Decline in Little Bustard *Tetrax tetrax* numbers wintering in Israel since the 1980s

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Summary: Little Bustard *Tetrax tetrax* is a rare non-breeding winter visitor to Israel. Until the 1980s, small and medium-sized flocks were recorded annually, mainly in the Golan area. At this time, an estimated 100 individuals wintered in Israel annually. Since the 1990s, numbers of wintering Little Bustards in Israel have declined gradually. The last sizeable flock consisted of 21 birds and was recorded in January 2014. Since then, numbers have dropped even further. In recent years the annual number wintering in Israel is either zero or single birds. The observed decline is probably unrelated to land-use changes or other factors in Israel, but may be linked to processes elsewhere.

INTRODUCTION

Historically, the Little Bustard *Tetrax tetrax* has been a rare, locally scarce, non-breeding visitor to Israel in winter, mainly to the north of the country (Shirihai 1996). There are a few historical records, including an individual hunted by Aharoni (1912). It arrives in November and stays until March. In winter, it favours open grassy plains and cultivated fields, especially cereals and legumes. Its distribution in Israel has been concentrated in the Golan area, where vast uncultivated grassy plains are available.

Since the 1990s, observed numbers of this species have dropped gradually. I review these changes and evaluate the current status and potential causes of the decline of the Little Bustard in Israel.

METHODS

For this study, all available published and unpublished data on Little Bustard occurrence, both in print and online, were collated (Appendix 1). Because the Little Bustard has always been a rare bird in Israel, and thus notable, reporting rates are expected to be high, especially since 2000 as the number of birdwatchers increased in the country.

Little quantitative information is available about the species in Israel before the 1980s; for this reason, estimates begin with the survey counts and national-level estimates recorded by Paz (1987) and Shirihai (1996) for that decade (Table 1, Figure 1). During the late 1990s and early 2000s, when professional birdwatching developed in Israel, records were collated into online databases. The earliest of these are Israbirdnet, an email group used by Israeli and visiting birdwatchers to report bird observations, and a dataset maintained by Israel Nature and Parks Authority (INPA) rangers. Since 2013, bird records in Israel have been collected using an online system developed by BirdLife Israel, and since 2018 using eBird (Sullivan *et al* 2009), these data being duplicated on the BirdLife Israel website (birds.org.il). Specimens taken within Israel for natural history collections were identified through correspondence with the main museums that are known to hold significant collections from Israel.

Due to the lack of systematically collected data before the 2000s, statistical trend analysis between decades is not possible. Therefore, to assess temporal changes in the numbers of Little Bustards wintering in Israel between the 1980s and the present, two simple decadal indices were calculated: 1) the highest count per decade; and 2) the decadal mean of the mean annual counts, for which mean annual count is defined as the mean of all observations that year. For the current decade, information through early 2025 was used. Duplicate reports of the same bird or flock were removed from the analysis.

Table 1. Decadal mean of accumulated annual counts, and highest counts per decade, of Little Bustards *Tetrax tetrax* wintering in Israel. The species is not noted in the country in other seasons. For quality of estimate, 1 = low, 5 = high.

Decade	Decadal mean of mean annual counts	Highest count per decade	Important sites	Quality of estimate
1980	60.0	70	1	1
1990	7.2	26	1	2
2000	3.0	17	1	4
2010	2.1	21	0	5
2020	1.0	9	0	5

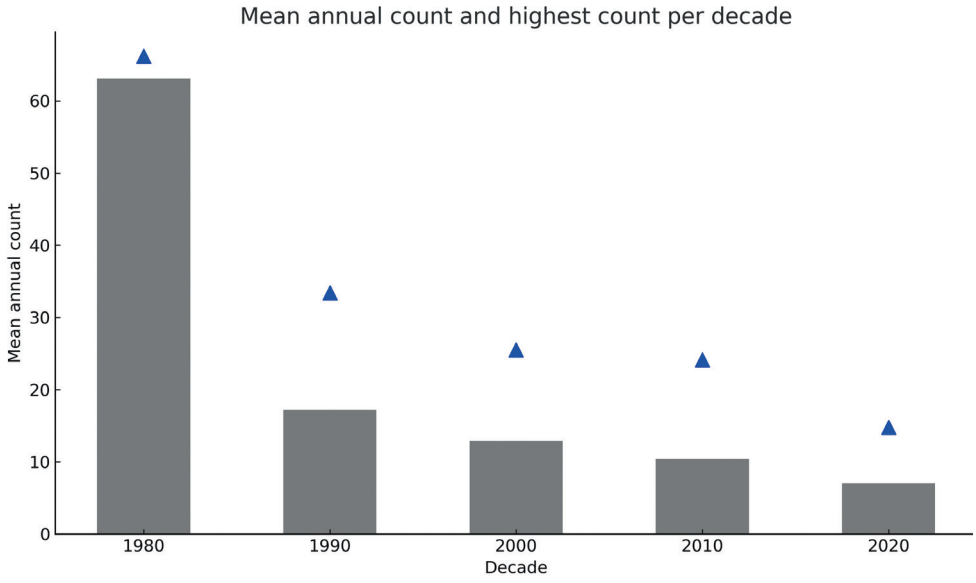

Figure 1. Decadal mean of mean annual counts (grey bars), and highest counts per decade (blue triangles) of Little Bustards *Tetrax tetrax* wintering in Israel.

RESULTS

The number of records of Little Bustard in Israel is 61 (Appendix 1). The decadal indices are presented in Figure 1 and Table 1. Until the late 1980s, a flock numbering 50–70 individuals returned to winter annually in the grasslands surrounding the Bnei Israel reservoir (32.85 N, 35.79 E). Smaller flocks were recorded regularly in the Hula valley and in cultivated fields in the Bet She'an valley. Small numbers, singles or small groups, were recorded as wintering and on passage in other parts of the country, including in semi-arid zones of the southern Judean plains. Thus during the 1980s, the national estimate of the wintering population was 100 individuals (Shirihai 1996). However, spatially- and temporally-explicit information on any of those records away from the main flock in the Golan are not available. Therefore, for the analysis here, only the figures concerning the Golan flock are used. Additionally, because of the paucity of historical data, it is unclear whether the estimate of 100 wintering birds reflects the pre-1980s as well.

Plate 1. Little Bustards *Tetrax tetrax* in an alfalfa field, Kfar Ruppin, Bet She'an valley, January 2014. Part of a flock of 21, the last sizeable flock recorded in Israel. © *Yoav Perlman*

From the 1990s, the largest flock wintering in the Golan shrank in size until it disappeared in the 2000s. However, exact counts depicting this decline in the 1990s and additional records from other parts of the country are largely missing. In the latter decade, the Little Bustard became a very rare winter visitor in Israel, observed only in small numbers, mainly in the Hula valley, Jizreel valley, Bet She'an valley and southern Judean plains, with a mean decadal count of 3 and highest count of 17. In some years only single birds were seen, occasionally small flocks. In the 2010s, the mean decadal count stayed low, at 2.1. The last sizeable flock was observed between December 2013 and January 2014 in the Bet She'an valley, numbering 21 birds. Since 2020, the species has not been recorded every year in Israel, having been unrecorded in winters 2021/22 and 2023/24. Records come mainly from the Bet She'an valley, with fewer records from Golan, Hula valley and other parts of the country. The decadal mean count in 2020s is 0.98. However, in winter 2024/25 an extraordinary number of Little Bustards was recorded in Israel, with a total 20 birds in the Bet She'an, Hula and Acre valleys and near Be'er Sheva in the northern Negev, including a flock of nine in the Bet She'an valley.

DISCUSSION

The decline in numbers of Little Bustards observed in Israel since the 1990s is likely to reflect the true tendency of its status in Israel, despite incomplete coverage in some years and the cryptic nature of Little Bustards in winter. Certainly, the large flock that used to winter in the Golan area until the 1980s no longer winters there. Recent observations are of single birds, at most.

The reasons for this observed decline of wintering Little Bustards in Israel are unclear. Previously used grassland habitat in the Golan is still vast and fairly well protected, and capable of supporting wintering flocks of Little Bustard. The agricultural zones where Little Bustards used to winter regularly in small numbers have undergone moderate changes, including agricultural intensification. Suitable large cereal and legume fields are still dominant in the Bet She'an and Jizreel valleys. There are no documented cases of direct mortality of Little Bustard in Israel, except birds collected for museums. Therefore, it is possible that the decline observed in Israel is linked with processes operating outside Israel.

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Appendix 1. All records of Little Bustard in Israel, in chronological order, 1911–early 2025

Codes: BSV = Bet She'an valley; CP = Coastal Plains; EG = Eastern Galilee; e/b = eBird/birds.org.il; HV = Hula valley; INPA = Israel National Parks Authority; isra = israbirdnet; JP = Judean Plains; NCP = Northern Coastal Plains; res. = reservoir; S1996 = Shirihai, H. 1996 Birds of Israel; TAU = Tel Aviv University Nature Collections; WN = Western Negev

1, **Sartaba**, Samaria, 01.01.1911 (Yisrael Aharoni, specimen in American Museum of Natural History); 23, **Bet She'an**, BSV, 06.12.1924 (Dr WK Bigger, S1996, 1 specimen in Natural History Museum, UK); 6, **Jaffa**, CP, 01.12.1933 (Ridenko, S1996); 1, **Kfar Masaryk**, Northern CP, 31.12.1949 (unknown, specimen in TAU); 13, **Bet She'an**, BSV, 22.01.1973 (Shimoni Ofer, S1996); 1, **Sde Eliyahu**, BSV, 18.11.1974 (Shalom Zuaretz, specimen in TAU); 1, **Tel Aviv**, CP, 09.11.1981 (Oz Horine, S1996); 3, **Kerem Shalom**, WN, 06.01.1983 (Oz Horine, S1996); 1, **Bnei Israel res.**, Golan, 04.01.1984 (Dror Pevzner, INPA); 1, **Tal Shahar**, JP, 07.12.1985 (Arie Rochman, INPA), 1, **Kfar Ruppin**, BSV, 27.12.1986 (Dan Alon, e/b); 1, **Kokhav Hayarden**, EG, 14.01.1987 (Avri Lachman, INPA); 11, **Hula valley**, HV, 28.11.1989 (Yaron Baser, S1996); 19, **Bet She'an**, BSV, 09.12.1989 (Ehud Dovrat, S1996); 1, **Ein Afek**, NCP, 25.12.1989 (Shai Blitzblau, INPA); 26, **Bet She'an**, BSV, 11.12.1992 (Ehud Dovrat, S1996); 17, **Kfar Ruppin**, BSV, 03.12.1994 (Rami Mizrachi, e/b); 10, **Kfar Ruppin**, BSV, 30.01.1996 (Eyal Shochat, e/b); 8, **Kfar Ruppin**, BSV, 29.11.1996 (Dubi Shapiro, e/b); 10, **Kfar Ruppin**, BSV, 14.01.1998 (Eyal Shochat, e/b); 1, **Kfar Ruppin**, BSV, 27.11.1998 (Dubi Shapiro, e/b); 1, **Sde Eliyahu**, BSV, 11.12.1999 (Rami Mizrachi, e/b); 1, **Bnei Israel res.**, Golan, 17.12.1999 (unknown, INPA); 1, **Bnei Israel res.**, Golan, 07.12.2000 (Ran Lotan, INPA); 6, **Bnei Israel res.**, Golan, 24.01.2002 (Yoav Perlman, e/b); 17, **Bnei Israel res.**, Golan, 20.02.2005 (Tuvia Kahn, e/b); 1, **Bnei Israel res.**, Golan, 17.11.2005 (Eran Banker, isra); 1, **Agamon Hula**, HV, 21.01.2006 (Yoav Perlman, isra); 1, **Ramot Meir**, JP, 10.10.2006 (Yoav Motro, isra); 1, **Majrase**, Northern Lake Kinneret, 28.12.2007 (Nathan Bainosoviz, INPA); 3, **Ramot Issaschar**, EG, 16.01.2008 (Ali Ahed, INPA); 1, **Revadim fields**, JP, 13.12.2008 (Ezra Hadad, isra); 1, **Agamon Hula**, HV, 14.12.2008 (Dotan Yosha, isra); 1, **Ein Hamifratz**, NCP, 19.12.2008 (Pablo Rudaeff, isra); 1, **Bnei Israel res.**, Golan, 01.01.2009 (Rony Livne, e/b); 1, **east of Katzrin**, Golan, 30.01.2009 (Eran Banker, isra); 1, **Wadi Adorayim**, Southern JP, 07.12.2010 (Ezra Hadad, isra); 1, **Kokhav Hayarden**, EG, 28.11.2011 (Roi Ben Yosef, INPA); 1, **Afula**, Jizreel valley, 08.12.2011 (Roi Ben Yosef, INPA); 1, **Agamon Hula**, HV, 11.12.2011 (Gev Galili, e/b); 1, **Be'eri**, WN, 14.12.2011 (Ziv & Michal De-Porto, isra); 1, **Hamadiya**, BSV, 06.01.2012 (Ami Dorfman, INPA); 2, **Ramtaniya res.**, Golan, 20.01.2012 (BirdLife Israel, e/b); 6, **Kfar Ruppin**, BSV, 12.01.2013 (Niv Bessor, e/b); 3, **Ma'akhaz ruins**, Southern JP, 20.12.2013 (Ezra Hadad, e/b); 21, **Kfar Ruppin**, BSV, 02.01.2014 (Tuvia Kahn, e/b); 3, **Agamon Hula**, HV, 15.01.2014 (Nadav Israeli, e/b); 1, **Area 81**, Southern JP, 24.01.2015 (Elon Gur, e/b); 1, **Lehavot Habashan fishponds**, HV, 21.11.2016 (Hula Bird Festival 2016, e/b); 1, **Kibbutz Ram'on**, Harod valley, 01.01.2017 (Tuvia Kahn, e/b); 4, **Maoz Haim**, BSV, 04.01.2017 (Oded Ovadia, e/b); 1, **Hazore'a fishponds**, Jizreel valley, 27.11.2019 (Uri Gabay, e/b); 1, Gal'on, Southern JP, 21.11.2020 (Liad Cohen, INPA); 1, **Maoz Haim**, BSV, 27.12.2023 (Eldad Golan, e/b); 1, **Be'er Sheva**, Northern Negev, 30.11.2024 (Micha Korkus, e/b); 4, **Kfar Ruppin**, BSV, 04.12.2024 (Nadav Israeli, e/b); 1, **Kfar Masaryk**, NCP, 12.12.2024 (Gal Sahar, e/b); 2, **Agamon Hula**, HV, 29.12.2024 (Amit Goldstein, e/b); 2, **Ramat Tzvaim**, BSV, 07.01.2024 (Ofir Lotan, e/b); 9, **Maale Gilboa**, BSV, 16.01.2025 (Avner Rinot, e/b); 1, **Bnei Israel res.**, Golan, 29.01.2025 (Noam Nusbaum, e/b)