

Population trend, time of arrival and altitudinal distribution of the Corncrake *Crex crex* in Switzerland – the results of 20 years of conservation

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The Corncrake once was a widespread breeding bird in Switzerland which occurred mainly on the Swiss Plateau (the lowlands of Switzerland). By the end of the 19th century and in particular during the first half of the 20th century, the population declined markedly and disappeared nearly entirely from the Swiss Plateau. Between 1970 and 1995, the species occurred sporadically, but was no longer breeding regularly. Being on the verge of extinction, measures were urgent. In 1996, SVS/BirdLife Switzerland started a conservation programme for the Corncrake which debuted in 1996-1998 with a pilot project and has been conducted as conservation programme each year since 1999. The main measure consists in the negotiation of 1-year contracts with the farmers of meadows where stationary calling males have been registered. The mowing of around 1 ha of meadow around the calling place is generally delayed until 15th August. The grants for the farmers are paid by the cantonal administration.

Since the beginning of the conservation programme of SVS/BirdLife Switzerland in 1996, the number of Corncrakes observed in Switzerland has increased considerably. One part of the increase is probably due to the more intensive search. However, our results show that Corncrakes not only occur in greater numbers but also have much more possibilities to breed in Switzerland since the beginning of the conservation programme. In the last 20 years, the number of Corncrakes found each year in Switzerland varied between 12 and 87 calling males. Altogether, 715 Corncrakes could be found, 659 during the breeding season (April-July) and 56 during migration in autumn. 55.1 % of these birds were stationary, i. e. they remained at the same place for at least five nights. Most of the Corncrakes (76.3 %) arrived in Switzerland in June or July (second half of the breeding season) and were found mainly in meadows at altitudes between 1,000 and 2,000 m a. s.l. (75.6 % of the observations made during the breeding season). This is very different from the situation in the beginning of the 20th century. At that time, Corncrakes mainly arrived in May and were essentially found in meadows of the lowlands. The present agricultural management explains the late arrival and the shift to higher altitudes: At the beginning of the breeding season in May, only the meadows in the lowlands offer a tallness of vegetation corresponding to the needs of the Corncrake. But these meadows are managed very intensively, are probably too dense for the Corncrake and are often mown before the arrival of the species. At higher altitudes, the meadows are more extensively managed and more suitable for Corncrakes, but the vegetation grows high enough only in the course of June.

Key words: Corncrake *Crex crex*, conservation programme, population increase, altitudinal shift, agricultural management, phenology, species recovery

1. Introduction

Originally, the Corncrake was found in naturally open habitat with tall grass, essentially in wet meadows along river valleys and probably also in mountain meadows and marshes (FLADE 1997). Later, the species adopted the meadows created by the development of agriculture. With the mechanization and the inherent intensification of the management of agricultural grassland, however, suitable habitat and possibilities to breed successfully were reduced, and the populations in Western Europe declined markedly (BROYER 1994, GREEN &

RAYMENT 1996). The situation in Switzerland reflected this pattern. At the beginning of the 20th century, the Corncrake was still a widespread breeding bird in Switzerland, mainly in the lowlands (KNAUS *et al.* 2011). Then, the population declined rapidly (VON BURG & KNOPFLI 1930). Around 1970, the Corncrake had virtually disappeared from the Swiss Plateau, the lowlands in Switzerland (GLUTZ VON BLOTZHEIM *et al.* 1973, SCHMID & MAUMARY 1996, MAUMARY *et al.* 2007). At present, the species is one of the rarest in Switzerland

and listed as critically endangered (KELLER *et al.* 2010). SVS/BirdLife Switzerland therefore started a conservation programme in 1996 to maintain and improve the breeding population of the Corncrake in Switzerland. Here we present the data gathered during 20 years of Corncrake conservation and monitoring.

2. Material and methods

Data were obtained in the period of 1996-2015 from systematic nocturnal searches for calling males done by employees of SVS/BirdLife Switzerland, gamekeepers or volunteers in the main Corncrake areas in Switzerland. Additional observations were made by chance by ornithologists from all around Switzerland. During these 20 years, 715 Corncrakes could be found in Switzerland, 659 during the breeding season (April-July) and 56 during migration in autumn. Details about data and methods used for Corncrake monitoring are reported by INDERWILDI & MÜLLER (2015).

3. Results

3.1 Size and development of the Corncrake population

Since the beginning of the conservation programme, from 1996 to 2015, between 12 and 87 calling males were found each year (mean 33.0, median 25, Fig. 1, right part). 363 of the 659 (55.1%) calling males recorded during the breeding season between 1996 and 2015 were stationary, i. e. they continued calling in the same territory for at least five nights. In 20 years, 61 broods could be confirmed and 176 breeding attempts were considered possible thanks to the delayed mowing concluded with farmers (see chapter “Conservation measures”) or because the Corncrakes settled in protected areas. The range varied between 3 and 40 cases of possible and confirmed breeding per year.

3.2 Distribution and important areas for the Corncrake

Corncrake observations could be made in nearly all parts of Switzerland (Fig. 2), yet a lot of these observations were only sporadic settlings or possible migrants.



Fig. 1: Number of male Corncrakes observed in Switzerland during the breeding season for the period 1970-2015 (source SCHMID & MAUMARY 1996, SVS/BirdLife Switzerland). – *Anzahl zur Brutzeit beobachteter Wachtelkönig-Männchen in der Schweiz für den Zeitraum 1970-2015 (Daten aus SCHMID & MAUMARY 1996 und von SVS/BirdLife Schweiz).*

Two regions are particularly important for the Corncrake: the Jura Mountains in the canton of Neuchâtel (orange circle) and some valleys of the canton of Grisons (Unterengadin, Surselva, Oberengadin, Val Müstair, red circles). Details on the distribution of the Corncrakes in the different regions are given in INDERWILDI & MÜLLER (2015).

3.3 Arrival in Switzerland

Observations in the first part of the breeding season until 31st May are relatively rare in Switzerland (107 of 714 observations with exact date, i. e. 15%, Fig. 3). Most of the calling males appear only in June and July (545, 76.3%). 62 individuals were observed for the first time in August or later. In six cases, this concerned young unfledged Corncrakes that were considered as confirmed broods at these places; the other records were classified as autumn migrants.

3.4 Altitudinal distribution

Between 1996 and 2015, Corncrakes could be recorded during the breeding season at altitudes between 200 and 2,400 m a. s.l. (Fig. 4). Most of the individuals were found in mountainous areas at elevations above 1,000 m (498 of the 659 Corncrakes observed during breeding season from 1996-2015, 75.6%) or even above 1,400 m (336, 51.0%). The confirmed brood at the highest elevation took place in 2005 at 1,940 m (Lü, Val Müstair, Grisons).

3.5 Relationship between date of arrival and altitude

Plotting the date of arrival against the altitude shows that the Corncrakes choose meadows at lower altitudes at the beginning of the breeding season and meadows at higher altitudes later in the season (Fig. 5).

4. Discussion

Once a widespread breeding bird in Switzerland, the Corncrake had practically disappeared from the Swiss Plateau by 1970. Between 1970 and 1995, there were only few observations per year in the whole country. Since the beginning of the conservation programme of SVS/BirdLife Switzerland in 1996, the number of Corncrakes observed in Switzerland has increased considerably, and the trend in numbers of calling males

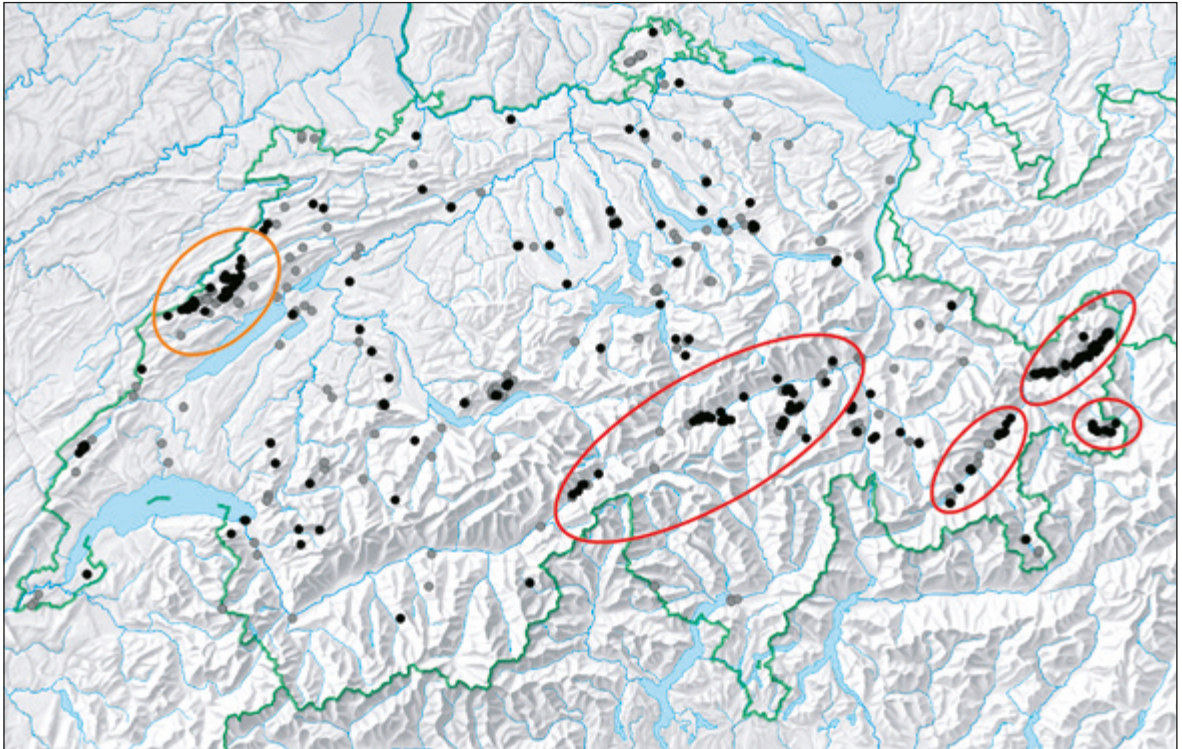
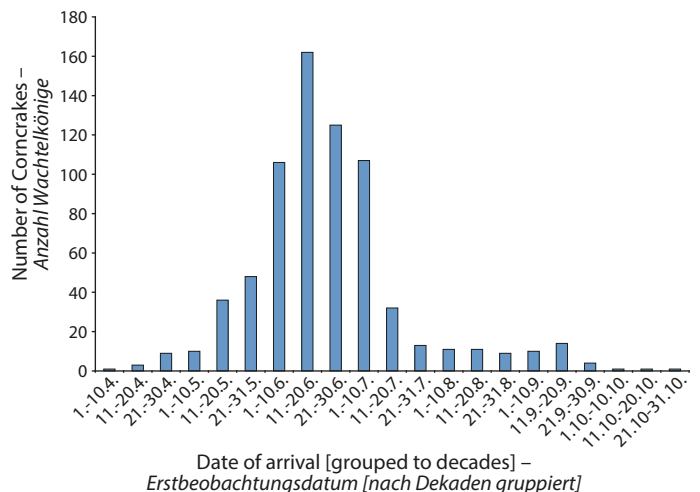


Fig. 2: Distribution of all Corncrake observations in Switzerland 1996–2015; records of autumn migrants are included (n=705, 10 records had no exact localisation). Black dots: stationary birds, grey dots: presumable migrants. In core areas (circled orange: Jura Mountains in the canton of Neuchâtel; circled red: Unterengadin, Surselva, Oberengadin and Val Müstair, the most important valleys of the canton of Grisons) dots may represent multiple observations at the same location. Background map: Bundesamt für Landestopografie. – *Verteilung der Wachtelkönigbeobachtungen in der Schweiz 1996-2015, inklusive Durchzügler im Herbst (n=705, 10 Meldungen ohne genaue Koordinaten). Schwarze Punkte: stationäre Vögel, graue Punkte: Durchzügler. In den Kerngebieten (orange: Juratäler im Kanton Neuenburg; rot: Unterengadin, Surselva, Oberengadin und Val Müstair, die für den Wachtelkönig wichtigsten Gebiete des Kantons Graubünden) überlagern sich die Punkte, die effektive Anzahl Beobachtungen ist größer als ersichtlich.*

shows the annual fluctuations typical for this species. One part of the increase is probably due to the more intensive research conducted on Corncrakes since the beginning of the conservation programme. Even if the numbers are not directly comparable between the period before 1995 and after, our results show that Corncrakes not only occur in greater numbers but also have much more possibilities to breed in Switzerland since the beginning of the conservation programme. To what extent the species breeds successfully is difficult to record due to its concealed breeding behaviour. Nevertheless, nearly each year one or more successful broods could be recorded.

Nowadays, the Corncrake is found in Switzerland essentially in the Jura mountains and the Alps. The situation therefore differs markedly from the beginning of

Fig. 3: First observations of Corncrakes in Switzerland in the period 1996-2015 (n=714) by ten-day periods. – *Erstbeobachtungsdaten aller Wachtelkönige in der Schweiz pro Dekade für den Zeitraum 1996-2015 (n=714).*



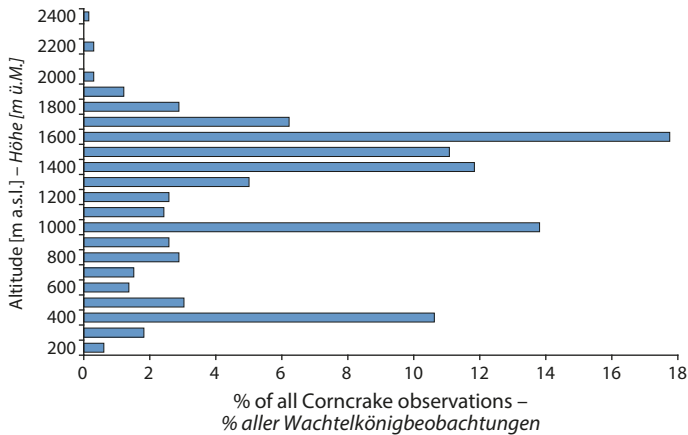


Fig. 4: Altitudinal distribution of Corncrake observations during the breeding season in Switzerland, 1996-2015 ($n = 659$). – *Höhenverteilung der Brutzeitbeobachtungen des Wachtelkönigs in der Schweiz 1996-2015 ($n = 659$).*

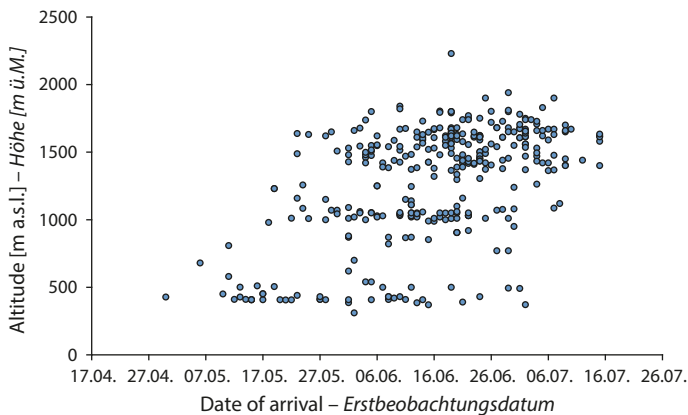


Fig. 5: Relationship between altitude and first observation date of stationary calling male Corncrakes in Switzerland ($n = 350$, 1996-2015). – *Zusammenhang zwischen Höhe über NN und Erstbeobachtungsdatum von stationären Wachtelkönigsmännchen während der Brutzeit ($n = 350$, 1996-2015).*

the 20th century, when the Corncrake was a widespread breeding bird on the lowlands of the Swiss Plateau (VON BURG & KNOPFLI 1930). SCHMID & MAUMARY (1996) analysed the altitudinal distribution in Switzerland: The number of observations above 1,000 m changed from 15.3% (1970-1977) to 47.9% (1986-1994). As our results show, the proportion of the Corncrakes observed above 1,000 m (75.6%) has increased further during the last 20 years. This shift in altitudinal distribution has also been observed in Austria (FRÜHAUF 1997), Slovenia (TRONTELJ 1997) and Italy (BERTOLI & LEO 2005, PEDRINI *et al.* 2012).

At the beginning of the 20th century most Corncrakes were observed in Switzerland during the second half of May (VON BURG & KNOPFLI 1930). At regularly occupied breeding sites in other countries, Corncrakes usually arrive in May (e.g. Poland, SCHÄFFER 1999),

on the western fringe of the breeding range on the British Isles and France even in April (e.g. DECEUNINCK *et al.* 1997). INDERWILDI & MÜLLER (2015) therefore concluded from this late arrival that first broods are presently rare in Switzerland. Most of the birds registered in this country are probably trying to perform second broods or lay replacement clutches after having been forced to leave their breeding territories in other parts of Europe due to mowing or vegetation becoming unsuitable due to seasonal succession (SCHÄFFER 1999, MIKKELSEN 2010).

The altitude and also the time of settling in Switzerland depend on the availability of (suitable) grassland for the Corncrake. At the beginning of the breeding season in May, the grass is tall enough only at lower altitudes. Yet, the management of the grassland at low altitudes is so intensive that it has been either mown upon arrival of Corncrakes, or the vegetation structure has become unsuitable for the Corncrake as the grasslands offer no structures and are too dense to move in (SCHÄFFER 1999). On the Swiss Plateau, only a few small protected areas that are extensively managed may still offer conditions favourable to the Corncrake in May. At the beginning or middle of June, the vegetation has also grown sufficiently at higher altitudes and offers a habitat for the Corncrake. The meadows in mountainous areas are managed more extensively and are more diverse offering better conditions for the Corncrake. This explains why most of the observations of Corncrakes in Switzerland take place in June and July at higher altitudes.

As shown by GREEN & RAYMENT (1996), there is a good correlation between the intensification of agricultural management and declines in the number of Corncrakes. The situation in Switzerland followed this pattern. During the 20th century, the changes in agriculture led to the nearly complete abandonment by the Corncrake of the Swiss Plateau. At present, the intensification of agriculture at altitudes around 1,000 m (essentially the Jura mountains) seems to lead to a new altitudinal shift of the Corncrake to even higher altitudes, visible when comparing the altitudes of the observations during the periods 1996-2005 and 2006-2015. This intensification also takes place at higher altitudes in the Grisons (GRAF & KORNER 2011), but to a lesser extent. In our opinion, the changes in the altitude of Corncrake occurrences are mainly explained by the modifications in agricultural management. Climate changes may play an indirect role on the growth of the vegetation in higher altitudes, thus permitting a more intensive agriculture, but also

facilitating the settlement of Corncrakes in meadows at higher altitudes.

5. Conservation measures

In 1996, SVS/BirdLife Switzerland started a conservation programme for the Corncrake in Switzerland that aims at improving the conditions for successful breeding. The first three years were conducted as a pilot project to test the measures in favour of the Corncrake. Since 1999, the conservation programme is implemented each year by SVS/BirdLife Switzerland in collaboration with the cantons (administrative subdivisions of Switzerland), their gamekeepers and many volunteers (HEER *et al.* 2000). The occurrence of Corncrakes in Switzerland is mostly unpredictable. They rarely settle in the same meadow in consecutive years. Therefore, an important part of the conservation programme is the nocturnal search for calling Corncrakes. Once a stationary calling male is found, SVS/BirdLife Switzerland determines the exact calling place that indicates the approximate position of a potential nest, and identifies the surface to be protected. The organisation (in some cases the canton) then contacts the farmer(s) of the meadow harbouring the Corncrake. The main measure is the conclusion of a 1-year contract with them. On a surface of around 1 ha at each calling place, the mowing is generally delayed until 15th August. A panel installed at the border of the meadow explains why the mowing is delayed and sensitises people for the needs of this endangered species. The contributions to farmers, compensating them for the loss of hay quality due to late mowing, are paid by the cantons. Since the beginning of the conservation programme, 173 call-

ing places (48 % of the stationary males recorded in Switzerland 1996-2015) could be secured through such contracts which offered the possibility for successful breeding. The most common reasons why the other stationary males couldn't be protected are: refusal of the contract by the farmer, difficulties in determining the exact calling place or Corncrake moving around, late information of the presence of a Corncrake, lack of time.

6. Conclusions

Currently, over 90 % of the Corncrakes in Switzerland occur in hay meadows cut too early to allow a successful breeding. In the period of 1996-2015, only 35 of the 363 stationary individuals were observed in protected areas, where they were not at risk due to early mowing. The Corncrake must still be considered as critically endangered in Switzerland. Without specific measures, Corncrakes have virtually no chance to breed in Switzerland. If we don't want the Corncrake to become extinct as breeding bird in Switzerland, the conservation programme of SVS/BirdLife Switzerland is to be continued.

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7. Zusammenfassung

Inderwildi, E. 2016: Bestandstrend, Ankunft und Höhenverteilung des Wachtelkönigs *Crex crex* in der Schweiz – Ergebnisse 20-jähriger Schutzbemühungen. Vogelwelt 136: 107 – 112.

Der Wachtelkönig war einst ein verbreiteter und häufiger Brutvogel in der Schweiz, hauptsächlich im Schweizer Mittelland. Ende des 19. Jahrhunderts und vor allem in der ersten Hälfte des 20. Jahrhunderts ging die Art stark zurück und verschwand praktisch vollständig aus dem Schweizer Mittelland. In den Jahren 1970 bis 1995 kamen nur noch sporadisch Wachtelkönige in der Schweiz vor und es fanden praktisch keine Bruten statt. Der Wachtelkönig stand am Rande des Aussterbens und es wurde dringend, Maßnahmen zu seiner Förderung zu unternehmen. 1996 lancierte der SVS/BirdLife Schweiz deswegen ein Artenförderungsprogramm für den Wachtelkönig, das von 1996-1998 mit einem Pilotprojekt startete und seit 1999 jedes Jahr vollumfänglich umgesetzt wird. Einjährige Verträge mit den Landwirten, dort wo rufende Wachtelkönige auftreten, ermöglichen es dieser Art zu Brüten, ohne durch eine zu frühe Mahd gestört zu werden. Rund um den Rufplatz des Wachtelkönigs wird etwa 1 ha Wiese in der Regel bis zum 15. August stehen gelassen.

Die Kantone entschädigen die Landwirte für den dadurch entstandenen Ertragsverlust.

Seit Beginn des Artenförderungsprogramms von SVS/BirdLife Schweiz im Jahr 1996 hat die Anzahl der in der Schweiz beobachteten Wachtelkönige deutlich zugenommen. Ein Teil dieser Zunahme ist vermutlich durch die intensivere Suche nach Wachtelkönigen bedingt. Aber unsere Resultate zeigen, dass nicht nur mehr Wachtelkönige auftreten, sondern, dass sie seit Beginn des Artenförderungsprogramms viel mehr Möglichkeiten haben, erfolgreich zu brüten. In den letzten 20 Jahren schwankte die Anzahl der jährlich in der Schweiz beobachteten Wachtelkönige zwischen 12 und 87 rufenden Männchen. Insgesamt wurden 659 Wachtelkönige zur Brutzeit gemeldet und 56 auf dem Durchzug im Herbst. 55.1 % dieser Tiere waren stationär, d. h. sie blieben mindestens fünf Nächte an einem Standort. Die meisten Wachtelkönige (76.3 %) lassen sich erst im Juni und Juli (zweite Hälfte der Brutsaison) in den Schweizer

Wiesen nieder und treten vor allem in den höheren Lagen zwischen 1.000 und 2.000 m ü. NN auf (75.6 % aller Brutzeit-Beobachtungen). Die Situation hat sich somit im Vergleich zum Anfang des 20. Jahrhunderts stark verändert: Damals kamen die Wachtelkönige hauptsächlich im Mai an und ließen sich in Wiesen in tiefen Lagen nieder. Die aktuelle Bewirtschaftung der Wiesen erklärt die späte Ankunft sowie den Rückzug auf höhere Lagen: Zu Beginn der Wachtel-

königbruttsaison im Mai bieten nur die Wiesen in tiefen Lagen eine ausreichende Wuchshöhe. Diese Wiesen sind aber heute so intensiv bewirtschaftet (stark gedüngt), dass sie vermutlich zu dicht für den Wachtelkönig sind und außerdem zum Zeitpunkt seiner Ankunft zum Teil auch schon gemäht sind. In höheren Lagen sind die Wiesen extensiver und geeigneter, bieten aber erst im Juni eine ausreichende Vegetationshöhe an.

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