Case study: Analysis of the Common swift diet to be used for mitigation measures planning

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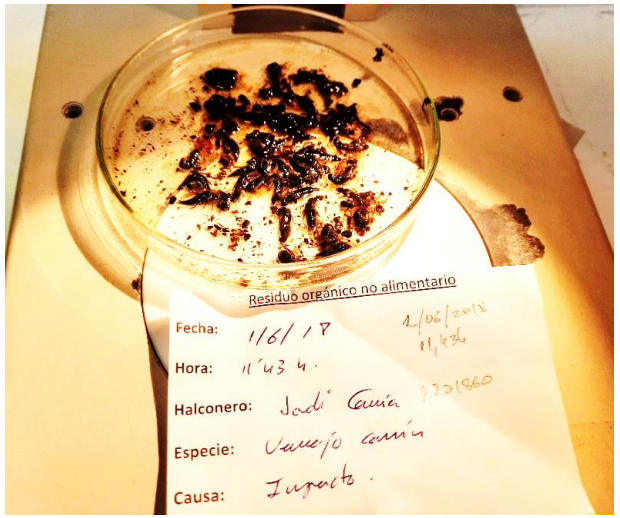
Introduction



The J.T. Barcelona-El Prat Airport operator (Aena SME, S.A.) is proactive in including within the wildlife strike prevention measures:

- Collaboration with external organizations and stakeholders.
- Scientific approach to the issue (as far as possible).
- Search for innovative solutions on the basis of Mediterranean ecology and local approaches.

Common swift (*Apus apus*) is the species most frequently involved in wildlife strikes at Airport.
We explored management tools based on Common swift diet analysis. Carcasses of 68 individuals of a total of 128 collected from bird strikes in 2015, 2018, and 2020 were used.

Aims of the study

- To get information about Common Swift local diet at J.T. Barcelona-El Prat Airport and its close surroundings.
- To get complementary information about the species biology.
- To propose wildlife hazard management improvements based on the results.

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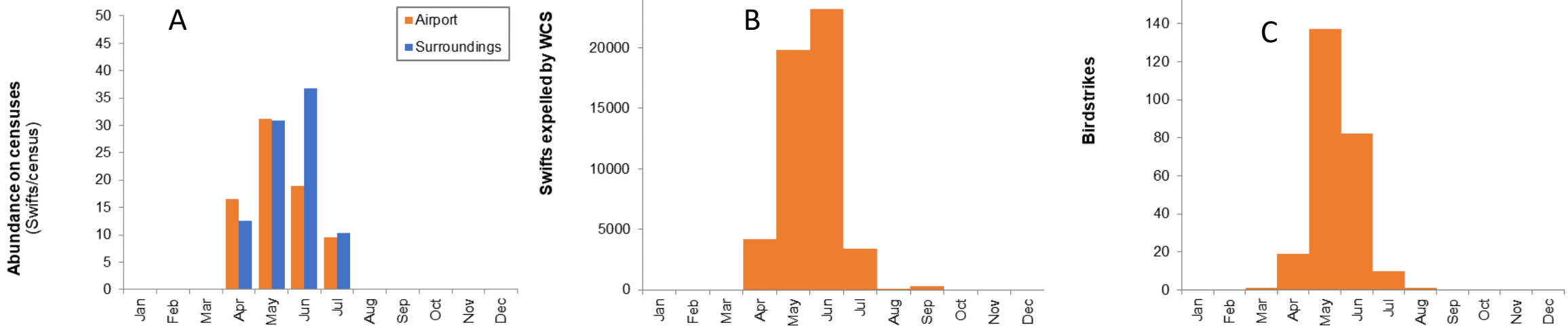
Common swift fenology at the Airport



A) Abundance according to biweekly censuses at the Airport and surroundings (2011-2020).
B) Observations and interventions of the Wildlife Control Service (2019-2021).
C) Bird strikes and FOD on RWY recorded (2016-2020).

Source: Aena

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Common swift diet at the Airport

Taxa	Swifts with each taxa N = 68	
	Núm.	%
Coleoptera (beetles, etc.)	41	60,3
Ants	38	55,9
Hemiptera (true bugs, etc.)	8	11,8
Diptera (flies, mosquitoes, etc.)	7	10,3
Hymenoptera, other than ants	5	7,4
Odonata (dragonflies, etc.)	1	1,5
Arachnids (spiders, etc)	1	1,5

Cockchafers.
F. *Escarabeidae*, O. *Coleoptera*

Importance of the timing of swarming. Ants and/or coleoptera (*curculionidae*, *estafilinidae* and *cockchafers*).

Beetles tend to show heavy flights, low and slow.
Ants fly at 15 a 50m high, and up to 100m.

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Ants found on 25 Swifts

Species	Swifts with each taxa	Queens	Males	Total ants
Tapinoma* group *nigerrimum	14	3	67	70
Tetramorium forte	7	57	49	106
Tapinoma madeirense	7	55	50	105
Tetramorium inmigrans	5	11	25	36
Plagiolepis schmitzii	2	20	2	22
Solenopsis sp.	1	21	2	23
Aphaenogaster subterránea	1	0	1	1
Temnothorax specularis	1	1	0	1

Ant species analysis is still ongoing.

Tetramorium forte

Species found inhabit human-altered environments, such as urban or semiurban barren and semiruderal areas or pine forests.

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Common swift diet in Europe

England [a]	Germany [a]	Switzerland [a]	Mediterranean France [a]	J.T. Barcelona-El Prat Airport
Hemiptera	Hemiptera	Diptera	Hemiptera	Hymenoptera [b]
Diptera	Coleoptera	Hemiptera	Hymenoptera	Coleoptera
Coleoptera	Diptera	Coleoptera	Coleoptera	Hemiptera
Hymenoptera	Lepidoptera	Hymenoptera	Arachnids	Diptera
Arachnids	Arachnids	Arachnids	Odonata	Odonata
			Diptera	Arachnids
			Lepidoptera	

a Source: Gory (2008)
b 89% of which are ants

Staphylinidae and *carabidae* (O. *Coleoptera*)

Curculionidae Polydrusus sp. O. *Coleoptera*.

Common swift diet in the Mediterranean region differs from that in central Europe.

In the Airport, hemiptera and diptera are scarce in comparison to other regions, whereas ants and coleoptera dominate.

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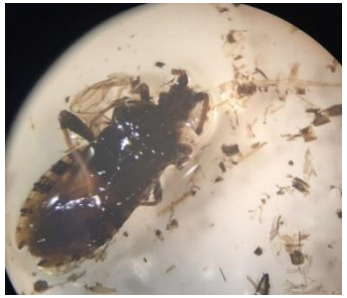
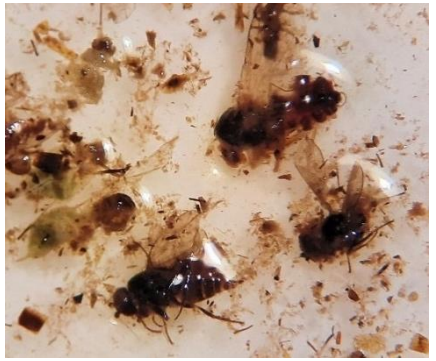
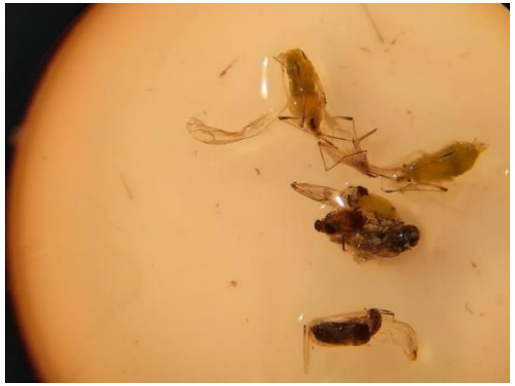
Examples of swifts prey taxa


Heteroptera: Left, F. *Rhyparochromidae*, *Emblethis* cf (feed on seeds). Center: True bug F. *Coreidae*. Right: *Henestaris sp.*, F. *Geocoridae* (Salt marsh zoophyophaga).

O. *Diptera*, SO *Brachycera* y group *Acalyptratae.*
Flies with larva growing on *asteraceae* flowers.






O. *Hemiptera* non heteroptera. Left: aphid (greenfly)
Righ: cicada (F. *Cicadidae*)

O. Coleoptera F Crisomelidae
Cassida sp.

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Conclusions (I)

1- Common swifts in the area are not breeders, but part of a non reproductive floating population:

- Just one individual found with brood patch.
- Only 6% of the individuals with food balls in the mouth (to feed the chicks).

2- Most consumed preys in May and June are:

- Hymenoptera (mainly ants)
- Coleoptera (wide diversity).

3- Opportunistic feeding behaviour in Common swifts is confirmed. No preference for male or female ants despite important differences on fat content.

4- Great consumption of flying ants could be a particular parameter of Iberian airports, or at least at J.T. Barcelona-El Prat Airport. Consumed species are generalist and adapted to human altered habitats.

5- Diet indicates that they are also opportunistic on the height above ground. Main preys have different flying behaviour: ants fly high and beetles low.

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Conclusions (II)

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6- Opportunistic behaviour shown by Common swifts in this study difficult the application of concrete and specific management measures. As species, their habitats and flight behaviour are of a wide spectrum.

7- The fact that Common swifts in the area are part of a non-reproductive floating population explains the high variability observed of their incidence on strikes.

8- Expelling interventions as well as habitat management should be maintained as the main measures on Common swifts.

9- Results do not provide enough information to predict diet taxa or potential bird strike events despite of intense and highly specialized effort involved in the study.

10- Common swift opportunistic behaviour results in feeding at any swarming event of a wide diversity of taxa. This could be mainly explained by analysing local weather factors that could be better studied with predictive models. **New planned research**.

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