



Aquatic Warbler translocation programme „EX-SITU“



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Context

Aquatic Warbler (lot. *Acrocephalus paludicola*) is the most threatened passerine bird species of continental Europe. Currently, the world population is considered to be 11 000 singing males. From 2014 Aquatic Warblers only breed in 4 countries in the world – in Belarus, Ukraine, Poland and Lithuania. Average distribution in these countries is shown at the table below.

Country	Average size of population (in years of 2007-2016)	Trend of population abundance
Belarus	4120	Decreasing
Ukraine	3653	Unknown (lack of data)
Poland (EU)	2996	Increasing
Lithuania (EU)	148	After a sharp decline, increase have been noticed from 2013

Table 1 Average distribution of the Aquatic Warbler population and dynamics of those populations

The International Union for Conservation of Nature (IUCN) has classified aquatic warbler for the category vulnerable A2c. The species is also protected under Annex I of the Birds Directive, Bern and Bonn conventions. In Lithuania aquatic warbler has a status of strictly protected species and is classified for the category 2(V) (vulnerable species) under Red Data Book of Lithuania. The main reasons of aquatic warbler population decline are following: a) damaged hydrological regime of habitats that are suitable for breeding (mainly due to the drainage), b) abandonment or intensive farming in breeding habitats, c) eutrophication, d) big fragmentation of local populations, e) low breeding success in territories of intensive farming.

Fragmentation of population increases the risk of aquatic warbler extinction in highly isolated territories and decreases vitality of population due to the lower genetic diversity. Observations on population dynamics show that aquatic warblers got extinct irreversibly in highly isolated populations. E. g. in 2011 aquatic warblers got extinct in Hungary, the Pomeranian population (the bordering area of Germany and Poland) that was constantly decreasing from 1990, got extinct in 2014. In Lithuania, in Žuvintas biosphere reserve, despite the successful restoration of huge breeding habitats, the population of aquatic warblers is constantly decreasing (in 1986 20-25 individuals were observed, while in 2016 only 4 singing males were noticed).

When trying to restore extinctic populations that cannot recolonize themselves naturally in good quality habitats, translocation of species' individuals from highly populated habitat to restored habitat, where population is extinct or is at the border of extinction, is implemented. Translocated new birds remember a new territory as their home where they come back to breed after migration (reprinting happens) in the age of 30-50 days.

In the case of aquatic warbler conservation, translocation has never been tested in a full scale¹.

¹ In 1990-1998 dr. Karl Schulze-Hagen kept Aquatic Warblers in aviary where the birds bred successfully. The scientist made reseaches about breeding behaviour. Dr. K. Schulze-Hagen is a consultant of this translocation programme.

Therefore, in the global context of decreasing trend of aquatic warbler population, it is very important to prepare for the future testing and improving the translocation methodology, so that it can be applied expeditiously and successfully when the risk of extinction will increase considerably. Furthermore, implementation of translocation methodology is getting more relevant when trying to restore extinct fragmented populations of aquatic warblers, that cannot recolonize themselves naturally even despite the good state of its habitats. In 2015 countries of Bonn convention that signed The Memorandum of Understanding concerning Conservation Measures for the Aquatic Warbler, recommended to develop and test the translocation programme for the species. Žuvintas biosphere reserve, where a big territory of more than 200 ha of suitable habitats were restored while the population is at the very end of the extinction for several years already, was chosen as the best place for the implementation of pilot translocation.

Goals / tasks of translocation programme

The main goals of the implementation of the Aquatic Warbler Translocation Programme include as follows:

- 1) To pilot and approve the methodology of Aquatic Warbler translocation;
- 2) To create conditions for restoration of a viable Aquatic Warbler population in the Žuvintas Biosphere Reserve.

These goals will be reached by achieving following objectives:

- a) To prepare the methodology of Aquatic Warbler translocation according to international practice on passerine bird translocation and expert recommendation;
- b) To implement the methodology of Aquatic Warbler translocation in Žuvintas biosphere reserve in 2018 and 2019, when transferring approximately 50 individs each year;
- c) To carry out the performance monitoring.

Methodology of Aquatic Warbler translocation

Feasibility review on Aquatic Warbler source and release sites

Aquatic Warbler translocation will be implemented while transferring birds from Zvanec fen mire in Belarus (source site) to Kiaulyčia and Žuvintai fen mires in Žuvintas Biosphere Reserve (release site). Zvanec was chosen as a source site due to following arguments: a) the aquatic warbler population living there is considered to be the largest one in the world, therefore taking the juveniles away will have the minor negative effect for the local population; b) responsible authorities from Belarus understood the importance of translocation programme and welcomed the decision.

The fen mires of Žuvintas Biosphere Reserve were chosen as suitable sites by the international aquatic warbler experts, because as follows:

- Big enough good quality habitats that were restored in frame of former conservation projects are found in the territory;
- The site of restored habitats has a great survival perspective due to the agricultural activities favouring protection of the Aquatic Warbler according to the special agri-environmental measure dedicated for the aquatic warbler conservation;
- Local aquatic warbler population is on the extinction limit for many years, the current number of Aquatic Warblers (3-7 singing males) is not sufficient for the population to recolonize it naturally from itself.

A comprehensive bird ornithofauna monitoring in Žuvintas lake and it's surroundings is carried out from 1960s. It is stated that essential negative qualitative and quantitative changes related to bird breeding and deterioration in nutritional conditions have happened during the whole research period. Those changes are related to abandonment of farming and natural succession from wet meadow and mire habitats to territories overgrown by reeds and woody vegetation. Those changes have also negatively affected aquatic warbler population – when transitional mires and alluvial meadows started to overgrown by reeds and woody vegetation, the population of these birds in Žuvintas decreased from about 25 singing males in 1980s to 3-7 males in 2010 – 2017.

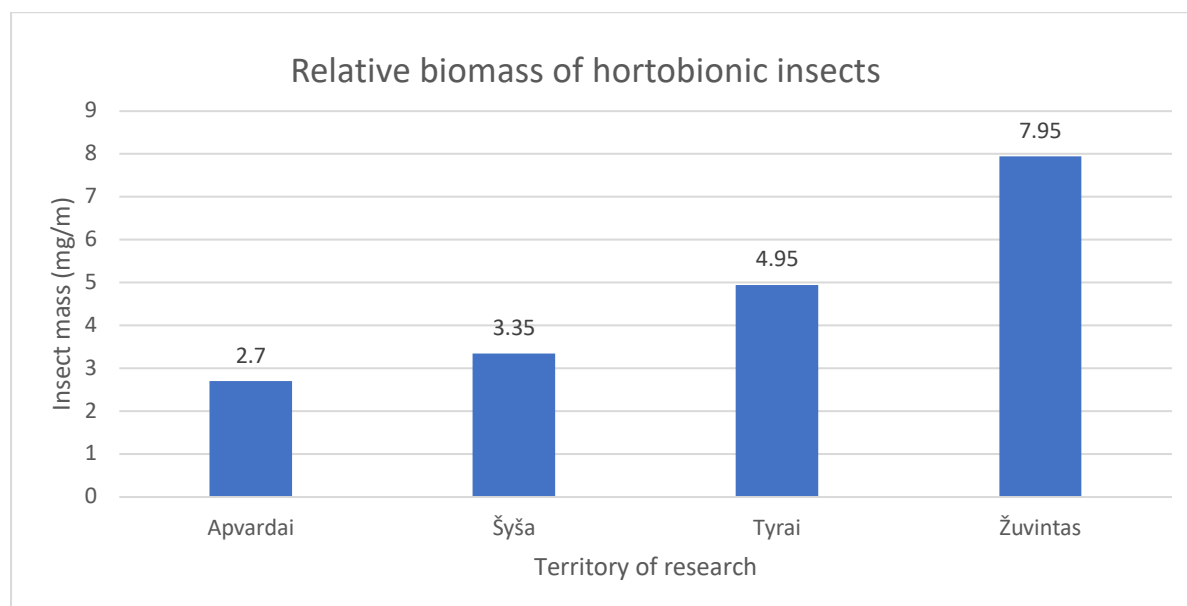
Since 2011, when activities of habitat restoration started in the territory (shrub and reed cutting), vegetation monitoring works were carried out in parallel. **Assessment of changes in vegetation** in 2011-2017 has shown that after the implementation of nature management activities the condition of vegetation communities suitable for Aquatic warbler breeding (*Caricetum elatae*, *Caricetum distichae* and *Caricetum distichae* mosaic with *Caricetum appropinquatae* or *Carex lasiocarpa* communities) has stabilized and currently occupies an area of more than 200 ha². Vegetation structure of habitats suitable for Aquatic warbler is also determined by the favourable conditions of the dynamics of water level - during the cold season, the area is periodically flooded, and during the vegetation period the water level is falling.

In assessing the suitability of a habitat for a site of the translocation, it is important to assess if the threats to the habitat are not only removed, but also if there are **adequate preconditions for ensuring that the habitat are not going to re-degrade in the long term**. In this aspect, the territory of the translocation site is included to the areas of the special agri-environmental measure dedicated for the protection of aquatic warbler. Following this measure, compensations are paid to implement management requirements set (late mowing 50% of the declared plot annually performing mowing rotation next year)³. Žuvintas Biosphere Reserve Directorate participated in the agri-environmental schemes and carries out continuous farming activities for mentioned measure. Therefore, it concludes that there are adequate prerequisites in the area for maintaining a good status of the habitat in the long run.

² Reports of vegetation monitorings of the project LIFE09 NAT/LT/000233 in 2011, 2013 and 2015. The head of the research group was dr. A. Balsevičius

³ The activity „The protection of Threatened Aquatic Warbler's population in wetlands“ of the measure „Argoenvironmental protection and climate“ under Rural Development Programme of Lithuania 2014-2020 m.

When evaluating the food base of the aquatic warbler in different places of breeding in Lithuania, studies of abundance of invertebrate animals and diversity have been conducted in 2017 also in Kiaulyčia botanical zoological reserve which is at the periphery of Žuvintas lake. In this study, it was found that in the fen mire of the lake Zuvintas (in potential and existing habitats of aquatic warbler) communities of arthropod animals have the greatest diversity and balance, while invertebrates of hortobionic group (insects found in the grass are the main potential source of food for the Aquatic warbler) stands out as having the largest biomass⁴ (Picture 1).



Picture 1. Mean biomass of arthropods defined by applying sweepnetting method in different Aquatic Warbler habitats: Apvardai - transitional mire Pušnies, Ružo and Apvardų PAST (Ignalina dstr.); Šyša – meadow of Šyša polder (Šilutė dstr.); Tyrai – sedge meadow in Kliošiai landscape reserve (Klaipėda dstr.); Žuvintas – alluvial meadow in Kiaulyčių botanical-zoological reserve (Alytus dstr.).

From the perspective of **threat of predators**, it is important to consider the site of translocation in these aspects: a) suitability of the translocation site and the level of predator threat for the aquatic warblers living in the wild; b) level of predator threat while holding birds in outdoor aviaries during the translocation. The main predators which has a negative effect for the aquatic warbler in a natural environment are shrews which destroys brood after it finds the nest.

Under natural conditions, broods destroyed by shrews are about 10-15 % of all nests (Tanneberger, F., Kubacka, J. (ed.). 2018). The greater risk of negative effects of these predators is in the habitat at an abnormally low level of water or after a fire when the conditions to hide a nest are more complicated. No monitoring of abundance of shrews is carried out in the wetlands of Žuvintas, however, in assessing the features of an existing habitat, the abundance of shrews cannot be higher than usual here. This is determined by the following conditions: 1) the habitats of the aquatic warbler in Žuvintas Biosphere Reserve are periodically flooded, therefore, the conditions for shrew spreading are unfavourable; 2) in release sites there are no mineral soil non-flooded islands, which could create good conditions for shrews to survive the unfavourable conditions due to high water levels.

⁴ ProjectLIFE MagniDucatusAcrola LIFE15 NAT/LT/001024 2017 m. Invertebrate Monitoring Report: A. Petrašiūnas. 2017. Invertebrates of Project sites Apvardai, Šyša, Tyrai and Žuvintas.

There is an additional risk of the negative effects of predators during the translocation programme, e.g., foxes, raccoon dogs, weasels or predatory birds can hunt birds which are in field aviaries. This risk will be managed through the following measures while implementing the translocation programme:

- The aviary is covered with sturdy metal net with 9 mm mesh size, which will in principle deprive the opportunity for predators of getting into the aviary;
- To prevent predators entrance to the aviary while digging up the cave, the walls of aviary will be digged in the ground to the 20 cm depth;
- All complex of the aviaries will be enclosed with a special electric fence which is used for the pasture of birds (mesh size in the bottom part is 5,9 cm);
- The whole territory of the aviaries (including the fragment of the sky) will be monitored by photo / video cameras which will records the image in response to the movement as well as making additional periodic video fixations. This will make it possible to spot predators in the area and take additional measures to chase them;
- While birds will be kept in the field aviaries, a specialist will permanently live in the wetlands near the aviaries. One of his tasks will be to observe the environment and take actions when predators will be noticed

The main **competitor** of the aquatic warbler in its living environment is the sedge warbler (*Acrocephalus schoenobaenus*). The threat of inter-competitive competition is minimal in the translocation site as the condition of the current habitat is unfavourable to the sedge warbler. Single shrubs are important for the habitat of the sedge warbler breeding, which were successfully removed while restoring and maintaining the habitats of the aquatic warbler. Due to the constant mowing, the shrubs do not appear in the translocation area again.

Principle of translocation programme's implementation

The transfer will be carried out collecting nests with young Aquatic Warblers, 6-7 days of age. This young age is most suitable because the birds are already capable of taking food and still small enough to be afraid of a person and for attempts to leave the nest. Having taken the whole nest at this point, a high probability exists the female will make a new nest and breed. Thus, a negative impact on the source site will be minimized. Chicks of the aquatic warblers raised in the translocation site eventually will recognize it as a home location and will return to breed there after migration.

During the development of the methodology, experts assessed these different alternatives to translocation strategies:

1. Translocation of young but self-sustaining birds which flew from nests;
2. Eggs translocation to the nests of the sedge warbler which breeds in the release area;
3. Holding translocated chicks in the aviaries indoors during the winter and releasing them to freedom in the second year;

Arguments why these alternatives have been abandoned are below:

Moving young chicks, which have left nests would cause great stress for birds, and since it is unclear when exactly the birds recognize the area as their homeland, there is still a high probability that even successfully translocated young birds would return to the pickup area after migration.

Feeding the captured grown up birds could be problematic if they would recognize a person as a threat and would not tend to feed.

In case of egg translocation, eggs would be hatched and chicks would be raised by the sedge warblers living in the translocation area. This alternative was rejected on the basis of international practice, which states that other types of young chicks identify themselves with the species that raised them. Birds learn that type of species voices which raised them, try to mate with other individuals of that species.

Therefore, in the case of the aquatic warbler, such a translocation would not be effective.

Holding and raising translocated chicks in the aviaries indoors during the winter could significantly reduce the mortality of these distant migrants. However, this method has been abandoned because it is doubtful if the birds kept in captivity will be able to survive independently in their free life or will be able to find food.

In evaluating these alternatives, it was decided to move 6-7 days old chicks, which will be released in the same year when they have learned to find food independently. A detailed description of the individual steps in the methodology for the translocation of the Aquatic Warbler is following.

Stage 1: Search of nests and pick up

The translocation program starts at the searching of the nests at the source site. Since finding a nest of the aquatic warbler is a very difficult task, this must be implemented by a team of experienced ornithologists (about 5 people).

The search starts at the end of May, depending on the beginning of the breeding season (about May 25-28). The nest is being searched while following-up a female carrying food for the young. When nests are found, a special team of ornithologists determine their age by weighing the young. When chicks are 6-7 days age (then they weigh 7.5-8 g), the nest is collected with the whole brood. It is the best to take the young when the sun is down and the feeding is over (the young are not fed at night). Every collected nest with the young is transferred into a wooden box to which sedges are added in order to imitate the natural environment and firmly fasten the nest so that it would not disintegrate. Set 6-7 days age is the most suitable for taking the chicks as in this age the young are already able to take food, but they are not afraid of human yet. The nests with the young are taken to the special camp, where they are fed from sunrise to sunset with about 20 minutes interval breaks. It is the best to feed the young by natural live food therefore, a food collection team must be together with the person responsible for the nutrition. The food collection team captures mire insects using entomological sweep nets. There will be at least one specialist in the food collection team that would have hands-on experience in the growing of insectivorous juveniles. In order to ensure the juveniles do not suffer from food shortage (for example, in sudden cold weather or a prolonged rainy period insect abundance may decrease), the translocation programme executors will have ready frozen bee larvae and/ or mealworms, live crickets. While feeding with larvae, they are thawed in the refrigerator and are given in small quantities because in the warmth quickly loses shape and texture. When 5 nests with chicks are collected they are transported to the release site. Youngs are ringed with coloured rings before transportation or it's done at the time of collecting the nest.

Stage 2: Transfer of the nestlings.

When at least 5 nests are collected, then chicks are being transported to release site. 10 nests will be transported during implementation of the translocation program (about 50 chicks). Transfer will be performed in 2 times. The best time for chicks transportation is night, during

their resting period when they do not need feeding. Taking into account that birds have to cross the state border with all necessary procedures, the border crossing has to take place and time in accordance with the working hours of veterinary services. Because of that chicks have to be fed since early morning (from dawn).

The state border crossing process must be coordinated with the border guards in advance, ensuring the passage of the "green corridor", ensuring that the chicks will not be waiting in the general queue.

Stage 3: Growing the young in cages.

Transported chicks are being placed into the cages (each nest into separate cage). Cage measurements (no less than): height – 35 cm, width – 30 cm and length – 45 cm. Three sides of the nest will be blinded so that the environment will not disturb the birds. One door will be on top of the cage (through them the feeding will be performed) and another door will be on front of the cage.



Picture 2: Example of the cage

From dawn till twilight the chicks will be fed every 20 minutes. While planning the feeding of the birds it is necessary to plan the shifts of birds supervision specialists. Feeding of one nest chicks takes up about 3 minutes, so in order to feed 5 families the feeding itself has to be an uninterrupted activity. Because of that the minimal staff should be at least two people working at full capacity, one of them should be feeding chicks and the other – collecting insects for the food. Bird care team has to exchange in order to balance the workload. In the beginning it is recommended to plan a bigger caretakers crew in order to avoid fatigue or unforeseen circumstances.

During the young age of the birds their maintenance will be performed by foreign experts who have great and successful experience in taking care of and feeding of insect-eating birds in captivity. While people lacking such experience in the beginning will be helping the experts and gradually will learn how to take care of the birds.

Variety of food is given in the section above (Stage 1: Search of the nests and pick up). Chicks food should be supplemented with calcium and vitamin D. A pinch of powdered supplements should be given twice a day with food. When are able to eat by themselves the food has to be served in plates, which later will be placed in the aviaries (it will be easier for the birds to find the feeding area).

In the room where the chicks will be kept it is advised to play an background sound from fen mire, also in addition there has to be audio of aquatic warbler's both male and female singing. Preferably few different males in one audio should be singing. The voice of the aquatic warbler should be clearly distinguished in the recording and should be played for a couple of hours in the morning and in the evening. For the rest of the time there has to be played the audio of mire sounds. Thanks to such audio the chicks will be learning the song of their species. Furthermore, background sounds will lessen the sound contrast in the room so the birds will experience less stress.

For 7 – 10 days the chicks will be maintained in such manner. During this time, they fledge and will get out of the nest. Eventually, they will start eating by themselves. When they are independent enough, there comes the time for moving them to field aviaries. Before letting the birds out to field aviaries, it is advised to feed them well.

Stage 4: Moving to a Field Aviary.

After chicks in cages learn how to pick food by themselves – they are transferred into field aviaries. Each nest is released into separate aviary (aviaries description is given in Annex no. 1). In aviaries the food for birds is given in usual regiment. The same food plate that was used in cages is also used in aviaries, because birds already know it. In order birds would learn to pick their own food, there will be additional insects brought into field aviaries. It is important that there would be adult aquatic warblers audible in the area. If there are no adult singing birds in the area, then audio has to be played periodically.

It is important to observe the behaviour of birds in order to see if they have enough of food and if they are learning to pick food by themselves.

Stage 5: Release of the Birds.

When birds will learn how to fly and find food, the soft release of birds will happen. For this purpose, frames with a larger mesh (about 7 cm in diameter) will be replaced in the aviaries. Then birds can fly out and come back when they need it. When birds will fly out the food will still be brought to aviaries, until the birds will stop visiting them.

Monitoring impact of Aquatic Warbler translocation programme

Transferred Aquatic warblers will be ringed with special rings. Movement of birds in the site will be observed constantly. During the next season complete counting of Aquatic warblers will be performed in order to see how many of them came back after wintering.

In addition, the translocation team will be taking notes of daily birds behaviour observations. It will help to accumulate the knowledge and valuable data.

The translocation programme is considered to be successful when it fulfils these requirements:

- Until the time of release chicks survival rate has to be no less than 74 %;
- At least one translocated bird has to come back after wintering to Žuvintas Biosphere Reserve area.

Implementation of programme and financial resources

The AW translocation will be performed during 2018 and 2019 summertime implementing the project “Stepping stones towards ensuring long-term favorable conservation status of Aquatic warbler in Lithuania” (LIFE MagniDucatusAcrola) no. LIFE15 NAT/LT/001024 that is financed by the EU LIFE+ Programme, Ministry of Environment of the Republic of Lithuania and project partners. The implementation of the translocation program is organized by the Baltic Environmental Forum, and implemented will be done by the partners of the project: Žuvintas Biosphere Reserve Directorate and Scientific-Practical Center of Natural Resources of the Belarusian National Academy of Sciences.

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Annex 1: description of aviary construction

General aspects of the aviary

- a) The aviary is covered with sturdy metal net with 1 cm mesh size;
- b) Overall dimensions of the aviary: Height above the ground 250 cm, Width 180 cm, Length 380 cm (incl. Safety porch);
- c) The aviary does not have fixed floor – ground of the aviary at the setup location will be natural fen mire vegetation of the release area. However, to prevent predators entrance to the aviary, the walls will be digged in the ground to the 20 cm depth;
- d) Transparent plastic plexiglass (height 70 cm) shall be fixed the full perimeter at the aviary from the outside of the aviary cage (to prevent trapping birds between plexiglass and metal net). This will serve as “insect wall” preventing escape of the insects released in the aviary as natural food for birds;
- e) The ceiling of the aviary should *additionally* be covered with soft flexible net made from thick material (to prevent bird entangle), mesh size 0,5 cm. The net shall be hanged 5 cm below ceiling serving as prevention to bird’s damage in case of stress if they try escaping by flying up.

The aviary has following compartments:

1. Main compartment – where the birds will be kept;
2. Safety Porch – a small entrance room to prevent escape of birds in case of door opening
3. Feeder and release hatch – located as part of the safety porch. It shall function as bird feeder and at time of release, birds shall be released through the feeder area.

Main Aviary Compartment (Scheme 2Error! Reference source not found.). Dimensions: Height 250 cm, Width 180 cm, Length 300 cm. At the dominant wind direction (west/west-south) a reed wall shelter shall be installed. Inside the aviary compartment, some bushes shall be placed to make comfortable resting place for birds. Alive insects shall be released inside the compartment, to enable birds learning a food search. The main compartment shall have entrance doors coming from the safety porch. Easy access from main compartment to the feeder shall be ensured (there is no net panel between those spaces).

According to the opinion of experts, who have experience in keeping Aquatic Warblers in captivity, Aquatic Warblers behave silently and hide when the human appears, therefore, the risk that regular short-term appearance of people carrying the food to aviaries would negatively affect birds’ preparation for their independent life is very low. Nevertheless, in order to minimize disturbance to birds, it is foreseen in the construction of aviary the possibility to change the position of reed shelter in such a way that birds would not have any visual contact with people. This will be implemented by putting reed shelters by the feeder. Additionally, behaviour of birds will be observed remotely (video camera and expert observation using binoculars) and feeding process will be changed accordingly if any signs of disturbance will be noticed.



Scheme 1 Aviary - front view

Safety Porch (Scheme 3). Dimensions Height 250 cm, Width 80 cm, total length 180 cm (feeder shall take 100 cm length and the safety porch itself – 80 cm). The porch shall have 2 doors – entrance to the pouch and entrance to the main aviary compartment.

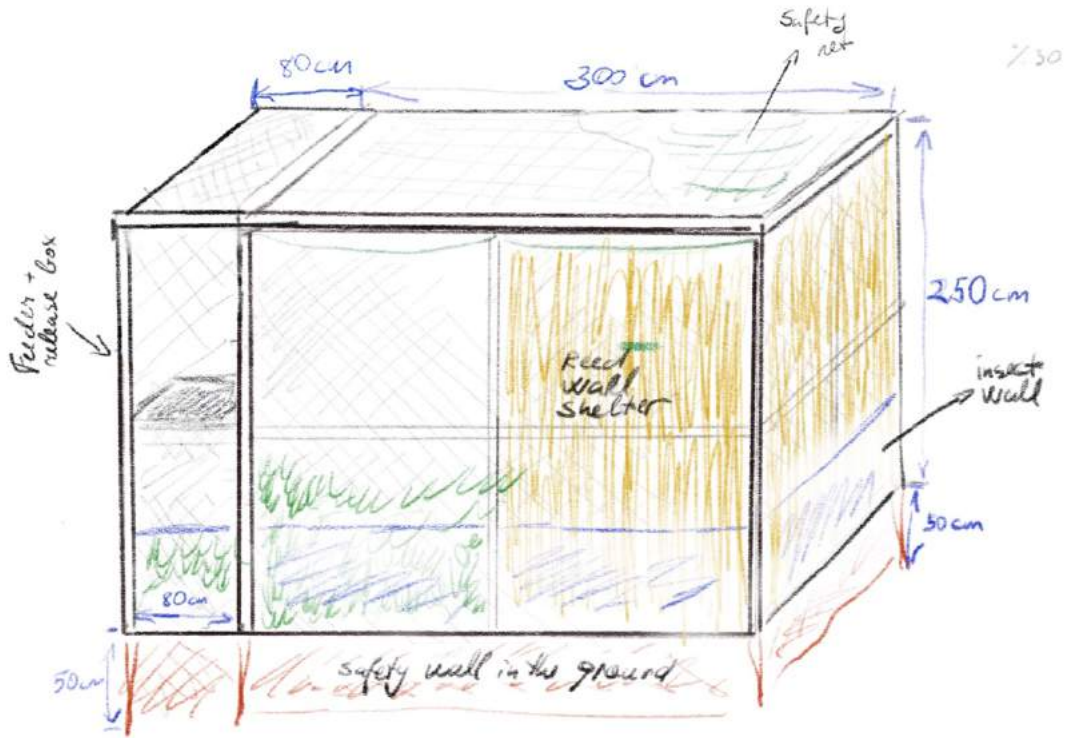
Feeder-Release Hatch (Scheme). Dimensions: Height 160 cm, Width 80 cm, Length 100 cm. The feeder shall have small food placement doors located in the safety porch area. Side walls oriented to the outside of the aviary shall be made by replaceable 2 window-frames filled with sturdy metal net. There should be 2 types of window-frame: 1) small (1 cm of smaller) mesh size and 2) with large (7-8 cm) mesh size. The small mesh size frame to be used with intention to keep birds inside aviary. The big mesh size will be used during and after birds release to the wild. Big mesh size will allow birds to escape from the aviary and return back, while prevent entrance of predators.

Doors (Dimensions Height 180 cm, Width 60 cm)

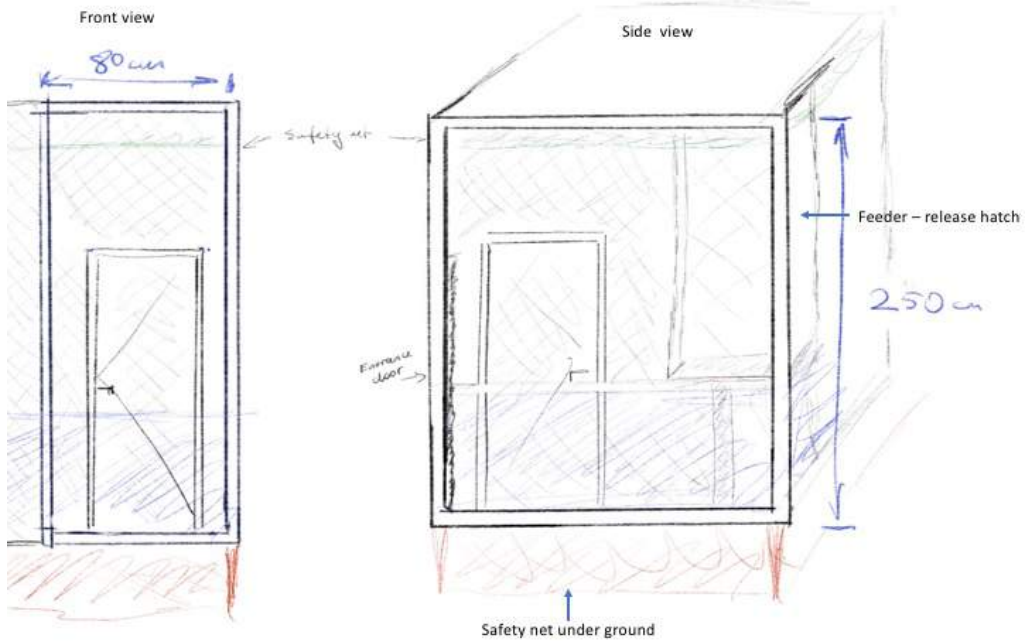
One as an entrance to the safety porch

One as an entrance to the main aviary compartment

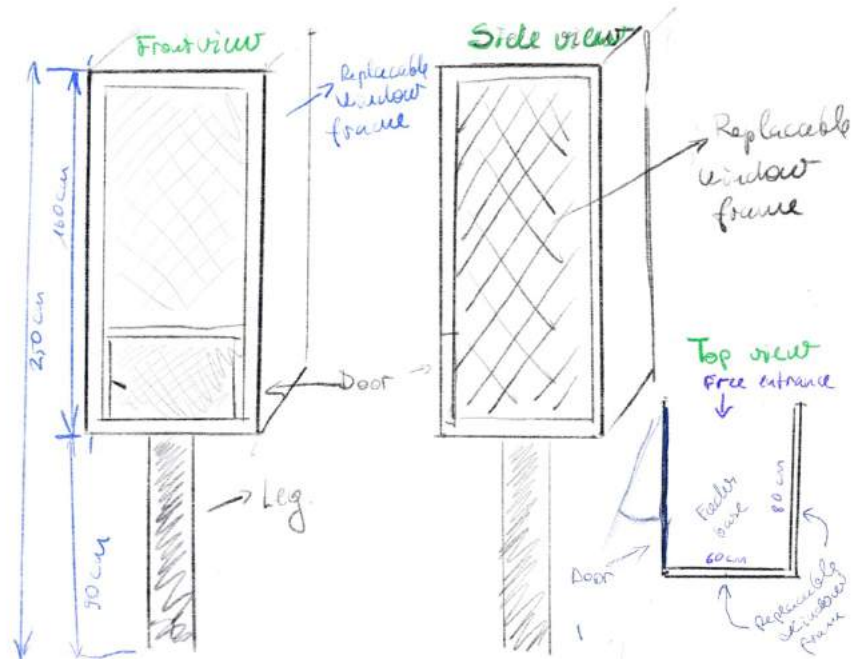
Both with turn buttons and rope handles on either side



Scheme 2 Back view



Scheme 3 Safety porch



Scheme 4 Feeder-Release Hatch