Journal of Life Sciences 14 (2020) 9-13
doi: 10.17265/1934-7391/2020.01.002

The State of Persian Wheatear *Oenanthe chrysopygia* de Filippi, 1863 in Armenia

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Abstract: The monitoring of Persian or Red-tailed Wheatear *Oenanthe chrysopygia* was conducted during 2003-2019. The species breeds at the foothills of Urts and Meghri mountain ridges at elevation range from 700 to 1,200 meters above sea level and inhabits rocky semideserts. The total suitable habitat for Red-tailed Wheatear is estimated as 128.4 km^2. The species disappeared at several gorges where larger scale new orchards have been launched. The population of Persian Wheatear makes from 70 to 105 breeding pairs. During last ten years the population shows moderate decline, $p < 0.05$, which is mostly caused by launching of new orchards which occupy natural breeding habitat of the species. Although the species is evaluated as endangered in Armenian Red List, the existing conservation measures are insufficient and should include the following: (1) lobbying official adoption of the species distribution range into the Emerald Network protected under Bern Convention; (2) development of management plans for these Emerald Sites, which will consider a strict policy towards new orchards in the semi-deserts of Meghri and Urts mountains; (3) obligatory environmental impact assessment of any new orchard projects in those areas; (4) introduction of eco-friendly concepts in the horticulture in these areas.

Key words: Persian Wheatear, Red-tailed Wheatear, *Oenanthe chrysopygia*, Armenia, conservation status, distribution, population dynamics, threats.

1. Introduction

Armenia is relatively small (29,743 sq km), landlocked mountainous country, where elevation varies from 375 to 4,090 m above sea level. Such large gap in elevations determines variety of climatic conditions and creates many different landscapes, including semi-desert, juniper woodland, deciduous forest, mountain steppe, and sub-alpine area. The terrain is rigorous and usually is represented with various rocky outcrops [1]. Among such a variety of landscapes, the Persian or Red-tailed Wheatear *Oenanthe chrysopygia* inhabits specific areas of semi-desert from 700 to 1,200 meters above sea level at the Southern regions of the country [2, 3]. The Persian Wheatear is an Asian monotypic species that was recently split from *Oenanthe xanthoprymna* and it inhabits Armenia at the western edge of its distribution range [4, 5]. Although the species is classified as Least Concern in IUCN Global Red List having a stable population trend [6], at European scale it is considered as endangered, having unknown population trend and 40-60 mature individuals [7]. In Armenian Red List it is also classified as endangered, according to criteria B1a+2a; D [8]. The Red Book used data collected in the period of 2003-2009, and now, after a decade, it is time to revise the modern situation with this specialized Passerine. Thus, the current communication is aimed at providing an update on distribution, population size and trends, as well as threats, existing and proposed conservation measures for the Persian Wheatear. Such information will become a foundation for its assessment for the next edition of *Red Book of Armenia* planned for implementation in 2020-2021.

2. Material and Methods

The systematic data collection on the species was started in 2003. Monitoring of the species was

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implemented on the routes or points. Since a 10 × 10 km square is accepted as a unit of change, the standard European Monitoring Grid 10 × 10 km was applied to Armenia, and as a result the territory of the republic was divided into 374 squares. Thus, routs and points of count are connected to squares, and each of them was obtaining its own identification number.

Data on the species were obtained from two different sources: (1) unstandardized observations (so called opportunistic data) and (2) standardized counts (data, collected according to standard methodology). Both data may be used to create species distribution maps, and data, collected by second method may be used for estimation of population trends.

(1) Unstandardized observations (opportunistic data) were provided by birdwatchers and contain minimum data requirements: precise identification of species, observation date, geographic coordinates, name of nearest locality (human settlement, mountain, historical site, etc.), breeding code, name of observer and his contacts. The observations have been commented, e.g. time, observation duration, number of people in the group, etc. Since it was not always possible to record precise geographical coordinates on the spot, information sometimes was provided according to 10 × 10 km square code.

(2) Standardized counts (counts conducted within certain time period) can be led by both: specialists and birdwatchers that have proper skills. Counts were implemented during fixed period of 1 or 2 hours, when an observer was passing the route in a slow motion. It was desirable to make such counts at the time of the day, when birds were most active (as a rule, early in the morning). The best season for Persian Wheatear count was considered the period between 10th of April and 20th of May, nevertheless, data collected from early-April and later until June were used as well. This method required more data: number of observed or acoustically recorded individuals, observation date, geographical coordinates of a beginning and the end of the route, start and end times of the count, breeding code, name and contacts of observer/s. Collected data were entered into standardized protocol and later were inputted into database. To calculate population trends, we used multi-year data series and process them using TRIM 3.0 software [9]. For the purpose the Collated Index was calculated using log-linear poison regression; then the deviations are calculated and presented as a linear function, showing populations growth or decline. Statistically significant change is stated on the $p < 0.05$ level, otherwise the population was considered stable. The mapping is implemented using ArcGIS 10.0 software. To estimate the threats, we have conducted surveys of local farmers, as well as interviews with the State Inspectorate for Nature Protection and Mineral Resources and staff of "Arevik" National Park.

3. Results

3.1 Distribution and Biological Peculiarities in Armenia

During 2003-2019 the Persian Wheatear was found in an additional spot (see map in Fig. 1), although in general, the new site stays within the logic of species' distribution in the country: it breeds at the foothills of Urts and Meghri mountain ridges. The species is found within the same elevation range—from 700 to 1,200 meters above sea level. It inhabits rocky semideserts, with availability of cliffs, rocks, boulders, and screes (see Fig. 2), and prefers the areas with bushes of *Paliurus spina-christi* and *Rhamnus pallassii*. The total habitat that suits the Red-tailed Wheatear is estimated as 128.4 km^2. Within that territory the foothills of Meghri mountain ridge make 78.8 km^2, while the foothills of Urts mountain ridge make 49.6 km^2. The breeding Persian Wheatears have been observed at the edges of human settlements where small-scale traditional mosaic orchards are built on the artificial terraces. However, the species disappeared at several gorges where larger scale new orchards have been launched.

Fig. 1 Distribution of Persian Wheatear in Armenia.

The wheatear makes its nests in cavities under stones or between the stones above ground. Use of the walls which are terracing the orchards for nesting was recorded.

Observations of feeding behavior of Persian Wheatear show two main strategies: (1) searching for the prey like grasshoppers and locusts on the ground from higher perch—usually top of a bush with subsequent attack, and (2) hovering in a flycatcher manner taking flying insects especially in the morning when the temperature is still low and the insects fly slowly.

3.2 Population Dynamics

According to the last estimation, population of Persian Wheatear makes from 70 to 105 breeding pairs. During last ten years the population shows moderate decline, $p < 0.05$ (see Fig. 3). The decline of the Persian Wheatear's population at certain gorges coincides with the launching of new orchards in these areas. The new orchards do not follow the traditional scheme of terracing, but instead are making large flat areas, which are destroying the natural semi-desert areas. For pest control in those orchards the pesticides are applied, while many of traditional orchards decide cultivating in eco-friendly manner.

4. Discussion

The observed shrink of distribution and decline of population of Persian Wheatears in Armenia is mostly related to occupation of the natural semi-desert habitats in Meghri district of Armenia by new orchards. The population of the species in Urts Mountains remains stable so far, because of complete absence of the human activities at that rigorous part of the mountains.

Fig. 2 Typical habitat of Persian Wheatear in Urts mountains of Armenia. Photo by author.

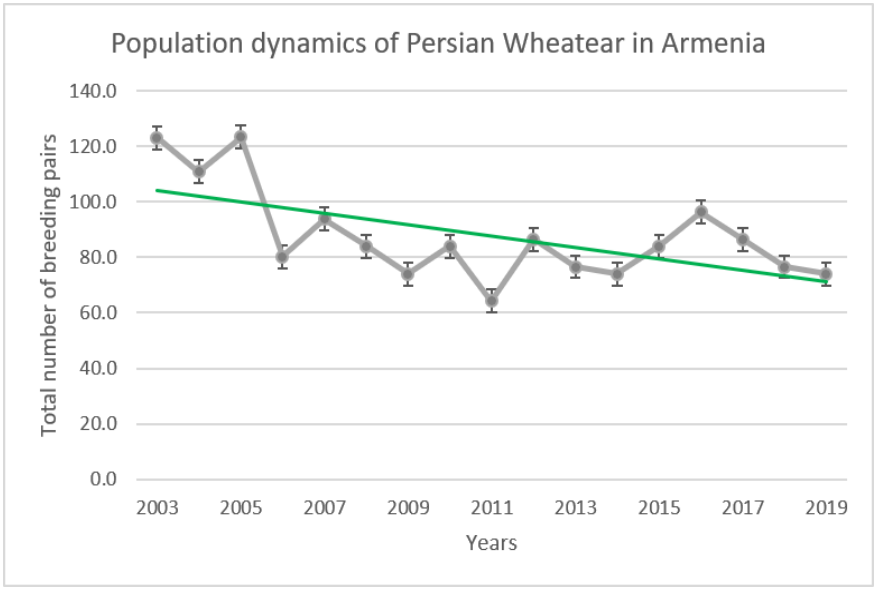

Fig. 3 Population trend of Persian Wheatear in Armenia during 2003-2019.

It is particularly related also to available territory for horticulture. In Urts mountains there are huge, relatively flat areas of semi-desert, which are not inhabited by Red-tailed Wheatear, and their occupation does not affect the species. In Meghri district the situation is different as the terrain is very steep and the flat belt of semi-desert is very narrow, which provokes farmers to go deeper into the natural rigorous semi-desert. The pesticides applied for this kind of intensive horticulture can also harm the species directly being accumulated through the food-chain or indirectly through general decline of prey species.

The species is evaluated as Least Concern in IUCN Global Red List, as it shows table population trend [6]. However, in Europe the species is considered as endangered. Probably the species would have to stay under this category, but the population trend has to be changed from unknown to decreasing and the number of mature individuals should be corrected from 40-60 [7], as only in Armenia there are 70-105 breeding pairs. It appears that the evaluation in Armenian Red

List: endangered, according to criteria B1a+2a, D [8] is sufficient.

The existing conservation measures, namely: (1) inclusion of the species in *National Red Book*, (2) protection of the part of its distribution range by national park "Arevik", as a part of Zangezur Biosphere Complex, (3) inclusion of the distribution range of the species into candidate Emerald Site "Arevik" [10]—are not sufficient since the species continues declining. Therefore, taking the real threats into account, the proposed conservation measures should include: (1) further lobbying official adoption of the species distribution range in the Emerald Network protected under Bern Convention; (3) development of management plans for these Emerald Sites, which will take into consideration a strict policy towards launching of new orchards in the semi-deserts of Meghri and Urts mountains; (4) obligatory environmental impact assessment of any new orchard project planned in Meghri district and Urts mountains of Armenia; (5) introduction of eco-friendly, organic, or bio-concepts in the horticulture in those areas, which are neighboring the habitats of endangered species.

Acknowledgements

The monitoring of the species in Armenia is supported by members of the Armenian Birdwatching Association Data archiving is supported by Observation Foundation. During 2015-2017 the survey was also supported by European Bird Census Council (EBCC) through a grant from the MAVA Foundation for the European Breeding Bird Atlas 2. The administrative support during study of the species was provided by National Park Arevik and Ministry of Environment of RA.

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