

## A snapshot of the summer diet of the Wood Pigeon *Columba palumbus* in Sicily

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The Wood Pigeon *Columba palumbus* is a large columbid bird which in the last decades experienced a significant demographic increase throughout its distribution range (Birdlife International 2018), and which is currently considered a potential threat to arable crops (see Ó Huallachain & Dunne 2013, and references therein). An increasing demographic trend was recently also observed in Sicily (Lo Valvo *et al.* 1993), where the species is nowadays common throughout the region including heavily urbanized areas (AA.VV. 2008), and it also occurs on several of the small circum-Sicilian islands (Massa *et al.* 2015).

The causes underlying its range-wide population increase are to date not fully understood. In particular, little is known about its feeding habits in the Mediterranean region (see Gutiérrez-Galán *et al.* 2017), a possible key factor to interpret is that if food availability could have locally affected its population status. Moreover, as stressed by Merabet *et al.* (2014), the diet of the species can vary in different regions based on food availability, so that local studies are needed in order to get a sound insight on its local feeding habits. To the best of our knowledge, there are currently no studies on its feeding habits available for the Italian populations.

In order to collect data on the summer diet of the species in Sicily, Wood Pigeons were sampled from farmlands in western Sicily, and the content of their crops was analysed. Samples were collected from the province of Palermo (western Sicily, Italy), within the municipalities of Villafraati, Bolognetta and Corleone (territorial hunting area: ATC Palermo 1).

The study area is characterized by scattered Oaks *Quercus cf. pubescens*, Black Poplars *Populus nigra* and Eucalyptus *Eucalyptus globulus* surrounded by several fields used for growing durum wheat grain. All the specimens were shot in September 2008 and September 2009

by local hunters during the legal hunting season and kindly made available to us. No information was available on the timing of the shooting down of each individual bird, so that it is very possible that not all the collected specimens had finished feeding before being shot.

All the specimens obtained were weighed, and the measurements of wing's total length and the length of the third flight feather were registered with a standard wing rule. The birds were considered as adults if they showed the white neck markings which are characteristic of the adults of this species. Their stomachs were dissected and the food items were identified by the authors with the use of a binocular microscope.

Overall, 41 specimens were collected in September 2008 (17 adults and 24 juveniles), and 45 in September 2009 (17 adults and 28 juveniles). The weights and biometrics of each specimen are reported in Tables 1 and 2. The crops of 86 Wood Pigeons were then analyzed, leading to the finding of 7 different food items: durum wheat grain *Triticum durum*, grapes *Vitis vinifera*, chickpea *Cicer arietinum*, fava bean *Vicia faba*, horse bean *Vicia faba* var. *minor*, Common vetch *Vicia sativa*, and Cape sorrel *Oxalis pes-caprae*, whose incidence in the individual birds is reported in Tables 1 and 2. Nine stomachs (2 from birds shot in 2008, 7 from birds shot in 2009) were found empty and were thus excluded from further analysis.

Among the 77 full stomachs, 62 (80.5%) contained wheat grains, and 21 (27.3%) contained legumes. No tree-bearing fruits or animal items were recovered from any of the collected specimens. No significant differences were observed between juvenile and adult birds nor between the two sampling periods, with a strong dominance of durum wheat grains and Fabaceae for both juveniles and adults in both years (Tables 1 and 2). Grapes, Chickpeas and Cape sorrel were observed only in the 2008 dataset,

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**Table 1.** Food items observed in wild Wood Pigeons from Sicily (September 2008). Juv.: Juvenile; Ad.: Adult. W: Wheat *Triticum durum*; G: Grapes *Vitis vinifera*; CP: Chickpea *Cicer arietinum*; FB: Fava bean *Vicia faba*; FBM: Horse bean *Vicia faba* var. *minor*; CV: Common vetch *Vicia sativa*; CS: Cape Sorell *Oxalis pes-caprae*.

Specimen	Age	Wing total length (mm)	Length of the third flight feather (mm)	Weight (gr)	Food items						
					W	G	CP	FB	FBM	CV	CS
1	Juv.	239	166	435	1	1	0	0	0	0	0
2	Ad.	235	165	400	1	0	0	0	0	0	0
3	Juv.	240	164	450	1	0	0	0	0	0	0
4	Juv.	280	161	310	1	0	0	0	0	0	0
5	Juv.	200	n.d.	370	0	0	1	1	0	0	0
6	Ad.	220	159	410	1	0	0	0	0	0	0
7	Juv.	234	165,5	330	1	0	0	0	0	0	0
8	Ad.	230	167	450	1	0	0	0	0	0	0
9	Ad.	237	165	470	1	0	0	0	0	0	0
10	Juv.	226	163	370	1	0	0	0	0	0	0
11	Juv.	236	n.d.	370	1	0	0	0	0	0	0
12	Juv.	221	160	340	1	0	0	0	0	0	0
13	Juv.	223	160	410	1	0	0	0	0	0	0
14	Juv.	232	165	370	0	1	0	0	0	0	0
15	Juv.	242	170	390	1	0	0	0	0	0	0
16	Ad.	249	178	430	0	0	0	0	0	0	0
17	Ad.	232	161	400	1	0	0	0	0	0	0
18	Ad.	237	158	420	0	0	0	1	0	0	0
19	Ad.	240	165	430	1	0	0	0	0	0	0
20	Juv.	232	166	410	0	0	0	0	0	1	0
21	Ad.	246	174	420	1	0	0	0	0	0	0
22	Juv.	224	154	390	0	0	0	0	0	1	0
23	Juv.	233	158	370	1	0	0	0	0	0	0
24	Juv.	238	165	430	1	0	0	0	0	1	0
25	Ad.	236	168	420	1	0	0	0	0	0	0
26	Ad.	235	160	410	1	0	0	0	0	0	0
27	Ad.	237	168	430	1	1	0	0	0	1	0
28	Juv.	240	166	420	0	0	0	0	0	0	0
29	Juv.	231	167	420	1	0	0	0	0	0	0
30	Juv.	230	159	250	1	0	0	0	0	0	1
31	Juv.	232	160	380	1	0	0	0	0	0	0
32	Juv.	224	150	400	1	0	0	0	0	0	0
33	Ad.	236	164	410	1	0	0	0	0	1	0
34	Ad.	240	172	460	1	0	0	0	0	0	0
35	Ad.	230	150	410	1	0	0	0	0	1	0
36	Ad.	244	173	400	1	0	0	0	0	0	0
37	Juv.	229	161	330	0	0	0	0	0	1	0
38	Juv.	230	166	310	1	0	0	0	0	0	0
39	Ad.	246	170	460	1	0	0	0	0	0	0
40	Juv.	229	153	360	1	1	0	0	0	0	0
41	Juv.	173	112	310	0	0	1	0	0	0	0

**Table 2.** Food items observed in wild Wood Pigeons from Sicily (September 2009). Juv.: Juvenile; Ad.: Adult. W: Wheat *Triticum durum*; G: Grapes *Vitis vinifera*; CP: Chickpea *Cicer arietinum*; FB: Fava bean *Vicia faba*; FBM: Horse bean *Vicia faba* var. *minor*; CV: Common vetch *Vicia sativa*; CS: Cape Sorell *Oxalis pes-caprae*.

Specimen	Age	Wing total length (mm)	Length of the third flight feather (mm)	Weight (gr)	Food items						
					W	G	CP	FB	FBM	CV	CS
1	Juv.	nd	nd	420	0	0	0	0	1	0	0
2	Juv.	233	167	410	1	0	0	0	0	0	0
3	Juv.	235	163	430	1	0	0	0	0	0	0
4	Juv.	224	168	400	0	0	0	1	0	0	0
5	Juv.	227	173	420	1	0	0	0	0	0	0
6	Juv.	229	163	440	1	0	0	0	0	0	0
7	Juv.	236	164	400	1	0	0	0	0	0	0
8	Juv.	223	138	390	1	0	0	0	0	0	0
9	Juv.	211	152	430	1	0	0	0	0	0	0
10	Juv.	235	165	410	1	0	0	0	0	0	0
11	Juv.	226	164	400	1	0	0	0	0	0	0
12	Juv.	232	166	430	0	0	0	0	1	0	0
13	Juv.	217	155	400	1	0	0	0	0	0	0
14	Juv.	224	162	380	1	0	0	0	0	1	0
15	Juv.	227	163	420	1	0	0	0	0	0	0
16	Juv.	234	166	440	1	0	0	0	0	0	0
17	Juv.	235	166	420	1	0	0	0	0	1	0
18	Juv.	237	171	380	1	0	0	0	0	0	0
19	Juv.	226	161	410	1	0	0	0	0	0	0
20	Juv.	221	160	400	1	0	0	0	0	0	0
21	Juv.	237	171	440	0	0	0	0	0	1	0
22	Juv.	219	152	430	0	0	0	0	0	1	0
23	Juv.	222	162	420	1	0	0	0	0	0	0
24	Ad.	226	167	470	1	0	0	0	0	0	0
25	Ad.	228	173	440	1	0	0	0	0	0	0
26	Ad.	229	171	460	1	0	0	0	0	0	0
27	Ad.	240	178	450	1	0	0	0	0	0	0
28	Ad.	236	172	430	1	0	0	0	0	0	0
29	Ad.	236	166	400	1	0	0	0	0	0	0
30	Ad.	225	160	480	1	0	0	0	0	0	0
31	Ad.	232	168	450	1	0	0	0	0	0	0
32	Ad.	232	167	440	1	0	0	0	0	0	0
33	Ad.	242	172	430	1	0	0	0	0	0	0
34	Ad.	240	175	470	0	0	0	0	1	0	0
35	Juv.	228	163	300	1	0	0	0	0	0	0
36	Juv.	228	166	340	1	0	0	0	0	0	0
37	Juv.	235	163	387	0	0	0	0	0	0	0
38	Ad.	242	175	407	0	0	0	0	0	0	0
39	Juv.	221	160	318	0	0	0	0	0	0	0
40	Ad.	242	175	402	0	0	0	1	0	0	0
41	Ad.	243	175	421	0	0	0	0	0	1	0
42	Ad.	251	179	411	0	0	0	0	0	0	0
43	Ad.	247	180	453	0	0	0	0	0	0	0
44	Juv.	157	220	337	0	0	0	0	0	0	0
45	Ad.	162	225	409	0	0	0	0	0	0	0

while horse bean was observed only in the 2009 dataset, but all these food items were present with a negligible incidence (Tab. 1).

Our results thus show a strong prevalence of wheat grains in the late summer diet of the Sicilian Wood Pigeon, followed by a rather common presence of legumes. Conversely, no tree-bearing fruits or seeds, acorns, or animal items were found. These findings are in conformity with the strong seasonality in the diet of the Wood Pigeon observed in other countries (see Gutiérrez-Galán *et al.* 2017, and references therein) and to the documented preference by the species for cereal crops, when these are available; moreover, the Wood Pigeon is known to be almost exclusively herbivorous: the occurrence of animal items in its diet are mostly limited to the pigeon's breeding period, and is usually necessitated by the demand for calcium required for the production of eggs (Gutiérrez-Galán *et al.* 2017). In the light of the sampling dates in the present study, which covered the post-reproductive period of the species and the high percentage of juvenile specimens, the complete absence of animal items from the studied crops is therefore not surprising.

Present data shows that, in accordance with what has been observed in other Mediterranean and non-Mediterranean areas, the summer diet of the Wood Pigeon is dominated by grains of cereal crops (Ó Huallachain & Dunne

2013, Merabet *et al.* 2014, Gutiérrez-Galán *et al.* 2017). The need for further sampling activities covering a whole year is desirable in order to collect data on the dietary shift of Sicilian Wood Pigeon when the rich trophic resource constituted by cereal crops and legumes is not available.

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