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Editor-in-chief Annika Forsten
annika.forsten@elisanet.fi
Editor Antero Lindholm
antero.lindholm@elisanet.fi
Editor Roderick Dixon
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Occurrence of the alternative call of Common Chiffchaff in Finland and Estonia

ANTERO LINDHOLM

Chiffchaff calls

The normal call of Common Chiffchaff *Phylloscopus collybita* is well-known to birdwatchers in Europe. It is similar in the nominate subspecies of Western Europe and *abietinus* which breeds in Northern and Eastern Europe (Cramp 1992). However, in the earlier literature the call was stated to be somewhat different between the subspecies with *abietinus* having a call resembling the modern concept of the *tristis* call (Ticehurst 1938), or only eastern *abietinus* having this *tristis* –like call, with western *abietinus* sounding like the nominate (Dean 1985). Later still, Clement *et al* (1998) describe the calls of eastern *abietinus* as somewhat different to those of nominate *collybita* and western *abietinus* by having the tonal quality of *tristis*: high-pitched and shrill and often slightly discordant 'peep', 'weep', 'pseet' or 'cheet'. Their sound spectrogram of an *abietinus* call, recorded in Moscow, shows a call very like a normal *collybita* call. I am not sure if the variation they report in *abietinus* calls is really geographical – in any case I would not go as far as Jännes (2002) and equate their description of eastern *abietinus* to the 'sweeoo' call described and discussed below in this article. The most distinct change in the calls occurs in the same area where the song changes – in the contact zone of *tristis* and *abietinus* just west of the Urals. In addition to calls, *collybita* and *abietinus* also have very similar songs. The call and song are different in the taxon *tristis* (normally treated as a subspecies) of the Ural Mountains and eastward and in *ibericus* of the Iberian Peninsula, which is nowadays normally treated as a different species, Iberian Chiffchaff. The vocalisations of *tristis* and *ibericus* will not be discussed any further here.

The normal call of Chiffchaff is used both as a contact call between different individuals and as an alarm call (Cramp 1992). Typically it is used in contact between the individuals of loose autumn groups. It is also used as a distress call when birds are in the hand – this is different from most bird species, which normally do not use similar calls in the hand to those used in "normal" contact situations (pers. obs.). There is much variation in this call, which may be dependent on the context in which the call is used, but this is far from clear.

In some years, especially in autumn, there has been widespread occurrence in Western and Northern Europe of Chiffchaffs with a different call, unlike the normal call of Common Chiffchaff, but also unlike normal calls of any other known Chiffchaff taxon. Those calls have generated much discussion and speculation and also some confusion. In English, this call is referred to as the 'sweeoo' – call, and this name has been used here (also spelled 'wheeoo' in some sources, and other variations have also been used).

I consider the 'sweeoo' call to be a call with at least two parts: first ascending and then descending so that the descending part reaches lower, or at least almost as low, as the start of the ascending part (*cf* the definition of call types further in this text). The published descriptions of calls are often unclear. Figure XII of Cramp (1992) resembles an "imperfect" type of 'sweeoo' call as referred to here, but otherwise Cramp (1992) or Glutz & Bauer (1991) do not include sound spectrograms of 'sweeoo' calls. It seems both handbooks briefly refer to this call: in Glutz as a kind of juvenile call, in Cramp not explicitly as such. Bergmann *et al* (2008) describe an impure 'sfie' or 'psi' from autumn as well as spring, and based on the

spectrogram this is a kind of 'sweeoo' call, and is not attributed specifically to young birds by them. Dean (1985) mentions that "a shrill sweeoo is also recorded for autumn Chiffchaffs", referring to this call. Constantine *et al* (2006) clearly regard 'sweeoo' as a juvenile call. Dean & Svensson (2005) describe a shriller and clipped 'sweeu' that is uttered by *collybita*, particularly, if not exclusively, by first-autumn birds – this seems to be a description of 'sweeoo' calls as understood here. However, also a possibly different call, somewhat resembling the normal call of *tristis* or the distress call of a chicken, is described as the call of nominate and *abietinus* Chiffchaffs juveniles (Glutz & Bauer 1991, Svensson *et al* 2009). These two descriptions are often not clearly separated, and seem to be two extreme variations of basically the same call (this seems evident from Glutz & Bauer 1991).

Chiffchaffs in Southern Finland and Estonia

Chiffchaff is a common breeder in both Finland and Estonia. On the south coast of Finland it is a somewhat scarce breeding bird and mostly confined to dense forests with a component of spruce. It occurs in the suburban forests of the Helsinki area, but is uncommon, and now and then also breeds in deciduous forests with very little spruce (Solonen *et al* 2010, pers. obs.). During the spring migration, mostly in early May, Chiffchaffs often fly over the coast without stopping and are mostly seen on smaller islands close to the coast, less on the mainland, and in late summer they tend to disappear in the forests and, therefore, they are not observed that often. During autumn migration, especially mid-September to early October, they occur commonly in many bushy areas, reed beds and urban parks of Helsinki and are, therefore, easiest to study at that time (Solonen *et al* 2010, pers. obs.).

In Northern Estonia, less than 100 km to the south, on the other side of the Gulf of Finland, Chiffchaff is much more common as a breeding bird – one of the commonest breeding passerines in forested areas (the sixth most numerous bird species countrywide, Elts *et al* 2009). That makes them easier to find and study throughout the summer.

The subspecies involved both in Estonia and Finland is *abietinus* (*e.g.* Clement *et al* 1998) although there has been some speculation concerning the increase of nominate Chiffchaff in the area (Hansson *et al* 2000, Lampila *et al* 2009).

Material and methods

This article is based on sound recordings of Chiffchaff calls, recorded from 1998 to 2013 in Southern Finland and Estonia, and field notes from the same period. At the same time and in the same area in Finland, Chiffchaffs were trapped, ringed and studied in the hand, and almost every bird studied by me was also photographed. Some trapped birds were also sound-recorded. My call recordings are from short field trips made especially to record any calls of Chiffchaffs, so there is no bias towards unusual types. The additional material by others may be somewhat biased to include "interesting" material – especially 'sweeoo' calls.

The calls were recorded in many situations. As noted earlier, Chiffchaffs use calls that to the human ear are very similar in many different contexts. There are variations in intensity and tone, which were not dealt with in this analysis. One call per individual was used in the analysis. Often the call of an individual is somewhat variable, or at least there are some variant notes. One call per each recording was chosen and is meant to represent what is typical for the individual.

Initial and terminal pitches of the call notes were measured, also the highest and lowest pitches, and the length of the call. The measurements were done with the program Syrinx, version 2.6h, (c) John Burt 1995-2006, www.syrinxpc.com. The measurements were taken from recordings of sampling frequency 22050 Hz. When measuring from the frequency axis, the spectrogram was plotted with FFT length 1024, and for the time axis, FFT length 128 was used.

Call variation

The sound spectrograms of the samples are depicted in Figures 1-8. The corresponding recordings can be heard on the Xeno-canto web site, and the reference numbers can be found in the captions of Figures 1-8. Addresses for the recordings are of type http://www.xeno-canto.org/195749, which locates the recording XC195749.

Call notes were classified into five groups: T1 (more or less straight ascent), T2 (like T1, but at the end, a very short descending part), H1 (first an ascending part then descending, then ascending. The starts is higher than the end, but neither is the highest or lowest point), H2 (like H1, but the last ascent is lacking or nearly lacking – the end is the lowest or almost the lowest point), H3 (like H2, but the last descent ends higher than the start of the note, this is so rare that it is not included in the table). T1 and T2 are "normal" calls, H1, H2 and H3 'sweeoo' calls. T1 and H1 are "pure" types, the others are more or less intermediates. Basic statistics of the types are presented in Table 1.

Even inside these groups there is variation. T1 and T2 sound quite similar to the human ear – they are separated here because T2 starts to have properties of true 'sweeoo' calls. A much more audible difference is caused by the harmonics of the call, which are often quite prominent in these types. If they are lacking or weak, the call sounds very thin and even has some resemblance to the call of *tristis* in tone. The harmonics may be quite weak even in spring, but I believe that their lack or weakness is a feature that is more common in juveniles. Calls with weak harmonics are often not quite straight, but have some curves in the spectrograms (but still ascending, although it could be asked whether the 'sweeoo' call is just an extreme variation of this curved type of call). The harmonics also seem to be stronger when there is more intensity in the calls – calls used in an alarm context have stronger harmonics than "lazy" contact calls. Figure 1 shows a T1 Chiffchaff call with normal harmonics and Figure 2 shows a T1 call without them.

One variation is a call with a strong second layer – almost as strong as the fundamental, but which is not a true harmonic layer. The second layer may start somewhat earlier than the fundamental, lies not that high up as true harmonic layer should be, and may be of somewhat different shape. The overall effect on the sound is similar to that of the true harmonic. Calls of this kind are common in spring and occur also in autumn. Figure 3 shows such a call. Figure 4 shows a variation, where the upper sound starts distinctly earlier – by adding one arm this would be quite close to the 'sweeoo' call. This may be only a co-incidence and the call does not sound like a 'sweeoo'.

'Sweeoo' calls are in fact quite distinct. Borderline cases that are confusable with the normal call are rare. Of the call material, only one is classified as H3 (Figure 5) and it is close to the most extreme of T2 calls (Figure 6). A good example of H1 is in Figure 7 and of H2 in Figure 8.

Calls in Finland and Estonia 1998-2013

During the study period, two distinct "invasions" of 'sweeoo' calls occurred in Finland, in 1999-2000 and 2011-2012. During these years, the majority of Chiffchaffs used the 'sweeoo' call.

The years 1999-2000 were not the first period when such calls were heard in Finland. They also occurred in the autumns of 1988 and 1993 (Pöyhönen 2000, pers. obs.). I also heard them but am unable to find any sound recordings of them among my own or the recordings of others and my only notes are that I heard it at least three times in Southern Finland in autumn 1988. The call was very conspicuous and confusing to me then, but the birds were identified as Chiffchaffs visually and I even heard a 'sweeoo' bird singing the normal Chiffchaff song.

In August 1998, 'sweeoo' Chiffchaffs were very common in Western Estonia, but I have only one recording from this month (type H1). The same autumn in Finland, I made one recording of a

	n	Note length	Start pitch	End pitch	Lowest pitch	Highest pitch
H1	19	152 (108-223) 36.1	4280 (3781-5637) 398.6	3894 (3230-4689) 370.7	3023(2604-4072) 322.5	5138 (4679-5654) 259.2
H2	19	137 (106-190) 22.2	3846 (3411-4355) 223.9	3234 (2613-4154) 315.6	3220 (2613-4081) 303.2	5073 (3921-5519) 421.6
T1	51	138 (88-190) 23.0	2821 (2178-5271) 606.4	4507 (3593-5102) 370.0	2771 (2178-3805) 488.2	4584 (3872-5271) 368.7
T2	9	142 (115-175) 16.5	3186 (2532-3839) 546.0	4619 (3683-5378) 454.2	3186 (2352-3839) 546.0	4858 (4493-5378) 291.6
All	99	141 (88-223) 25.6	3338 (2178-5637) 783.7	4152 (2613-5378) 627.9	2951 (2178-4081) 471.3	4800 (3872-5654) 444.0

Table 1. Basic statistics of the call types. Lengths in ms, pitch in Hz. Average (minimum - maximum) standard deviation.

normal call (T1) and there were no records of 'sweeoo', neither by me nor reported by other observers.

In the spring of 1999 several 'sweeoo' Chiffchaffs were reported at Ristisaari, an island on the south coast of Finland (Pöyhönen 2000).

The autumn of 1999 was the first autumn in Finland when the phenomenon was widely discussed. 'Sweeoo' calling birds were widespread and common. It seems obvious that, initially, some were misidentified as Greenish Warblers, which have normally left the country by early September (Pöyhönen 2000) when 'sweeoo' Chiffchaffs became widespread. At Kotka, between 15 and 26 September, dozens of 'sweeoo' were heard but very few birds with the normal call. After that, between 30 September and 9 October there were still many 'sweeoo' birds, but also many with the normal call (Pöyhönen 2000). I only heard dozens of 'sweeoos' and no normal calls from 13 September onwards in the Helsinki area, but was away after 2 October. Of the two available sound recordings, one was of type H1 and other of type H2, albeit slightly intermediate, tending towards H1.

In the spring of 2000, again several 'sweeoo' Chiffchaffs were heard at Ristisaari (Pöyhönen 2000) and also at Hanko (pers. obs.).

In autumn 2000 'sweeoo' callers were still common and widespread. It is interesting that seven of nine sound recordings are of type H2, and that no birds with the call H1 appear in the recordings. One is of type T1, so a normally calling bird, from Sörve, Saaremaa, Estonia from mid September, where most birds were calling 'sweeoo' at the time. One was of type H3, from mid August, at Läänemaa, Estonia. Such callers were widespread at that time and I assumed them to use some juvenile variant of the 'sweeoo' call. Their call was without harmonics and started to resemble *tristis* in tone.

The last time I heard a 'sweeoo' Chiffchaff during the first "invasion" was a bird calling in April 2001 in Southern Estonia. In the autumn all seven recordings were of normal type, both in Estonia

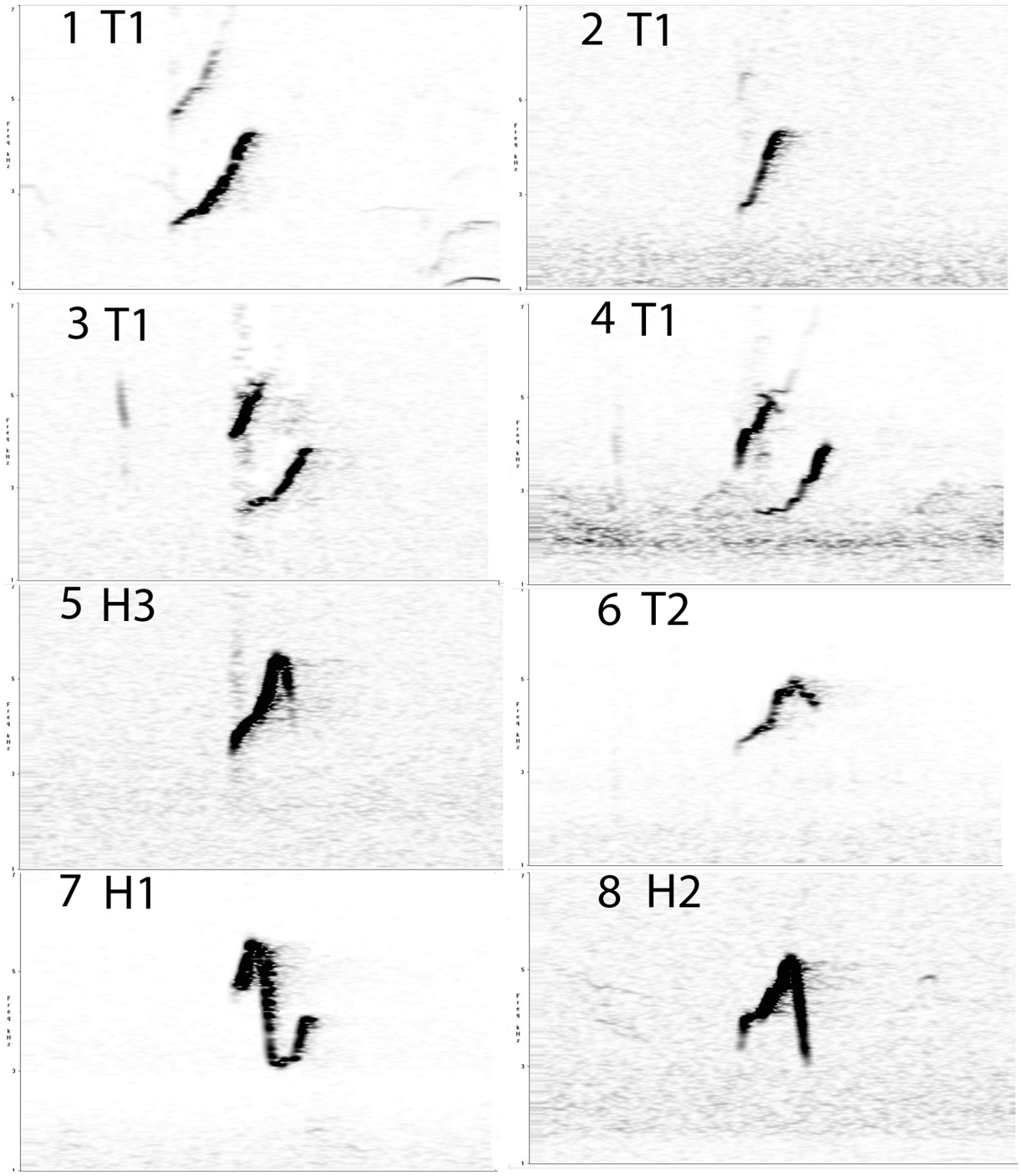


Figure 1. 30 April 2005, Ridala, Läänemaa, Estonia. Xeno-canto code XC195749.
Figure 2. 5 October 2008, Espoo, Uusimaa, Finland. XC195750.
Figure 3. 22 May 2011, Vihti, Uusimaa, Finland. XC195751.
Figure 4. 5 May 2011, Laukaa, Keski-Suomi, Finland (recordist Tero Linjama). XC195703.
Figure 5. 14 August 2000, Noarootsi, Läänemaa, Estonia. XC195752.
Figure 6. 9 October 2010, Hanko, Uusimaa, Finland. XC195754.
Figure 7. 19 September 2011 Espoo, Uusimaa, Finland. XC195755.
Figure 8. 7 October 2000, Helsinki, Uusimaa, Finland. XC195757.

and in Finland. In my notebook I wrote that between 1 August and 31 October 2002, 34 heard (of which four were trapped) Chiffchaffs in Finland and 15 in Estonia, all had the normal call. After that time, all sound recordings were of type T1 between 2003 and 2008 (n=29). From early summer 2003 I have notes of two normally calling breeding birds in Finland. Many calls were recorded in early August, but no 'sweeoo' call or other obviously juvenile-like variations were heard or recorded.

On 22 May 2009 at Naissaari, an island off Tallinn, Estonia, there was one normally calling bird and one 'sweeoo' (H1), which was sound recorded. This 'sweeoo' was the first I had heard since 2001. But, in autumn 2009, starting from mid-August, only normal calls were heard and sound recorded - one from Estonia in August was of type T2 and six other recordings were of type T1.

From about that time, it has been possible to report 'sweeoo' Chiffchaffs separately to the Finnish bird observation recording system Tiira and there are lots of records. However, it is impossible to be certain what a large number of heterogeneous observers understand as a 'sweeoo' call, and also it may be that the call is reported with higher likelihood when it is scarce, but still the numbers reported seem to give a good picture. When referring to Tiira observations below, April-May is spring, June-July summer and August-November is autumn. In autumn 2009 there were only three reports of 'sweeoo' and they were all from October.

In spring 2010, in Tiira, there was a single reported 'sweeoo' from the Åland islands and none from the summer of that year. On 5 September 2010 one 'sweeoo' of type H1 was recorded at Peipsi, Eastern Estonia. There were many others with a similar call present (J. Pirhonen *in litt*). However, at the same time, I noted no 'sweeoo' and seven normally calling Chiffchaffs in Finland. Of 17 ringed Chiffchaffs between 4 September and 2 October five were calling and all had a normal call. But later in October, three with variable calls were recorded at Hanko: one normal (T1), one slightly aberrant (T2) and one 'sweeoo' of "imperfect" type H2. In Tiira, there were 33 individuals reported from Finland, several by observers that I know have a similar understanding of the 'sweeoo' call as I do. The earliest is from late August, with the rest from mid-September onwards and about half from October. It could be said that in 2010 the normal call dominated but there were some indications of what was coming.

In 2011 the 'sweeoo' call was dominant in Finland, although not in spring. There were 20 individuals reported in Tiira by 31 May. A recording from central Finland on 5 May is of type T1, another there from 20 June is of the same type. There were seven individuals of 'sweeoo' reported in Tiira in July. All 13 sound recordings made in autumn 2011 are of the H1 type 'sweeoo', earliest of these was recorded on 6 August. In Tiira, from August to November there were 1278 individuals reported – starting from the very first days of August.

Two recordings from spring 2012 are also of H1 type, but a juvenile recorded on 27 July is of type H2. In spring, there were 137 individuals and in summer 28 individuals reported in Tiira. Seven recordings from Finland between 1 September and 15 October are all of type H2, one recording from Estonia on 30 September is also of type H2, and the others heard at the same time were at least of some 'sweeoo' type. In Tiira, between August and November, there were 1607 individuals of 'sweeoo' calling birds reported.

In 2013 the normal call again returned to both Finland and Estonia. In Tiira, there were still 19 individuals of 'sweeoo' reported in spring, 11 in summer and only 16 reported in autumn, of which only six after August. The six recordings I have from that autumn are all of types T1 or T2.

In summary, during both "invasions", the 'sweeoo' call was dominant in Estonia a year earlier than in Finland. It also seems that the changes to 'sweeoo' and then back to normal happen during the summer. And type H1 is dominant in the first year of an "invasion", type H2 in the second year.

Visual characters of 'sweeoo' and normal Chiffchaffs

Measurement data of Chiffchaffs trapped at Laajalahti, Espoo in the Helsinki area, is available from 1986 to 2013 (Table 2). In this period, from 2002 we paid special attention to Chiffchaffs. The nets were situated mostly in a reedbed, but some nets were inside a small wood. At this site, constant effort trapping ended on 15 September, and after that date, we sometimes played the song of *collybita* or *abietinus* Chiffchaff in order to trap more Chiffchaffs, this occurred both in normal and 'sweeoo' years. We trapped 57 Chiffchaffs that made 'sweeoo' calls during handling (in reality there were many more, but this was the number of cases for which the call was written down in the field notes) and 56 with the normal call. The most important measurement in the context of this study is the wing length that was measured as maximum length (*e.g.* Svensson 1992). Wing lengths of the 'sweeoo' birds were 57-68 mm, avg 63.39 mm, stdev 3.00. The corresponding values of normally calling birds were 56-70 mm, 62.99 and 3.31. Although the differences are slight, it seems that there may be a slight tendency of 'sweeoo' birds to be larger. But many of them were trapped using playback of song and this seems to attract more males than females, and this may explain the tendency. So before any further statistical testing, I looked at more historical wing length data. Because 'sweeoo' birds are very dominant in some years and absent in others, a similar but larger dataset may be obtained by taking into account all measured Chiffchaffs and comparing years. During 1991-2001, 34-100% of wing measurements were taken using an alternative method – the length of the third outermost primary (*e.g.* Svensson 1992). To overcome the problem of comparability, some kind of transformation is needed. I used a coefficient 1.317896, provided by Esa Lehikoinen and based on measurements of 403 individual Chiffchaffs in Finland by several ringers. However, this transformation must be kept in mind when discussing the results. As it easy to see from Table 2, the transformation does not give exact results, for some unknown reason.

The average of the wing length of birds from 'sweeoo'-years 2011-2012 is 62.70 (n=173) and from non-'sweeoo' years 2009, 2010 and 2013 it is 62.74 (n=342). The 'sweeoo'-years 1999 and 2000 give 63.36 (n=110) and non-'sweeoo' years 1996-1998 are 63.63 (n=186). The explanation for the difference between the first and second comparison may be the method transformation described earlier. In any case, it is evident that the tendency that seemed to appear in birds that were classified by call type does not seem to hold in this test. At least, the null hypothesis that there is no difference in the wing length of 'sweeoo' and non-'sweeoo' birds could not be rejected based on this material.

There is much variation in the colours of the birds: the eye-ring may be quite prominent or unobtrusive, the distinctness of the supercilium varies and its colour can be variably yellow. The upperparts are typically greyish-olive. Some are more greyish than others, and others are of darker olive colour with almost black wing-feathers. The underparts are dull pale grey with variable yellowish streaking or blotching on the breast. If there are some differences in the colouration between 'sweeoo' and normal birds, or between 'sweeoo' years and normal years, they are average differences only, with extensive, and probably complete, overlap. In fact, there is a change in average colouration, slight but perceptible, every year, from mid-September towards mid-October, with decreasing saturation of olive and yellow in the plumage - presumably when more easterly populations migrate through (another explanation would be the bleaching of the plumage).

DNA analysis

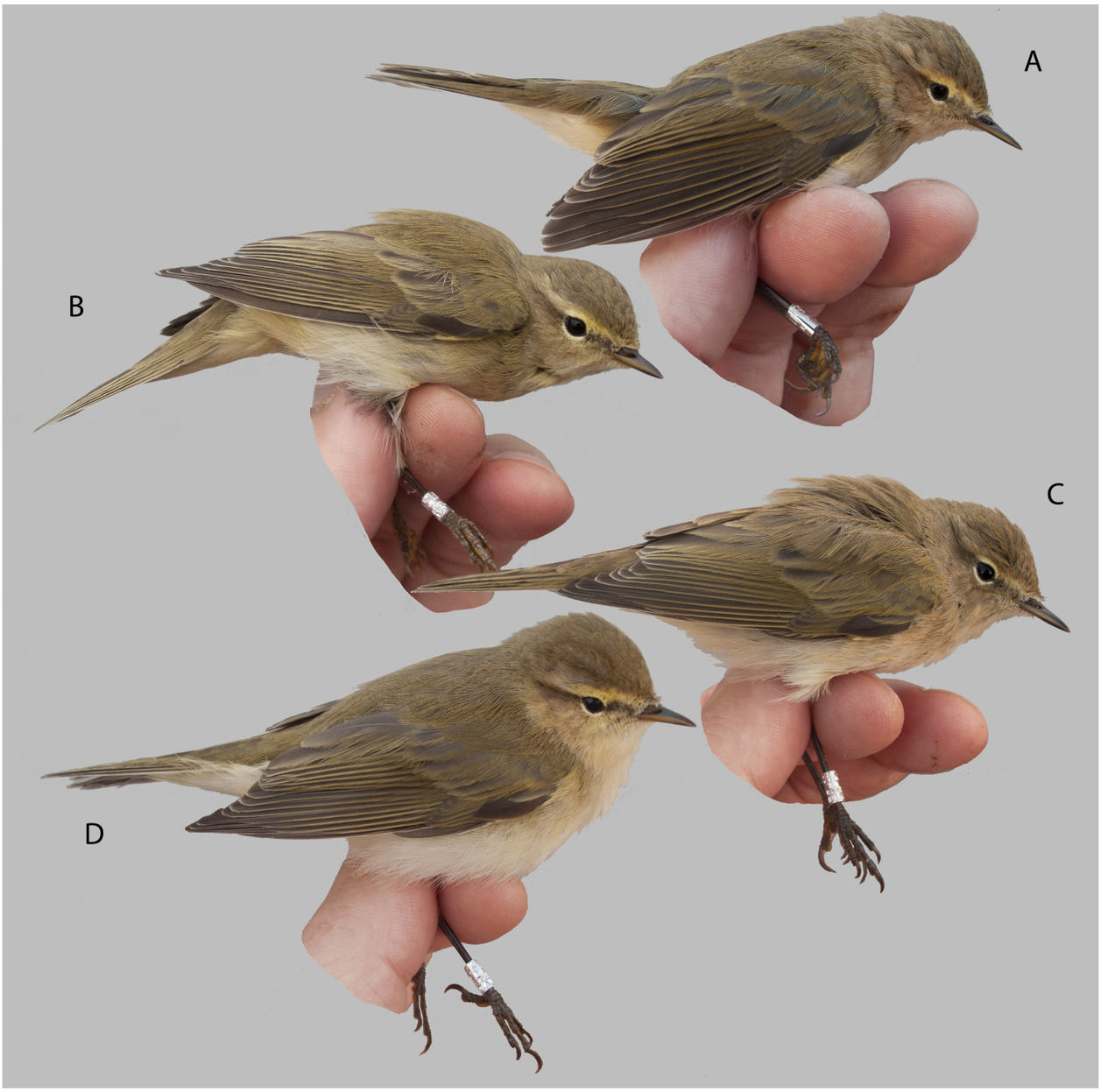
One 'sweeoo' individual from Hanko, in 2012, was analysed by Laura Kvist / University of Oulu Zoological Museum. It carried mitochondrial cyt-b gene of *abietinus* type - not *collybita* or *tristis*, which are known to be distinct, nor some other unknown type.

'Sweeoo' calls elsewhere in Europe

The 'sweeoo' call has been recorded in many

Year	Sweeoo-year	Min	Max	Avg	Std dev	N
1986		59	67	62.88	2.80	17
1987		63	63	63.00		1
1988	X	57	68	63.00	3.29	25
1989		58	68	62.77	3.34	26
1990		60	64	61.67	2.08	3
1991		*56.7*	*68*	*61.88*	*3.16*	*26*
1992		*58*	*67.2*	*62.11*	*2.75*	*12*
1993		*57.3*	*69.2*	*63.28*	*3.03*	*46*
1994		*55.4*	*68.5*	*61.81*	*3.55*	*31*
1995		*58*	*70.5*	*63.35*	*3.31*	*51*
1996		*56.7*	*69.2*	*64.02*	*3.02*	*101*
1997		*60.6*	*68.5*	*64.55*	*2.77*	*26*
1998		*55.4*	*69.8*	*62.55*	*3.41*	*59*
1999	*X*	*58*	*68.5*	*62.92*	*3.29*	*76*
2000	*X*	*58*	*68.5*	*64.35*	*3.22*	*34*
2001		*58*	*68.5*	*63.27*	*3.09*	*44*
2002		56	68	61.95	2.89	63
2003		58	68	62.57	2.77	76
2004		60	61	60.50	0.58	4
2005		56	68	61.77	3.11	30
2006		58	68	62.19	2.53	53
2007		56	67	62.28	2.81	36
2008		57	66	61.30	2.50	10
2009		57	69	62.00	3.04	73
2010		58	70	63.20	3.05	123
2011	X	57	68	62.78	2.87	105
2012	X	53	69	62.57	3.54	68
2013		57	69	62.72	2.97	146

Table 2. Wing lengths of Chiffchaffs at Laajalahti, Espoo, Finland. Years when a variable part of birds were measured with a different method are in italics (see text).



All photos taken at Laajalahti, Espoo, Finland. All are first-year birds.
A) 22 September 2013. Ring number 89814U. Not heard to call, but 2013 was not a 'sweeoo' year. Wing length 60 mm.
B) 19 September 2010. Ring number 38315U. Bird with normal call, wing length 62.5 mm.
C) 17 September 2011. Ring number 38368U. Bird with 'sweeoo' – call, wing length 67 mm. When the supercilium is less distinct, the eyering stands out.
D) 17 September 2011. Ring number 38360U. Bird with 'sweeoo' – call, wing length 66.5 mm.

European countries. I will not try to give a comprehensive summary here. Not so much is properly published but information can be found on various web sites and discussion forums. There are many call descriptions that are difficult to assess whether they are referring to the same 'sweeoo' call as in this article or something different.

'Sweeoo' callers were common on spring migration in early April 1999 at Dobrogea, Romania (pers. obs.), The only sound recording was of type H1. In Russian Karelia in autumn 1999, 'sweeoo' was common and widespread at the same time as the main "invasion" in Finland (Pöyhönen 2000). In October 2000, the call at Dobrogea was the normal T1 (two personal recordings, many field observations).

Starting from summer 2000, 'sweeoo' Chiffchaffs have been common in Bayern, Germany, at least from Munich to Salzburg in Austria (Langenberg 2001), throughout the year, as in Saarland, Germany from 2008 (Hoffman 2010).

In the spring of 2011, a majority (75%) of Chiffchaffs used a call of 'sweeoo' type in the West Midlands, England, and the phenomenon was widespread in England (Dean 2014). It should be noted that this type of call is regular in this area during late summer and early autumn, at which season juveniles are deemed to be primarily involved (A. Dean *in litt*). In Eastern Poland, in late May 2011, two sound recorded birds had a 'sweeoo' call of type H1 (T. Linjama recordings).

In Xeno-canto (2014) there are some dozens of 'sweeoo' recordings: autumn 2007 Sweden, spring 2009 Netherlands, autumn 2009 Great Britain, Netherlands and Sweden, autumn 2010 Netherlands, spring 2011 Netherlands, autumn 2011 Netherlands, Poland, Spain and Sweden, spring 2012 Poland and Sweden, autumn 2012 Sweden, spring 2013 Germany, autumn 2013 France, Spain and Switzerland. The phenomenon is not totally synchronised continent wide. For example, from autumn 2011 there are many recordings of the normal call, while it was a typical 'sweeoo' time in Finland. But most of the 'sweeoo' recordings in Europe were recorded in 2011 and 2012 – which were also peak years in Finland. Especially interesting is the situation in Sweden: from autumn 2011 there are two recordings by Jelmer Poelstra from Uppland, which is the part of Sweden situated closest to Southern Finland. They are both type H1, which was also dominant at the time in Finland. But in the same autumn from Falsterbo, the southern tip of Sweden, there are several recordings of the normal call and no 'sweeoo' at all. Jelmer Poelstra recorded four spring birds from Uppland in 2012, of which two were H1 and two H2. The following autumn, he recorded four birds of type H2. So even the type change seems to be synchronised with Southern Finland.

Discussion

Two main explanations suggested for the phenomenon were:

- These birds were from some unknown area, where this type of call is the normal call. They are vagrant in NW Europe or in some years, they use unusual migration routes. Pöyhönen (2000) and Jännes (2002) believed in this theory and suspected that the birds came from the east.

This does not seem very likely, because the occurrence has been very widespread. Moreover, the birds have looked normal: like *abietinus* in Finland (pers. obs.), like nominate in Great Britain (Constantine *et al* 2006). Also, there are many breeding records of 'sweeoo' Chiffchaffs: In Finland (J. Pirhonen *in litt.*), England (A. Dean *in litt.*), Ireland (Constantine *et al* 2006), and Germany (Hoffmann 2010).

Pöyhönen (2000) drew attention to the fact that 'sweeoo' years 1988 and 1999 were both good years for eastern vagrant *Phylloscopus*. 1988 was really good for Pallas's Leaf Warbler (27 individuals) and a record year for Yellow-browed Warbler (66 individuals) (Hario *et al* 1989). However, from 1998 until 2012 there seems to be a surprisingly weak correlation between numbers of these two

undoubtedly eastern species – it is not trivial anymore to define what a good year is for eastern vagrant *Phylloscopus* and what is not. Anyway, during this period, top years for Pallas's (over 50 birds) were 2000, 2003 and 2008. Top years for Yellow-browed (over 100 birds) were 2003, 2005, 2008, 2011 and 2012 (Tiira, 2013, for 1998 and 1999, Rissanen *et al* 2013 for 2000 onwards). In any case, there is no distinct support for the claim that the 'sweeoo' years 1999-2000 and 2011-2012 were exceptionally good for eastern *Phylloscopus,* except the latter years for Yellow-browed.

- The 'sweeoo' call is the normal juvenile call of Common Chiffchaff, or a normal phase in the development of the Chiffchaff call. This has been pointed out by many, but especially by Constantine *et al* 2006. According to them, the different abundance of this call in some years is because of the different development stage of the main population. I think this is a good partial explanation. Most importantly, the 'sweeoo' call can be seen as an immature phase of the call development – Chiffchaffs can be regarded as having this call normally in their repertoire, but not in use. However, neither Constantine *et al* nor anyone else has been very successful in explaining why in some years this call is so common and used throughout the year and also by adult birds. The most noteworthy thing in the occurrence of 'sweeoo' Chiffchaffs is that they are very common in some years, greatly outnumbering the normally calling birds, and almost absent in some other years. In addition, juveniles in Finland and Estonia do not normally use 'sweeoo' calls in non-'sweeoo' years (pers. obs.). However, the situation is different in Western Europe and especially England, where the ‘sweeoo’ call is heard every year for a brief time in late summer (and then often somewhat hesitant and 'plastic'), in addition to the real 'sweeoo' years, when the call is more common and persistent (A. Dean *in litt*). The 'sweeoo' call is variable both within and between years, even more variable than the normal call, a fact which Constantine *et al* (2006) thought was a mark of plasticity of the juvenile call.

It is well-known and extensively studied that the songs of oscine passerines are in considerable part learned (*e.g.* Catchpole & Slater 2008, Marler & Slabbekoorn 2004). By contrast, since the classic studies it has been believed that the calls are innate. However, several cases of call learning have been identified (Marler & Slabbekoorn 2004). Especially interesting are cases of call matching where a pair or flock of birds adjust their calls to match each other. In the 'sweeoo' case, it seems that proper call learning is not needed because the 'sweeoo' call should be the juvenile call which every individual should already have in its repertoire, at least in theory.

The real problem with the "call matching" theory is the difficulty in finding explanations for the birth and death of the phenomenon. Constantine *et al* (2006) suggested delayed breeding in some years lead to a greater amount of younger individuals. Chiffchaffs with 'sweeoo' calls have been remarkably common in some years and that has suggested to several commentators that a great density of population may trigger this aberrant call. The numerical changes in the Finnish breeding population have been great during the past 30 years. From the top years in the early 1980s the species went down 70% until 1998, but after that there has been a distinct recovery so the years 2010-2012 have been the best since mid 1980s (Väisänen & Lehikoinen 2013). The point count data shows that the top years (over 1.5 birds for a route) were 1984-1987, 1990, 1995 and 2009-2013. In the Finnish ringing data the top years (>=1000 ringed) were 1980-1982, 1984, 1989, 1993, 1995, 2002-2003 and 2010. Those in the municipality of Hanko (>=70 ringed, dominated by standardised ringing at the Halias bird observatory) were 1980-1981, 1984, 2000 and 2010. Those in the municipality of Espoo (>=150 ringed, dominated by standardised ringing at Laajalahti) were 2001, 2002-2003, 2006 and 2010 (all this data from the Finnish Museum of Natural History, 2013). The good numbers in the early 1980s went without published records of 'sweeoo' callers, and the 'sweeoo' year of 1988 was not remarkable in the numbers of Chiffchaffs. Also the 'sweeoo' years 1999-2000 do not seem to stand out and even 2011-2012 are not better than, for example, 2010. There

does not seem to be a relation between the numbers of 'sweeoo' callers and data of breeding and migrating Chiffchaffs.

Summary

The 'sweeoo' call of Chiffchaff occurred as a dominant call in "invasions" in about ten-year intervals. Both of the better documented "invasions" started in Estonia one year earlier than in Finland and lasted two years in Finland and three years in Estonia. The call used in the second year of invasion in Finland was of simpler type in both invasions. There are no known morphological or genetic differences between alternatively calling birds and normal *abietinus* from the same areas, and it is very probable that they are from the same population and taxon. The causes of the birth and death of the occurrence of the call type are still a mystery.

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