell from nine occupied territories to just two (Lefranc & Vincent Martin *unpubl.*)

Population size and density in the Crau sèche are not known for the winter. A study conducted in Spain that sexed ringed birds using molecular genetic techniques showed that most adult males were largely resident, with high fidelity to specific territories, while females, were much more prone to movement (Campos & Martin 2010).

The relatively few birds that are in the neighboring Camargue outside of the breeding season (early August to early March, e.g. Kayser *et al.* 2014) probably come from the Coussoul and are presumably predominantly female; much of the data relates to the well-known Tour du Valat area, where up to around four pairs nested until ca. 2000 in a specific, small and rare habitat, now perhaps too dense and unsuitable *Phyllirea* shrubs growing in the sandy soil (NL pers.obs.). Movements to and from the Alpilles, a limestone mountain range to the north that hosts a small breeding population of *Pie-grièche méridionale*, also seem likely.

Notes on breeding biology

In Coussoul, egg laying begins in the last week of March and the first eggs for repeat clutches can be recorded in June. Lepley *et al.* (2000) found that most eggs (80 %) were laid between 10th April and 10th May. The clutch varied between three and seven eggs (mean 5.2 ± 1.1 for $n = 22$; Fig. 6). Over the course of two years, the 24 pairs monitored laid 137 eggs; hatching success was 54% , fledging success was 27% and overall breeding success was 1.54 (± 1.93) fledged young per breeding pair. More than half of the pairs (54, 17%) that built at least one nest did not produce a single fledgling. The predation rate on eggs and nestlings was high: 44 % of the nests were predated (probably by Magpies *Pica pica*); approximately 16% of nests that were either empty or containing clutches were abandoned, but this never occurred in nests with nestlings. No second brood was recorded, but 50% of pairs that lost their eggs or young in the nest made a second attempt. In only one case was there a third attempt.

Foraging and food

Meridionalis hunts in the typical shrike sit-and-wait manner, with most prey captured on the ground. In the Coussoul, where trees are rare except along canals and in marginal areas, the average perch-height is about 2 m (1-3 m; Fig. 7). Hovering for a few seconds, a few meters above the ground may occur, particularly when perches are rare.



Figure 6. A 7-egg clutch in a *Phillyrea* bush. Norbert Lefranc.



Figure 7. On the hunt from the top of a pile of stones. Norbert Lefranc.

Some insight into the local diet of *meridionalis* was gained through direct observations, prey found in larders (Cheylan 1975) and through identification of prey from regurgitated pellets (Lepley 1995; Vivat 1998; Lepley *et al.* 2004).

In the Coussoul, impaled prey are rarely recorded, but caches are necessary when vertebrates, mainly small passerines, are captured, which occurs rarely. Remains of the following species were found in larders: Mammalia: Pygmy white-toothed Shrew *Suncus etruscus*, Greater white-toothed Shrew *Crocidura russula*, Wood Mouse *Apodemus sylvaticus*; Aves : Stonechat *Saxicola torquatus*, Skylark *Alauda arvensis*, Tawny Pipit *Anthus campestris*; Reptilia: unidentified small lizards presumably Common wall lizard *Lacerta muralis*; Amphibia: Edible frog *Rana esculenta*, Mediterranean tree frog *Hyla meridionalis*. Among the impaled arthropods: the Megarian banded centipede *Scolopendra cingulata*, and one of the largest

spiders of France, Tarantula wolf spider *Lycosa tarantula*.

The Coussoul hosts a rich, diverse arthropod community well adapted to this particular habitat, which includes the endemic Crau Plain grasshopper *Prionotropis rhodanica* (Massa *et al.* 2015) and the near-endemic beetle *Acmaeoderella cyanipennis perroti*. Grazing intensity, which varies from site to site, certainly has a direct influence on the diversity and abundance of insects; for example, many grasshoppers require a specific vegetation structure (Bröder *et al.* 2023).

A total of 5,409 prey were identified from 257 pellets collected during a single breeding and winter period showed that vertebrates were rarely captured and that the major groups were: Coleoptera (26, 64%), Orthoptera (12, 93%), Hymenoptera (4, 72%) and Arachnida (10, 65%). High seasonal preferences were found. Coleoptera were recorded in large quantities throughout the year; Carabidae were the main prey in winter, Melolonthidae were particularly important for the adults during the nestling period (*Amphimallon ruficorne* accounted for 29% of the wet biomass) and Cetoniidae (particularly *Netocia oblonga* and *N. morio*) for the fledglings. Hymenoptera were largely consumed in autumn and Arachnida in autumn and winter. Orthopterans dominated the diet in summer and autumn, with large numbers available as early as June (essential for juveniles), with approximately 50,000 individuals/ha in August, before a gradual decline until November (Foucart, 1997). Lepidoptera larvae were eaten by fledglings in winter and spring.

Conservation and perspectives

The Crau sèche *meridionalis* population accounts for between 5 and 10% of the total French population. A Special Protection Area (SPA, Birds Directive) covers 39,333 ha of the Crau plain and includes the *Réserve Naturelle Nationale des Coussouls de Crau*, created in 2001, with an area of 7,400 ha, including 6,343 ha of Coussouls. Notably, almost 60% of the territories occupied in 2023 lie within the boundaries of this reserve. It is hoped that this percentage will increase in the near future as steps are currently being taken to add ca. 3,152 ha of Coussouls for the reserve.

The current management plan of the reserve (2015-2024; Wolf *et al.* 2015) logically devotes a lot of space to the *Principales espèces d'oiseaux* (listed above; Fig. 8), but unfortunately only devotes two lines to the *Piegrièche méridionale*. The species has been in sharp decline in its breeding range worldwide and it has been listed as *Vulnerable* on the IUCN Red List since 2017 (Lefranc & Worfolk 2022). Given the regional and national importance of the Crau sèche *meridionalis* population, the value of this shrike to local cultural heritage certainly merits reassessment in the forthcoming updated management plan (2025-2034). Of course, particular attention should be paid to maintaining adequate habitat and research into

various aspects of species' biology should be encouraged; a ringing program that began 20 years ago but was abandoned (Andrew Newton *viva voce*) could be restarted to gain a better understanding of the respective movements of adults, first-winters, males and females, as well as survival, predation risk, etc. A specific survey carried out regularly over a yet to be determined period (between 5 and 10 years?), seems desirable.



Figure 8. The emblematic Coussoul species : Pin-tailed Sandgrouse (400 to 800 individuals in this arid desert). Yann Toutain.

Access to the Coussoul

A bird trip to the south of France invariably includes the Camargue, the Crau sèche and the Alpilles, generally in that order. Most roads crossing the Coussoul are normally closed, so access is largely prohibited. However, there is one excellent place: the Peau de Meau area (129 ha) in the National Nature Reserve. Peau de Meau is a *Bergerie* with an inbuilt observatory. A 4-km long path leads there from the car park. On your way there is a good chance of seeing most bird species, especially early in the morning, including the Pin-tailed Sandgrouse and the Iberian Grey Shrike. If you are lucky, you might even catch a glimpse of the elusive and impressive Ocellated Lizard *Timon Lepidus*, another flagship species of Crau sèche, believed to host one of the largest populations in France (Tatin *et al.* 2016). Access to this part of the reserve is possible, although a permit must be obtained for 2 days (not necessarily consecutive) and for a few Euros at the Maison de la Crau (Ecomusée), 2 Place Léon Michaud in Saint-Martin-de-Crau where further information can be provided. The nature reserve is jointly managed by the *Conservatoire d'Espaces Naturels de Provence-Alpes-Côte d'Azur (CEN PACA)* and the *Chambre d'Agriculture des Bouches-du-Rhône (CA 13)*.

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