

On the validity of the 'Steppe Grey Shrike' as an independent species

EVGENIY N PANOV & ANNA A BANNIKOVA

The large grey shrikes inhabiting northeastern Iran, Kazakhstan and the Central [Middle] Asian republics of the former USSR, northern Mongolia and northwestern China are regarded by Lefranc & Worfolk (1997) as belonging to the eastern population of the polytypic Southern Grey Shrike *Lanius meridionalis*, representing the geographical race *L. m. pallidirostris* (Figure 1). The same status is assigned to the taxon in the review of true shrikes, Laniidae, in volume 13 of *Handbook of the Birds of the World* (Yosef 2008). Both sources support the view presented in earlier fundamental works, in particular *The Birds of the Western Palearctic* (Roselaar in Cramp & Perrins 1993) and a number of others. At the same time, one may readily find numerous publications on the Internet where the taxon is presented under the name Steppe Grey Shrike *L. pallidirostris* (eg www.birds.kz, www.oiseaux.net). How did this view of these birds as an independent species arise and to what extent are species status and the imposed name supported?

Although it is difficult to trace the very first step in assigning species status to the taxon, we suppose that it would be the *Checklist of the Birds of Eurasia* compiled by BF King in 1997 (King 1997). It is important to note that there is no explanation in that work of the author's reason for elevating the taxon from subspecies to the rank of independent species. It can only be assumed that the decision by King was based on differences in the external morphology of *pallidirostris* compared to other subspecies of the Southern Grey Shrike (in particular, in their colour patterns). At the same time, it should be pointed out that these differences are often overestimated, largely because the bird is not well known to western ornithologists.

Within the framework of zoological systematics, it is difficult to justify separating the form *pallidirostris* as an independent species as it interbreeds freely with its more westerly counterpart *L. m. aucheri*, so that an intermediate population has been formed in the northeast of Iran (Meinertzhagen 1954, Vaurie 1955, 1959, see also Dubois 2000 and Figures 2 and 3).

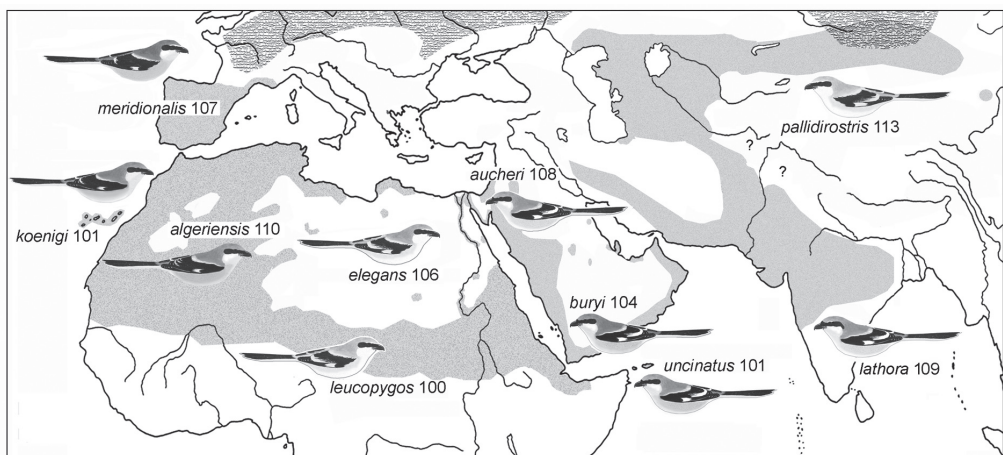


Figure 1. Range of the Southern Grey Shrike *Lanius meridionalis*. Figures denote mean wing length (mm) in males. The different shading style at the top shows southern parts of the Great Grey Shrike's *Lanius excubitor* range (after Panov 2010).

EVIDENCE FROM MOLECULAR STUDIES

Other sources for the treatment of *pallidirostris* as a full species derive from comparative molecular studies, the reliability of the inferences from which needs examination. The first notion of assigning the rank of full species to *pallidirostris* was in a short paper by Hernández *et al* (2004). This proposed splitting the Southern Grey Shrike *L. meridionalis* into at least two independent species: a western one composed of the subspecies *meridionalis* (Iberian peninsula) and *koenigi* (Canary islands), and an eastern one including the races *aucheri* (Middle East) and *pallidirostris*. Later, two papers appeared almost simultaneously¹ in which this topic was discussed on the basis of other molecular markers.

Where the validity of *L. m. pallidirostris* as a full species is discussed from the molecular point of view (eg Hernández *et al* 2004, Gonzalez *et al* 2008), a problem arises from the proposed genetic paraphyly of *L. meridionalis* and Great Grey Shrike *L. excubitor* though the case for two taxa paraphyly itself seems far from clear.

Indeed, one can see that in all trees, both mitochondrial and nuclear, the subspecies of Southern Grey and Great Grey Shrikes are intermixed with each other and the American Loggerhead Shrike *L. ludovicianus*. On the tree based on the nuclear introns *odc*

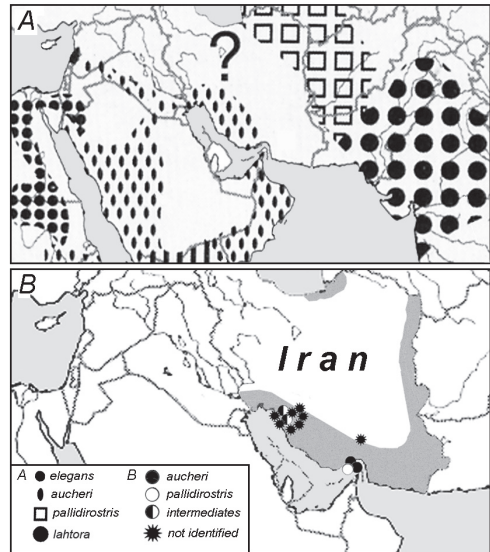


Figure 2. Distribution of the Southern Grey Shrike *Lanius meridionalis* in the Middle East and western Asia. A—from Lefranc and Worfolk 1997; B—from Mansoori 2001 and Dubois 2000. In B—shaded area depicts range of 'residents' (Mansoori 2001).

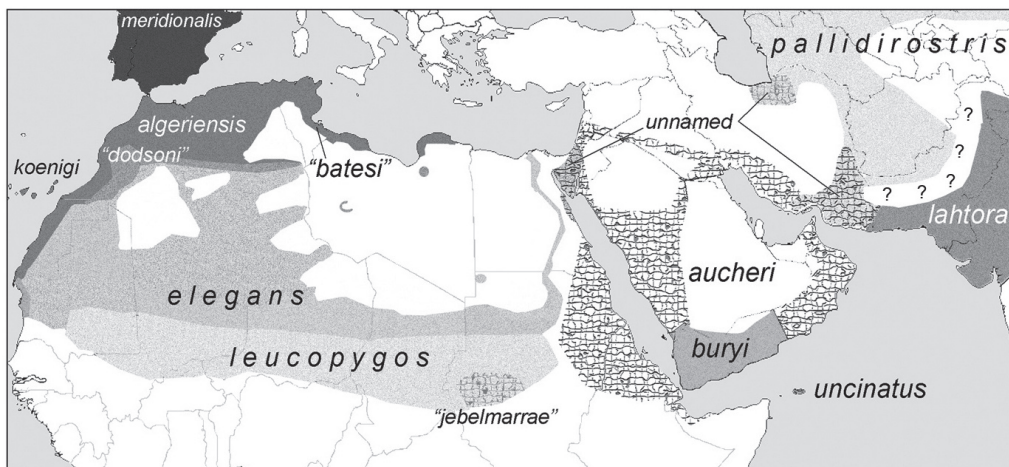


Figure 3. Clinal geographical variation in the range of the Southern Grey Shrike *Lanius meridionalis*. Intermediate (hybrid) populations at boundaries of subspecies' ranges are denoted by names in quotation marks or are labelled 'unnamed' (after Panov 2010).

¹ Gonzalez *et al* (2008): ms received 6 June 2007, published online 8 March 2008; Klassert *et al* (2008): ms received 28 February 2007, available online 16 March 2008.

and *myo*, *L. m. meridionalis* forms a group with the nominate race of the Great Grey Shrike *L. e. excubitor*, though the bootstrap support for this grouping is, in fact, very low. At the same time, other forms with a vulnerable molecular phylogenetic position, such as *L. e. invictus*, *L. m. algeriensis* and *L. ludovicianus*, were not examined by nuclear markers and are absent from the tree. As for the clustering of *L. m. meridionalis* with the American race of the Great Grey Shrike *L. e. invictus*, this is, for the time being, also a result of mitochondrial studies only (Gonzalez *et al* 2008, Klassert *et al* 2008).

On the mitochondrial trees (Gonzalez *et al* 2008, Klassert *et al* 2008), *L. m. algeriensis* and *L. m. koenigi* form a single group with a very low level of molecular differentiation, which is in good agreement with the geographical proximity of their ranges. The association of the clade *L. m. algeriensis* + *L. m. koenigi* with *L. e. excubitor* from Poland, on the other hand, is obscure, taking into account the obvious spatial distance between both. In any case, the distribution of the taxa studied in the trees discussed clearly contradicts zoogeographical considerations of these taxa, including the firmly established fact that the Great Grey and Southern Grey Shrikes are independent species and completely isolated reproductively in the zones of contact and overlap of their ranges (*eg* Panov 1995, 2010, Lefranc 1999).

An apparent discordance between the biological species boundary of the Great Grey and Southern Grey Shrikes and the mtDNA genotype might be attributed to ancient introgressive hybridization preventing molecular divergence. The invasion of 'foreign' mtDNA genotypes through hybridization is well known in animals and birds in particular (*eg* Irwin *et al* 2009). However, the potential probability of this phenomenon was not taken into account by the authors of the papers analysed.

To sum up, the limited number of reconcilable DNA results and the lack of concordance with biological species boundaries is easily explained by the limitation of geographical samples and restricted local samples (down to just 1 specimen), which may have resulted in a strong bias of the phylogenetic signal when studying widely distributed and seasonally migrating taxa.

The recent molecular study by Olsson and co-workers (2010) dealt with the same genetic loci as Gonzalez *et al* (2008) and Klassert *et al* (2008). This paper differs in a positive way from those discussed above. Firstly, a wider range of taxa and populations was studied, and almost all specimens examined were collected at or near their breeding places. A large number of museum specimens was used, which gives confidence in the correctness of their specific and subspecific identifications. Secondly, the possibility is admitted that ancient hybridization may have influenced the molecular divergence revealed. And, finally, there is some important discussion concerning the question of correctness and objectivity of results.

In particular, Olsson *et al* (2010) emphasize the danger of relying on a single molecular marker, such as mtDNA, in taxonomic revisions though they contradicted this philosophy in the abstract to the paper by concluding that: "... the *Lanius excubitor* complex may be divided into at least six species, *L. borealis*, *L. elegans*, *L. excubitor*, *L. lahtora*, *L. meridionalis*, and *L. uncinatus*" ie the Southern Grey Shrike discussed here is proposed as comprising four independent species—*L. meridionalis*, *L. elegans*, *L. uncinatus* and *L. lahtora* (= *lahtora*+*pallidirostris*). It should be mentioned, however, that the authors ended their suggestion in the abstract by saying that 'other taxonomic treatments are also possible'.

FURTHER OBJECTIONS TO THE ARGUMENTATION PRESENTED IN MOLECULAR STUDIES

To return to the question of the possibility of assigning the rank of full species to some subspecies of Southern Grey Shrike (and the race *pallidirostris* in particular), there are further contradictions. Based on mtDNA tandem repeats, Hernández *et al* (2004) recognized

a pair of southern European and African subspecies (*L. m. meridionalis* + *L. m. koenigi*) and a pair of Asian subspecies (*L. m. pallidirostris* + *L. m. aucheri*). Later, however, Gonzalez *et al* (2008) were unable to confirm the inference about the closeness of *L. m. meridionalis* and *L. m. koenigi*. They found instead that these forms 'differed significantly'. At the same time, Gonzalez and co-authors did not find evidence to distinguish the Canarian subspecies, *L. m. koenigi*, from *L. m. algeriensis* on the African mainland (Tunisia). It was suggested that these races together correspond to a separate species, other than *L. meridionalis sensu stricto* from the mainland. Klassert *et al* (2008) suggested that *L. m. meridionalis* should be elevated to species status, while *L. m. koenigi*, *L. m. algeriensis*, *L. m. aucheri* and *L. m. pallidirostris* 'should be reviewed and assigned to different species'.

This latter suggestion appears ambiguous. Should all these forms be assigned to any one species, or is the idea to distinguish several species (two to four)? From what is known by ornithologists to date about interrelations of the forms *L. m. algeriensis*, *L. m. aucheri* and *L. m. pallidirostris*, it can be inferred that all of them are interconnected through a chain of intermediate (hybrid) populations (Meinertzhagen 1954, Vaurie 1955, 1959, Roselaar in Cramp & Perrins 1993, Shirihi 1996, Figure 3). In other words, geographical variation in the section of the Southern Grey Shrike's range covering North Africa, the Middle East and part of Central Asia is strongly clinal. Bearing this in mind, any attempt to divide this apparently genetically unified whole into two or more species seems to make no zoological sense.

Moreover, we do not believe that the category 'species' is so simple that it may be based only on mitochondrial genetic distances. Especially in so far as there is no rational and careful taxonomic synthesis on this topic for birds, unlike that already implemented by a number of studies for mammals (eg Bradley & Baker 2001, Baker & Bradley 2006). Caution in proposing new species of shrikes based on *cytb* genetic distances is especially relevant because of limited information on nuclear sequences for some crucial forms in the present studies.

The same important idea is clearly expressed (though see above) by Olsson *et al* (2010). They highlight the possible danger of relying on a single molecular marker, eg mtDNA, in taxonomic revisions and phylogenetic inference, as the following quotation explains: "Since the mitochondrial gene tree deviates substantially from the (non-cladistic) interpretation of relationships based on morphological and ecological characteristics, and there are indications that the gene tree might not fully conform with the organismal phylogeny, any proposed taxonomy is uncertain".

Besides, taking into account the complexity of subspecific identification and a limited range of samples from different geographical areas, one must be careful about accuracy in any general conclusions. For unbiased comments about the relationships between shrikes of the *L. excubitor/L. meridionalis* species group one needs an extensive sample of their geographical races². In other words, treating *L. m. pallidirostris* as a separate species (*L. pallidirostris*) on the basis of the molecular studies published so far cannot be justified.

NOMENCLATURAL ASPECTS

The history of distinguishing Southern Grey Shrike as an independent species is portrayed by Klassert *et al* (2008) as follows: "... *Lanius meridionalis* has been proposed and accepted at international level as a separate species (British Ornithologists' Union,

²As Gonzalez and co-authors (2008) wrote "... only one sample of *L. m. algeriensis* was available and, due to shortage of DNA, we could only sequence the cytochrome *b* gene. Consequently, in order to validate these results, further sampling will be necessary especially in North African populations. The systematic relationships of other African populations that possibly are closely related, for instance, *L. m. elegans* and *L. m. leucopygos*, remain unknown, and they may represent key taxa [the italics are ours] in this issue".

1997)". What needs to be made clear is that statements and decisions in the BOU Records Committee Report (July 1996) referred to here (British Ornithologists' Union 1997) were based on a review of the relevant recent literature, including the first (Isenmann & Bouchet 1993, Panov 1993, 1995) to propose that "the *excubitor* and *meridionalis* groups of races are better treated as separate species". It should be noted that in the two 1993 papers cited, the Southern Grey Shrike was erroneously named *Lanius elegans* (after the North African race *elegans*). However, as P Isenmann informed ENP later, the correct name of the taxon is *meridionalis*, since Swainson proposed the name *elegans* in 1831, ie 11 years after Temminck's work (1820, in which a subspecies *meridionalis* had been described as the first representative of this species).

And then, Klassert and co-workers wrote: "Furthermore, Harris and Franklin (2000)³ and Hernández *et al* (2004) have suggested the existence of three species (*L. excubitor*, *L. meridionalis* and *L. pallidirostris*)". We have shown above that the evidence put forward by Hernández *et al* in favour of *L. pallidirostris* as an independent species simply lacks weight.

Even if one accepts these proposals, a new eastern polytypic species ('Steppe Grey Shrike')⁴ cannot be named *pallidirostris*, as the order in which the subspecies were described is as follows: *uncinatus* 1881, *leucopygos* 1828, *elegans* 1831, *lahtora* 1832, *algeriensis* 1839, *pallidirostris* 1852, *aucheri* 1853, *buryi* 1901. So, even from this point of view, the name *L. pallidirostris* is invalid. Olsson *et al* (2010) introduced a necessary correction in their paper. They assigned to the pair of forms *meridionalis* and *lahtora*, similar in respect of cytochrome *b*, a second name *lahtora*, which corresponds to the rule of taxonomic priority and so makes use of the name *Lanius pallidirostris* ('Steppe Grey Shrike'), as often encountered now in publications on the Internet, inappropriate.

And, finally, turning to the vernacular name 'Steppe Grey Shrike' of *L. (m.) pallidirostris*. Although not all those who use 'Steppe Grey Shrike' also treat it as an independent species, this nevertheless leads to still more confusion. As said above, the name, now widely used in many publications (in particular, on the Internet), is misleading since there may be confusion with *L. excubitor homeyeri*, called Steppe Grey Shrike by Dement'ev & Gladkov (1968: 38). In the latter book (p45), the common name for *L. meridionalis* [then *excubitor*] *pallidirostris* is Desert Grey Shrike (*Lanius pallidirostris* Cassin, 1852, originally described from wintering individuals in northeast Africa). In reality, *pallidirostris* is rather a desert than a steppe bird (eg Panov 2010).

We should like to touch on two points in conclusion. First, if each population or a local cluster of them is considered as a species because of its differences from other large local populations (as in the paper by Olsson *et al* 2010), the main pragmatic aspect of classification of the lower-level taxa (in particular, an idea of their hierarchical arrangement) will be lost. And, secondly, it is unfortunate that changes tend to be proposed not by local researchers carrying out thorough studies on a given taxon, but by people who are prepared to make judgements 'from a distance'. There is evidence of this in the case under discussion; for a similar example in shrike systematics see Panov (2009).

ACKNOWLEDGEMENTS

We greatly appreciate the help given by Mike Wilson, who kindly edited an early draft of this paper and improved our English. We also wish to thank the two anonymous reviewers of the ms.

³As M Wilson kindly informed us, Harris and Franklin (2000) stated only: "... the race *pallidirostris*, or 'Steppe Grey Shrike', deserves greater attention ..." because of differences in its vocal/behavioural repertoire.

⁴Although the BOU in 1997 used the name 'Steppe Shrike', most other authors, including more recently, appear to favour 'Steppe Grey Shrike'.

REFERENCES

- Baker, RJ & RD Bradley. 2006. Speciation in mammals and the Genetic Species Concept. *Journal of Mammalogy* 87: 643–662.
- Bradley, RD & RJ Baker. 2001. A test of the Genetic Species Concept: cytochrome-*b* sequences and mammals. *Journal of Mammalogy* 82: 960–973.
- British Ornithologists' Union. 1997. Records Committee: Twenty-third Report (July 1996). *Ibis* 139: 197–201.
- Cramp, S & CM Perrins (eds). 1993. *Handbook of the Birds of Europe, the Middle East and North Africa (The Birds of the Western Palearctic)*. Vol 7. Oxford University Press, UK, pp433–552.
- Dement'ev GP & NA Gladkov. 1968. *Birds of the Soviet Union*. Vol 6. Israel Program for Scientific Translations, Jerusalem. [English translation of the 1954 Russian original: *Ptitsy Sovetskogo Soyuz*. Sovetskaya Nauka, Moscow.]
- Dubois, PJ. 2000. Trip Report: Iran, February 20—March 7. www.osme.org/osmetrip/iran2.html
- Gonzalez, J, M Wink, E Garcia-del-Rey & G Delgado Castro. 2008. Evidence from DNA nucleotide sequences and ISSR profiles indicates paraphyly in subspecies of the Southern Grey Shrike (*Lanius meridionalis*). *Journal of Ornithology* 149: 495–506.
- Harris, T & K Franklin. 2000. *Shrikes and bush-shrikes*. Christopher Helm, London.
- Hernández, MA, F Campos, F Gutiérrez-Corcherro & A Amezcua. 2004. Identification of *Lanius* species and subspecies using tandem repeats in the mitochondrial DNA control region. *Ibis* 146: 227–230.
- Irwin, DE, AS Rubtsov & EN Panov. 2009. Mitochondrial introgression and replacement between yellowhammers (*Emberiza citrinella*) and pine buntings (*Emberiza leucocephalos*) (Aves: Passeriformes). *Biological Journal of the Linnean Society* 98: 422–438.
- Isenmann, P & M-A Bouchet. 1993. L'aire de distribution française et le statut taxinomique de la pie-grièche grise méridionale *Lanius elegans meridionalis*. *Alauda* 61: 223–227.
- King, BF. 1997. *Checklist of the Birds of Eurasia*. Ibis Publishing, Vista, California.
- Klassert, TE, MÁ Hernández, F Campos, O Infante, T Almeida, NM Suárez, J Pestano & M Hernández. 2008. Mitochondrial DNA points to *Lanius meridionalis* as a polyphyletic species. *Molecular Phylogenetics and Evolution* 47: 1227–1231.
- Lefranc, N. 1999. Les pies-grièches *Lanius* sp. en France: répartition et status actuels, histoire récente, habitats. *Ornithos* 6(2): 58–82.
- Lefranc, N & T Worfolk. 1997. *Shrikes: a guide to the shrikes of the world*. Pica Press, Sussex, UK.
- Mansoori, J. 2001. *A Field Guide to the Birds of Iran*. Nashr Zehn Aviz, Tehran. [In Persian]
- Meinertzhagen, R. 1954. *Birds of Arabia*. Oliver & Boyd, London.
- Olsson, U, P Alström, L Svensson, A Mansour & P Sundberg. 2010. The *Lanius excubitor* (Aves, Passeriformes) conundrum—taxonomic dilemma when molecular and non-molecular data tell different stories. *Molecular Phylogenetics and Evolution* 55: 347–357.
- Panov, EN. 1993. Superspecies of shrikes of the former USSR. International Shrike Symposium. Archbold Field Station, Lake Placid, Florida. Program and Abstracts: 12.
- Panov, EN. 1995. Superspecies of shrikes of the former USSR. In: Yosef, R & FE Lohrer (eds). Shrikes (Laniidae) of the World: Biology and Conservation. *Proc. Western Foundation Vert. Zool.* 6(1): 26–33.
- Panov, EN. 2009. On the nomenclature of the so-called Isabelline Shrike. *Sandgrouse* 31: 163–170.
- Panov, EN. 2010. True Shrikes (Laniidae) of the World. Ecology, Behavior, Evolution. Pensoft, Sofia-Moscow. In press.
- Shirihai, H. 1996. *The birds of Israel*. Academic Press, London.
- Temminck, CJ. 1820. *Manuel d'Ornithologie*. Ed 2(1): 143.
- Vaurie, C. 1955. Systematic notes on Palearctic Birds. 17 Laniidae. *American Museum Novitates* 1752: 1–19.
- Vaurie, C. 1959. *The birds of the Palearctic fauna. Passeriformes*. HF & G Witherby, London.
- Yosef, R. 2008. Family Laniidae. In: del Hoyo, J, A Elliott & DA Christie (eds). *Handbook of the Birds of the World*. Vol 13. Penduline Tits to Shrikes. Lynx Edicions, Barcelona, pp732–796.

Evgeniy N Panov, Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences. panoven@mail.ru
 Anna A Bannikova, Department of Vertebrate Zoology, Moscow University. hylomys@mail.ru