

## Water Pipits: three species rather than one?

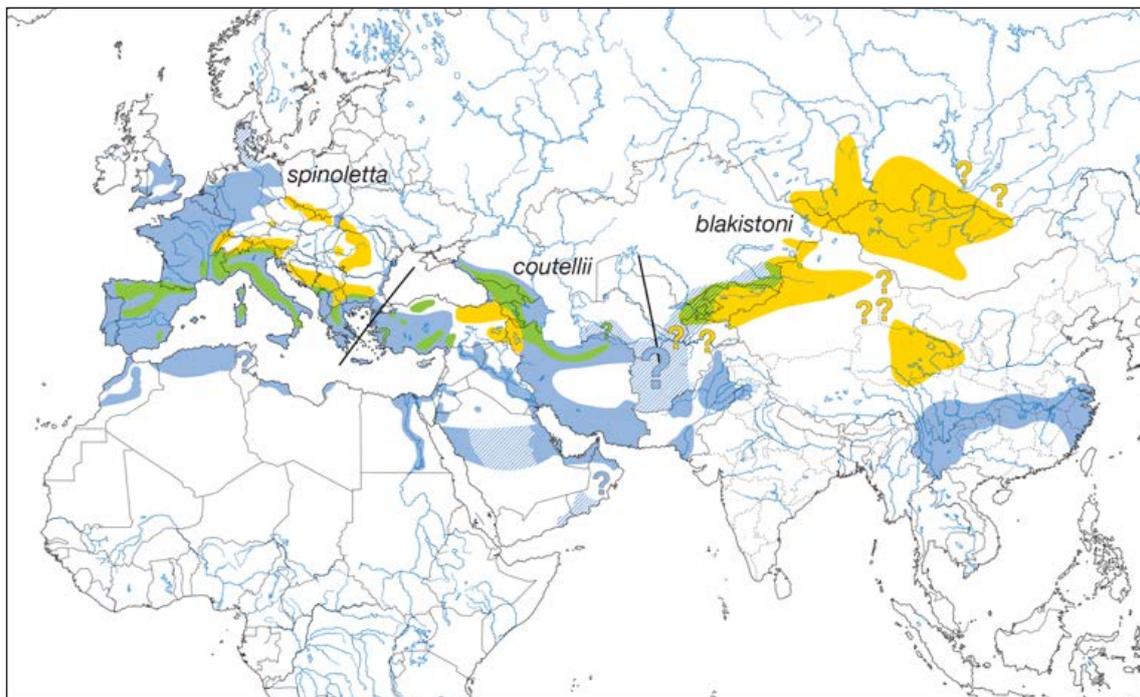
**Abstract** Based on a distinctive call, differences in plumage and a preliminary genetic analysis, the ‘Caucasian Water Pipit’ *Anthus spinoletta coutellii* may represent a separate species within the Rock *A. petrosus*/Water Pipit *A. spinoletta* complex. The differences between the taxa currently treated as three races of a single species, the Water Pipit *A. spinoletta*, are described in this short paper.

The Water Pipit *Anthus spinoletta* is a widespread breeder in the Palearctic, with three currently recognised subspecies: nominate *spinoletta* inhabits the mountains of most of southern and central Europe; *A. s. coutellii* breeds from the Bosphorus eastwards to Iran; and *A. s. blakistoni* breeds in central Asia, from Kazakhstan, into Russia, possibly Afghanistan (unclear), China and Mongolia (Alström & Mild 2003; del Hoyo *et al.* 2004; Gill & Donsker 2014; fig. 1). The ‘Caucasian Water Pipit’ *A. s. coutellii* is certainly a taxon that deserves further study. While the plumage differences, compared with nominate birds, have been well covered in key references such as Alström & Mild (2003) and van Duivendijk (2011), the distinctive call of *coutellii* has until recently been poorly described and the genetic status of this taxon has not been investigated.

### Plumage

Compared with nominate *spinoletta*, *coutellii* is more obviously streaked above in all plumages. In summer plumage, *coutellii* shows more extensive, rich apricot colouring on the underparts than nominate *spinoletta*, with little or no streaking. In winter plumage, *coutellii* tends to show more contrast between the greyer head/nape and the light brown upperparts than *spinoletta* (which has generally more uniform, darker brown upperparts, with just a hint of grey to the nape), plus a paler rump patch, and lesser coverts which are contrastingly greyish. The pale supercilium tends to extend further behind the eye, while the underparts show sparser and finer streaking, and sometimes a yellow or apricot/buffish wash. On average the lores are somewhat paler (at least distally).

The eastern taxon *blakistoni* generally shows the palest plumage and least colour in



**Fig. 1.** The distribution of the three taxa currently treated as the Water Pipit *Anthus spinoletta*; reproduced from Alström & Mild (2003), with kind permission of the publisher, Christopher Helm/Bloomsbury.

the underparts of these three taxa. It also shows a more obvious complete (or almost complete) pale eye-ring and broader supercilium, which exaggerates very plain lores and is reminiscent of Buff-bellied Pipit *A. rubescens* in this respect.

The second outermost tail feather (T5) in *coutellii* has a shorter pale wedge at the tip than *spinoletta* and the pale wedges on the outer tail feathers are closer to pale grey than white in *coutellii*. T5 is more extensively pale and whiter in *blakistoni* (Alström & Mild 2003; pers. obs.).

### Calls

MG had previously noted that, compared with nominate *spinoletta* and Rock Pipits *A. petrosus*, the typical flight call of *coutellii* can sound quite different. It has a clearly more rasping or buzzing quality and it seems a shorter call. Sonograms show that the kink (or 'dog-leg') in the (more gently) ascending pitch at the start of a *spinoletta* call is missing or weak, and the call ends as sharply as it begins. Sonograms also show 2–3 deep modulations to the flight call, giving it a characteristic 'M'-shape, which is consistent with the perceived raspiness in the field and a sharp beginning and ending. While there is some variation in the calls, two recent studies of the calls of *coutellii* have confirmed this analysis (Honold & Martin 2013; Fijen 2014). With practice, calls heard in the field can sound



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21. 'Caucasian Water Pipit' *Anthus spinoletta coutellii*, Negev, Israel, November 2012, showing contrast between greyish head and well-streaked brownish mantle.

more distinctive than implied by the existing literature.

We have not had the opportunity to study the calls of *blakistoni* in the field. Recordings suggest that the typical flight call of *blakistoni* is different again, with a simpler sonogram shape, and fewer modulations than *coutellii*, the product of a sweeter, more Meadow Pipit *A. pratensis*-like call. While more research is needed, the flight calls of both subspecies of Buff-bellied Pipits are typically distinctive, with that of nominate *rubescens* resembling a



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22. 'Caucasian Water Pipit' *Anthus spinoletta coutellii*, Eilat, Israel, March 2012. This individual is moulting into summer plumage with extensive peachy tones to the underparts; later in the spring, the streaking will become even more reduced.

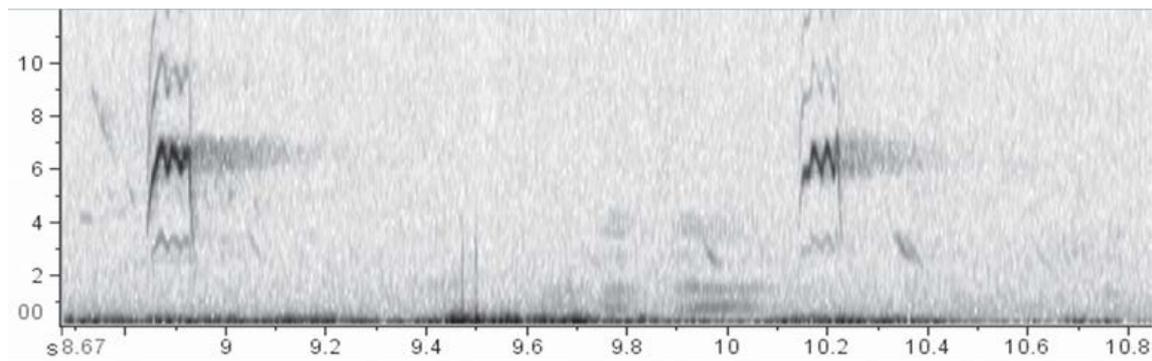
## Short papers

cross between Meadow Pipit and Grey Wagtail *Motacilla cinerea*, and *A. r. japonicus* sounding closer to Meadow Pipit. The differences in call, plumage and DNA suggest that a taxonomic review of the two Buff-bellied Pipit taxa may also be fruitful.

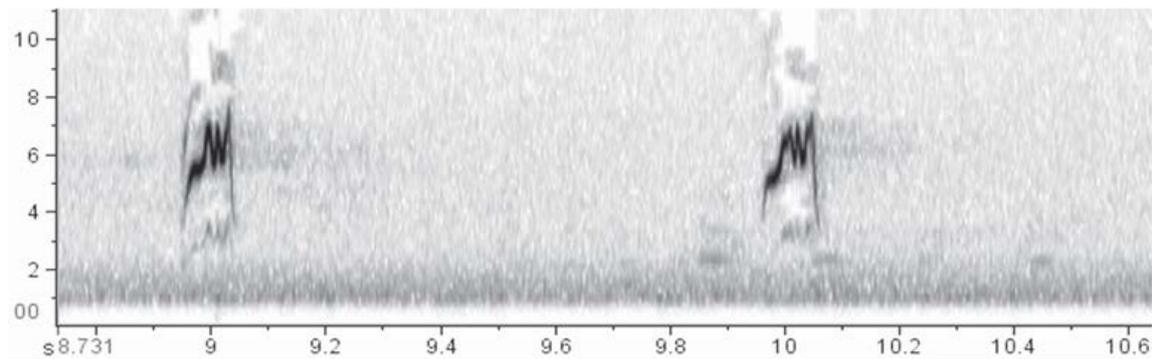
### Genetics

In order to investigate the genetic status of

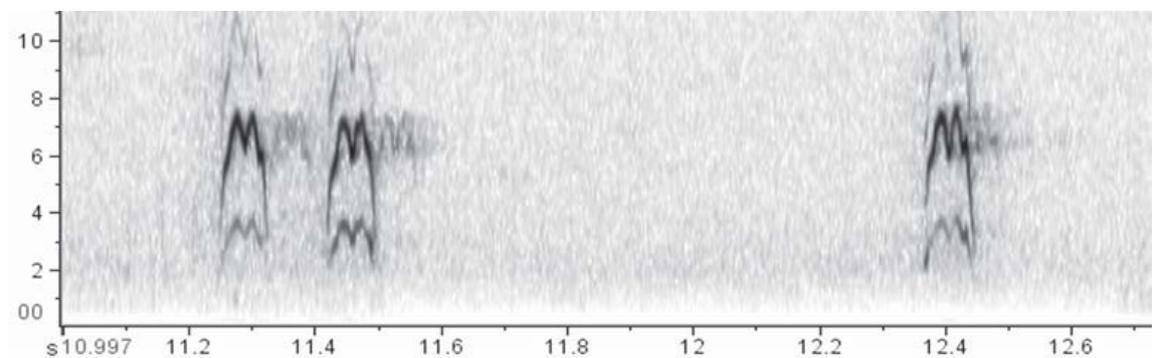
*coutellii*, body feathers that came loose from three birds during routine ringing sessions in northern Israel in mid November 2013 were collected by YP and YK (one of these birds is shown in plate 27). DNA was extracted from these feathers and mitochondrial genes were amplified and sequenced. This represents the first published genetic analysis of this taxon. A preliminary analysis of 1001 bp of



**Fig. 2.** Sonogram of 'Caucasian Water Pipit' *Anthus spinoletta coutellii*, Mount Hermon, Israel, November 2013, from a recording made by MG. Note: two or more well-spaced modulations, indicative of a rasping call, with a well-defined beginning and ending.



**Fig. 3.** Sonogram of Water Pipit *Anthus s. spinoletta*, Hulkesteijnse Bos, Zeewolde, the Netherlands, December 2008, from a recording made by Ruud van Beusekom. The 'dog-leg' shape at the beginning of the sonogram is characteristic of the ascending pitch at the beginning of a *spinoletta* call, while (compared with *coutellii*) the modulations are closer together, and the call sounds correspondingly less harsh.



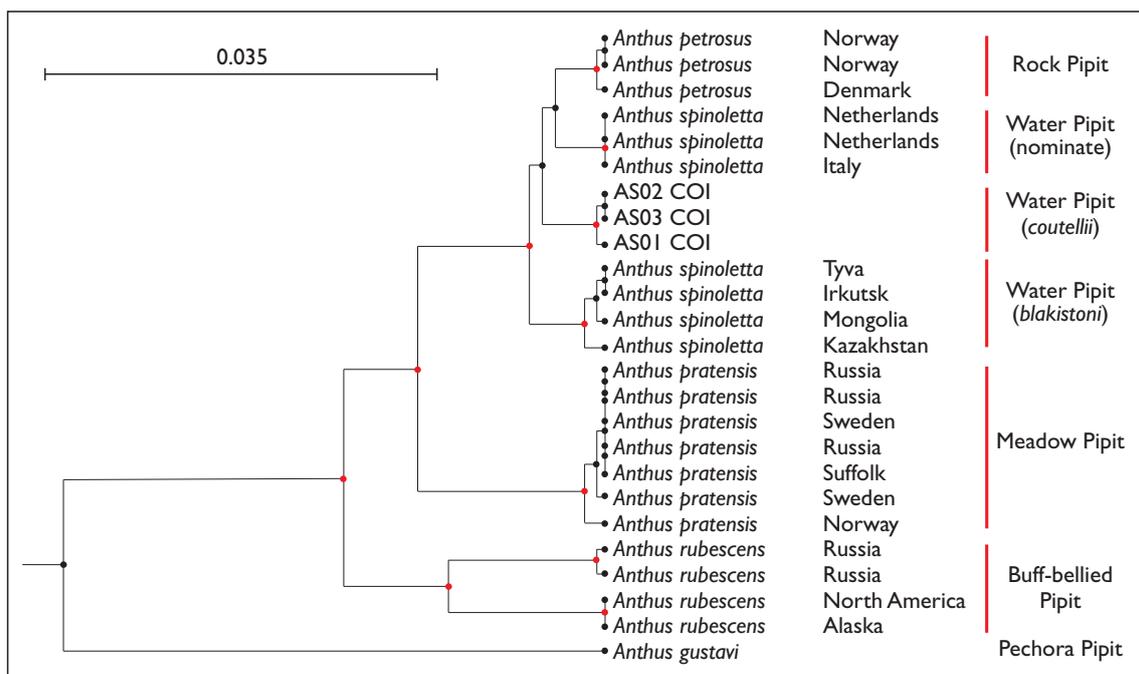
**Fig. 4.** Sonogram of Water Pipit *Anthus s. blakistoni*, Ili-Alatau National Park, Almaty province, Kazakhstan, May 2014, from a recording made by Arend Wassink. One obvious modulation to each call, no 'dog-leg' at the start (i.e. no kink in the steeper ascending pitch at the beginning), representing the 'sweetest', most Meadow Pipit-like sound of the three taxa.

*cytochrome-b* sequence from the first bird (AS01) (sequence uploaded to the European Nucleotide Archive with Accession number LN650643) showed a very significant 5% level of genetic difference both from an individual of nominate *spinoletta* sampled in the Swiss Alps by Arctander *et al.* (1996) and from a Rock Pipit sampled in Denmark for the same study. The 5% genetic divergence is much greater than that commonly found between subspecies of Palearctic species. However, very little comparable genetic material was available and, in particular, no Water Pipits of the eastern taxon *blakistoni* have been sequenced for *cytb*.

To expand the analysis the mitochondrial gene encoding cytochrome-c oxidase subunit 1 (COI) was sequenced for all three *coutellii* and compared with that of nominate *spinoletta* (from Denmark, the Netherlands and

Italy), *blakistoni* from Kazakhstan, Russia (Tyva and Irkutsk) and Mongolia, and *littoralis* Rock Pipits from Scandinavia. Buff-bellied Pipits from North America and Russia were added to the analysis, as were Meadow Pipits from the UK to the eastern edge of the species' range in Russia (Tyumenska Oblast). This analysis confirmed and extended the *cytb* conclusions. Two of the *coutellii* have identical COI sequences and the other was 1 bp different, and together they formed a discrete clade separate from all other taxa. The degree of genetic divergence between *coutellii* and other Water Pipits was similar to that between *blakistoni* and nominate *spinoletta*, and greater than that between nominate *spinoletta* and Rock Pipit (fig. 5).

Several interesting results became apparent after the genetic analysis. Buff-bellied Pipits from North America (*A. r.*



**Fig. 5.** Relationships of taxa within the Rock *Anthus petrosus*/Water *A. spinoletta*/Buff-bellied Pipit *A. rubescens* complex. A preliminary phylogenetic tree based on 597 bp of COI gene sequence obtained for all taxa. Important branch points, which have extremely strong bootstrap statistical support (90–100%), are highlighted in red. The tree suggests that nominate *spinoletta* Water Pipits are most closely related to Rock Pipits (all examples here are *littoralis*), and that the three *coutellii* Water Pipits from Mount Hermon (AS01–03) form a tight genetic grouping roughly equidistant from the nominate Water Pipit/Rock Pipit grouping and the *blakistoni* Water Pipit grouping. There is a deep genetic split in Buff-bellied Pipit correlating with the Old vs New World subspecies, potentially indicating another future split. DNA sequence Accession Numbers: *A. s. coutellii* (AS01, AS02, AS03) respectively) = LN650645, LN650646 and LN650647; *A. petrosus* = GU571252, GU571253, FJ465301; *A. s. spinoletta* = KF946592, KF946593, FJ465306; *A. s. blakistoni* = GQ481363, GQ481364, GQ481365, GQ481366; Meadow Pipit *A. pratensis* = GQ481350, GQ481351, GQ481352, GU571731, GU571732, GU571734, JN801265; *A. rubescens* = GQ481357, GQ481362, DQ432731, AY666215; Pechora Pipit *A. gustavi* = KC354895. A fully annotated tree showing bootstrap support values for each node will be available on the BB website ([www.britishbirds.co.uk/birding-resources/key-refs/](http://www.britishbirds.co.uk/birding-resources/key-refs/)).

Andy Hood



23. Water Pipit *Anthus s. spinoletta*, Flamborough, Yorkshire, November 2014. A typical brown-and-white winter-plumaged Water Pipit with weakly streaked upperparts.

*rubescens*) and Russia (*A. r. japonicus*) are highly distinct genetically, but are nevertheless sister taxa. However, the Buff-bellied Pipits are apparently not as closely related to Rock and Water Pipits as the Meadow Pipit is

– this is a counterintuitive result that deserves further study. It is very strongly supported by the current COI data but more sequence and a more sophisticated analysis would be needed before further conclusions could be

George Reszeter/www.birdsofeurope.co.uk



24. Water Pipit *Anthus s. spinoletta*, Pyrenees, Spain, April 2004. Note pinkish tones across the underparts, less extensive than in *coutellii*, and very little streaking on the upperparts.

drawn. In stark contrast to Buff-bellied and Water/Rock Pipits, Meadow Pipits are genetically very similar across their range. There is very strong support in the *COI* tree to show that Water Pipit as currently defined is paraphyletic, because the Water Pipit clade includes Rock Pipit. The exact relationship of the *blakistoni*, *coutellii* and nominate *spinoletta/petrosus* clades to each other is not well resolved at present, but the apparent paraphyly of the grouping suggests that splits are necessary, and the more or less equidistant genetic distinctiveness of the three Water Pipit taxa from each other suggests that species status may be merited not only for *coutellii* but also for *blakistoni*.

### Conclusion

We consider that there is a combination of plumage, vocal and genetic evidence to suggest that 'Caucasian Water Pipit' may represent a separate species within the Rock/Water Pipit complex. Further sampling of all taxa and an analysis of nuclear genes is required, but a three-way split of Water Pipit may have to be considered. As recently as 1986, Buff-bellied, Water and Rock Pipits were all included in a single species, but were split on the basis of their well-characterised differences in plumage, vocalisations, biometrics and breeding ecology (Knox 1988).



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**25.** Water Pipit *Anthus spinoletta blakistoni*, Beijing, China, February 2012. The palest of the three Water Pipit taxa, with a particularly broad supercilium, plain lores (giving a characteristically open-faced appearance), and with the most limited underpart streaking in winter plumage.

The data presented here suggest that there may be more work to do, and that the book has not yet closed on the taxonomy of this group.

### Acknowledgments

We thank Dan Alon and Jonathan Meyrav for their contributions to the work summarised here, and Sander Bot, Thijs Fijen and George Sangster for comments on a draft of the manuscript. MG has studied Water Pipits during three visits to Israel, in both spring and autumn, in collaboration with the Society



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**26.** Water Pipit *Anthus spinoletta blakistoni*, Beijing, China, April 2012. The grey head contrasts with browner upperparts, as in *coutellii*, although *blakistoni* has the least amount of pinkish colouring to the underparts in spring of the three taxa discussed here.

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**27.** 'Caucasian Water Pipit' *Anthus spinoletta coutellii*, Mount Hermon, Israel, November 2013. DNA from this individual contributed to the genetic basis of the work reported here. Visible here are colder, greyer-toned lesser coverts, contrasting with well-streaked brown mantle and scapulars. Also visible is the pale rump patch.

for Protection of Nature in Israel (SPNI). For assistance with sound recordings thanks to Ruud van Beusekom, Thijs Fijen, Paul Marvin, Matt Slaymaker and Arend Wassink. Sonograms were derived using Raven Pro software (Cornell University); sequence analysis was performed using CLC sequence viewer ([www.clcbio.com](http://www.clcbio.com)).

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