

Action C.2
REFORZAMIENTO POBLACIONAL
C.2.2 Reintroduction in Sardinia



ISPRA

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LIFE PROJECT “AQUILA a-LIFE” (LIFE16 NAT/ES/000235)

BONELLI’S EAGLE (*Aquila fasciata* Vieillot, 1822) REINTRODUCTION IN SARDINIA

Azione C2: Reinforcement poblacional
C.2.2 Reintroduction In Sardinia

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According to a formal agreement with ISPRA, Forestas Agency set up the cage.

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1. HACKING CAGE: LOCATION AND SETTING UP

The hacking cage was set in the first selected release site, Tepilora Regional Park, within an area patrolled by Forestas state agency. Access to the site was restricted and controlled by Forestas personnel, both during day and night. To reinforce site patrolling, we put three camera traps along the main tracks towards the cage; these camera traps didn't detect any intrusion by human beings. Occasionally, the presence of sheep dogs was detected, but dogs never came close to the aviary. Regional Forestry Corp was also involved in this phase, in order to intensify the patrolling of the whole site.

The cage was built up according to technical instructions from Grefa (Fig.1), which also supervised (J.J. Iglesias) the operations at a later stage of construction, also giving advices for the location of the outer platforms. Two feeding platforms were available inside the aviary as well as two drinking points. Overall three inspection windows with tinted glasses were set, two in the nest and one in the main cage. In the nest, two camera traps were also set, recording three min video every five minutes.

In 2018, one day before the arrival of the first eagles, the Veterinary Service requested to "seal" the nest with an extra-net, in order to prevent insects to come inside the nest. We used a metal net with tight texture all around the nest. Although it reduced air circulation, it was very useful to effectively prevent wasp and flies to come into the nest, attracted by the meat waste, thus improving eagle's welfare during the nest-stage.

Outside the cage, six feeding platforms were set up as well as one drinking point. The latter was never used by the animals, because, as discovered during post release observations, several natural water points were available close to the cage in the main valley, notably one along the river down the cage and another closer to the cage and used for bathing.

Camera traps were set up at five outer platforms; for the sixth, we put the camera trap on the top of a pole, which was however removed soon after release, since it could prevent the eagles from feeding at the corresponding platform. For the same reason, we removed the plastic cones originally put along the pole to prevent martens from access to the outer platforms.

After completion of the first hacking season, the aviary has not been modified, apart from some minor changes that have been realized to improve, as an example, the view of the observers. The shadow are in the nest was also increased.

The same cage was used in hacking season 2019.

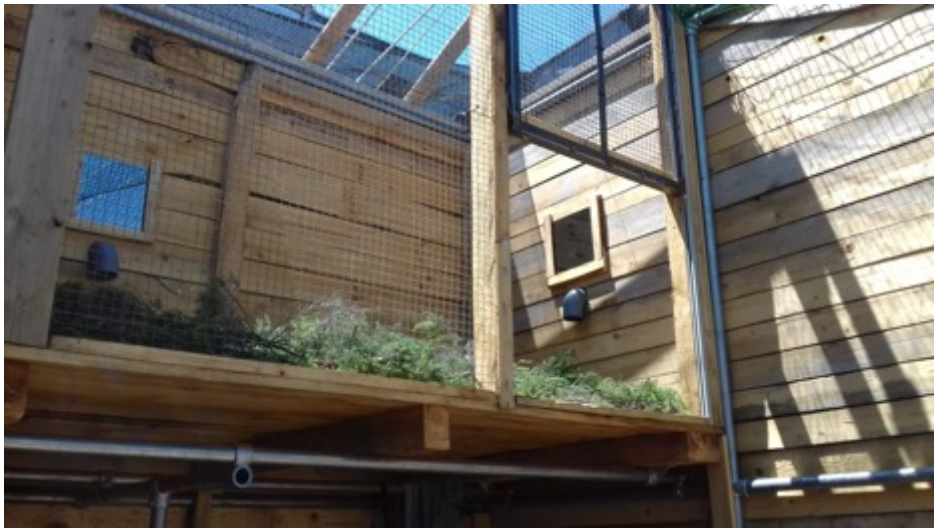


Fig. 1 View of the hacking aviary and nest

2. INDIVIDUAL HISTORIES

In 2019 (Tab.1), hacking started at the end of April (27) in Tepilora Regional Park (Bitti, NU), when 5 chicks, 4 coming from Andalusia (wild) and one from GREFA (Madrid, captive born), were released in the hacking cage, at about 50 days of age. On 12 of May another eaglet (A12) of about 45 days from Sicily (wild, Life ConRaSi project) was placed in the cage.

The first 4 eaglets (A07, A08, A09, A11) were kept in the nest section of the cage for 18 days and then released (at 67-79 days of age) in the main aviary, where they remained for 31 days.

On May 25, after respectively 28 days (A10) and 13 days (A12) of permanence in the nest section of the cage, these eaglets were released in the main aviary with the others. Their later release from the nest was decided because A10 was the youngest of the first five eagles and A12 arrived much later than the other.

All the first six eagles were released in nature at dawn, on 19/6/2019.

On 13 July other two birds, A14 recovered from Valencia (wild) and A15 from GREFA (captive born, Madrid) were hosted in the hacking cage; A14 was wild-borne eagle from Andalusia, recovered by Grefa after being found shot. These eaglets stayed in the nest for only a couple of days and spent other two weeks in the hacking cage before being released on 26 July.

All the animals were tagged in Grefa with E-obs devices, which were set observing the same sampling schedule applied by the other partners of the project, and marked with colored metal rings with individual alphanumeric codes readable at distance (base color yellow, with black inscriptions). Upon arrival in Tepilora Regional Park, they were also ringed with metal rings issued by the Italian ringing center ISPRA.

The name for the all eaglets were chosen by Forestas team who built up the hacking cage.

The start of hacking was followed by dedicated press releases.

Year	Origin	Name	PVC Ring	SEX	Birth date	Arrival date	Age	Date of release from the nest	Release in nature	Age at release
2018	LPO	Abbaluchente	A01	F	04-mag-18	29-giu-18	56	17-lug-18	20-ago-18	108
2018	LPO	Helmar	A02	M	05-mag-18	29-giu-18	55	17-lug-18	20-ago-18	107
2018	LPO	Posada	A03	F	07-mag-18	29-giu-18	53	17-lug-18	20-ago-18	105
2018	LPO	Tepilora	A04	F	09-mag-18	29-giu-18	51	17-lug-18	20-ago-18	103
2018	Grefa	Nurasè	A05	F	29-mag-18	24-lug-18	56	02-ago-18	20-ago-18	83
2018	Andalusia	Saccaia	A06	F	10-apr-17	15-dic-18	614	-	21-dic-18	
2019	Andalusia	Muscatoglio	A07	M	02-mar-19	27-apr-19	56	15-mag-19	19-giu-19	109
2019	Andalusia	Artaneddu	A08	M	27-feb-19	27-apr-19	59	15-mag-19	19-giu-19	112
2019	Andalusia	Prenna	A09	F	25-feb-19	27-apr-19	61	15-mag-19	19-giu-19	114
2019	Andalusia	Illiorai	A10	M	11-mar-19	27-apr-19	47	25-mag-19	19-giu-19	100
2019	Grefa	Pratteri	A11	M	09-mar-19	27-apr-19	49	15-mag-19	19-giu-19	98
2019	Agrigento	Battore	A12	M	17-mar-19	12-mag-19	56	25-mag-19	19-giu-19	94
2019	Valencia	Ichnusa	A14	F	19-mar-19	13-lug-19	116	14-lug-19	26-lug-19	129
2019	Grefa	Inoche	A15	F	19-apr-19	13-lug-19	85	14-lug-19	26-lug-19	98

Tab. 1 List of the Bonelli's eagles hacked in 2019 (highlighted in yellow) in Tepilora Regional Park. PVC rings are yellow with black inscriptions. Eagles were also fitted with metal rings and GPS-tags.

Upon release, besides Ispra, the major of Torpè, Forestas, Anthus and Grefa were present (Fig. 2) and the event was followed by local media.



Fig. 2 The start of hacking season 2019

3. HACKING AND RELEASE



Fig. 3: A07 and A09 (left) and A07 and A011 eating together on the opened door of the cage.

3.1 Behavior in the cage

Compared to eagles hacked in the previous season, the 2019 eagles showed a relatively different behavior, characterized, both in the nest and in the main cage, by minor interactions between them and much less vocalizations. All of them kept on being strongly suspicious and alert at any noise in/outside the cage and they never got used to even familiar, daily noise (i.e. that of the cage

itself). These differences could be related to the wild origin of most of the eaglets compared to those hatched in 2018, when almost all individuals but one came from captive breeding.

Moreover, inexplicably, the 2019 eaglets didn't like crows which they showed to strongly avoid.

Eagles spent most of the time resting, while flapping activity increased with time. The tree trunk put in the nest was strongly used by all the eagles, particularly for flapping, as occurred also in 2018.

Since in 2019 the eagles were released in nature in two different periods (19/6 and 26/7), the cage was occupied while the first six eagles were already flying outside. The cage has been therefore a strong point of attraction for the animals already free, as the latter often came to the aviary, socializing with the eagles inside (Fig. 4,a and b). In fact, A07, A09, A11 and A12 were all present at the same time around the cage, turning around it and kicking against the net in attempt to enter inside. To support eagles' interactions, food was also put on the top of the aviary, where free eagles fed regularly.

On 12 May the eaglet A12 was transferred from Sicily (where it was captured in a wild nest) and inserted into the nest section of the aviary, where the A10 specimen was also present (A07, A08 A09 and A11 were already in the main cage). On 25 May the nest was opened and A12 and A10 passed in the main cage together with the others. A12 appeared immediately integrated with the other eagles, showing a behavior of extreme curiosity and stealing on several occasions the preys from the other eaglets. The integration of A12 with the other eagles was also confirmed after the release.

On 06 of May, the experiment to test, during five minutes recording, the attitude of the eagles towards unusual, unknown objects was repeated. We introduced a carrot in the nest: unlike in 2018, the eagles did not show any interest in the new, unknown object during the following hours, for which it was decided to stop the experiment, which in any case will be repeated in hacking 2020. However, on 2 May a pine cone was presented to the eaglets in the main cage. This attracted the attention of A07, which immediately began to take and throw it. This behavior was subsequently imitated by all the other eagles.



Fig. 4. a) Interactions between eagles inside and outside (red arrows) the cage and **b)** free eagles eating on the top of the aviary.

3.2 Release in nature

The animals were released in nature all together on June 19th (A07, A08, A09, A10, A11 and A12) and on July 26th (A14 and A15), at about 5.00 in the morning.

On June 19th, A10 was the first to fly outside the cage (at 5.26 a.m.), followed by A07, A09, A08, A12 and A10 that flew all together, while A11 was the last (6.09 a.m.). On July 26th, A14 left the cage first followed by A15 within 9 minutes.

Within three days after release, almost all the eagles came to eat both on the feeding platforms and on the roof of the cage. Unfortunately, on June 21, A08 was chased by three *Corvus corax* and forced to leave the release site. It never ate close to the cage after the release and moved in the area of Coghinas lake, where it kept on moving around. On 8 July, after half a day of restricted movements, this eagle was recovered dead. The necropsy revealed strong debilitation: the eagle didn't hunt enough (or at all) to maintain the good post-release physical conditions.

During the first days after release the birds were located with UHF telemetry and observed several times. The young eagles showed immediately an excellent ability to fly, also favored by the strong interaction between them. They were observed constantly flying together, chasing each other and resting at the same rocks. The interactions and apparent sociality were more evident in the morning, when, before flying, all the specimens began to vocalize together.

During the weeks following the release and before the start of the dispersion, all the eagles have explored the valleys around the hacking site. They increased their movements, even if they always returned to eat at the cage. This represented such a very strong attraction for all individuals, that later on several individuals slept in it, well after their release.

At the release, besides Ispra, Forestas and Paola Boneddu (Enpa - Ente Nazionale Protezione Animali – Nuoro) were also present.