ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
AGRICULTURAL UNIVERSITY OF ATHENS

LIFE ANDROS PARK

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"Conservation of priority species and habitats of Andros Island protected area integrating socioeconomic considerations"

ACTION C.2

Final Report on the establishment of a plant nursery with an approximate area of ca. 800 sqm

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(assisted by KAIREIOS LIBRARY and MUNICIPALITY OF ANDROS)

December 2018

ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ AGRICULTURAL UNIVERSITY OF ATHENS · ΙΝΣΤΙΤΟΥΤΟ ΑΓΡΟΤΙΚΗΣ ΟΙΚΟΝΟΜΙΑΣ ΚΑΙ ΚΟΙΝΩΝΙΟΛΟΓΙΑΣ (ΙΝΑΓΡΟΚ) ΕΛΛΗΝΙΚΟΣ ΓΕΩΡΓΙΚΟΣ ΟΡΓΑΝΙΣΜΟΣ - ΔΗΜΗΤΡΑ · CBD-Habitat · ΚΑΪΡΕΙΟΣ ΒΙΒΛΙΟΘΗΚΗ · ΔΗΜΟΣ ΑΝΔΡΟΥ · MOm · ncc nature conservation consultants

Abstract

The establishment of a plant nursery for the project LIFE Andros Park serves both the needs of seedlings production for the restoration of *A. glutinosa* alluvial forests (Action C.2) as well as the production, maintenance and conservation of plants in the Botanic Garden (Actions C.3 and E.2). The functions and the infrastructures of the plant nursery were established at two localities. The main nursey was constructed at Agadaki Estate (Andros), while a supplementary one was set up in AUA's premises. The nursery at Agadaki Estate occupies an open area of approx. 250 sqm. and has a relatively total capacity of 8000 plants growing in 2-4 lt pots. The nurseries within AUA's existing greenhouses were set up in order to facilitate propagation (seed germination and seedlings early growth) of more than 10000 plants. Both infrastructures are fully functional and can serve all project's current and future needs.

Περίληψη

Η δημιουργία φυτωρίου φυτών για το έργο LIFE Andros Park εξυπηρετεί τόσο τις ανάγκες της παραγωγής φυτών για την αποκατάσταση των αλλουβιακών συστάδων με *A. glutinosa* (Δράση C.2), όσο και την παραγωγή, ανανέωση και διατήρηση ex situ των φυτών του Βοτανικού Κήπου (Δράσεις C.3 και E.2). Οι λειτουργίες και οι υποδομές του φυτωρίου φυτών χωρίστηκαν σε δύο θέσεις. Το κυρίως φυτώριο κατασκευάστηκε στο Κτήμα Αγαδάκη της Άνδρου και μία συμπληρωματική μονάδα στις εγκαταστάσεις του Γεωπονικού Πανεπιστημίου Αθηνών. Το φυτώριο του Κτήματος Αγαδάκη καταλαμβάνει ένα ανοιχτό χώρο 250 τ.μ. περίπου και έχει συνολική δυναμικότητα 8000 φυτών σε δοχεία χωρητικότητας 2-4 λίτρων, ενώ τα θερμοκήπια του Γ.Π.Α. μπορούν να φιλοξενήσουν περισσότερα από 10000 νεαρά σποróφυτα (δηλ. τη βλάστηση σπόρων και την ανάπτυξη φυταρίων). Και οι δύο υποδομές είναι πλήρως λειτουργικές και μπορούν να εξυπηρετήσουν όλες τις τρέχουσες και μελλοντικές ανάγκες του έργου.

Action C.2

Deliverable: "Final Report on the establishment for a plant nursery with an approximate area of ca. 800 sqm"

Introduction

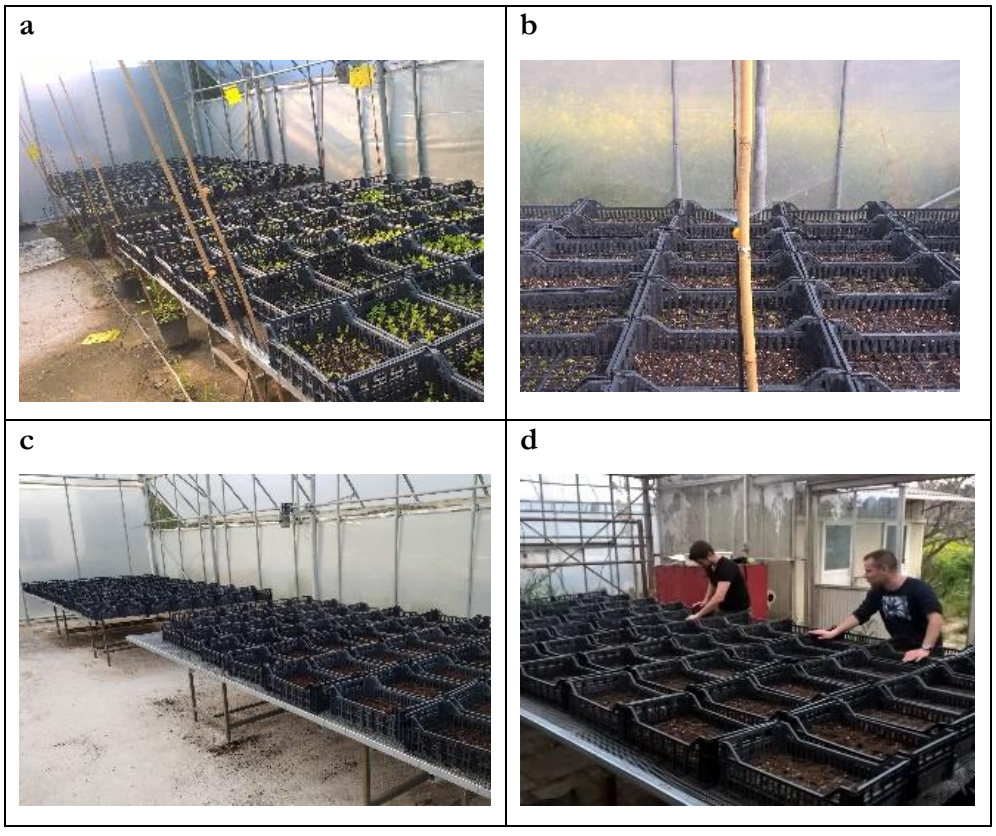
The establishment of a plant nursery in the frame of the project LIFE Andros Park serves both the needs of producing adequate number of seedlings to be used for the restoration of *A. glutinosa* alluvial forests (Action C.2), and the production, maintenance and ex-situ conservation of Botanic Garden plants (Actions C.3 and E.2). The initial plan was to establish -right from the beginning of the project- a nursery of an approximate area of 800 sqm at the Agadaki Estate of Andros in order to satisfy the needs of all three Actions. However, as the sowing, inoculation and first 2-4 months of alder seedlings would take place at AUA facilities, an appropriate greenhouse infrastructure of the University was also formed and used in the frame of the project.

Outcome

The Agadaki Estate area was chosen for setting up the plant nursery since it is where the Botanic Garden will be established (Action E.2). In addition, its relative proximity to the priority habitat and the *A. glutinosa* stands of Vori and Lefka where the restoration actions will take place (Action C.2) makes it an ideal location for this particular purpose. Moreover, the pertinent infrastructure which were planned for the Agadaki Estate would also serve the operation the operation of the Botanic Garden (e.g. fencing, irrigation); in this way available resources are best exploited by minimizing expenses and by serving the objectives of several Actions. However, it was decided that the initial development of alder seedlings as well as their inoculation by symbiotic fungi should be accomplished at AUA's premises since pertinent works had to start right at the

project's onset while the University offered already established infrastructures and available human resources which could ascertain much easier/efficient control over plant growth and maintenance.

Hence, the first stages of nursery's establishment were implemented at AUA and were focused at suitably modifying existing infrastructure in two greenhouses where the initial development of all alder seedlings was to be performed. Small interventions/improvement were performed on the irrigation system (Fig 1a,b), while long tables were constructed to host the large number of plants which were anticipated to grow there. The two greenhouses (large and small) which would serve as nurseries have a surface area of approx. 100 sqm and 60 sqm, respectively (Fig 1c, d).



Figures 1a, b) Snapshot of the irrigation sprayers at AUA's large greenhouse, **1c)** AUA's large greenhouse before irrigation improvements, **1d)** AUA's small greenhouse.

In parallel, all necessary interventions started for constructing the nursery at Agadaki Estate in Andros. An open area of approx. 250 sqm at the second terrace was chosen since it was the

largest available, with plenty of natural sunlight and in close proximity to the water supply and the main staircase of the Estate, making easy the delivery of any items for its construction and operation (Fig. 2a). The extent of the area could not had been larger because the surface of the successive terraces existing downhill is gradually decreasing, while big olive trees cast their shadow over most of the space available (Fig. 2b). Alder trees are photophilic plants needing open space to thrive. However, in order to fulfil the needs of other plants needing less light, part of the nursery was covered with a 50% shadow net.

Figures 2a) The open, sunny place of the nursery, **2b)** View of the shadow casted by big olive trees at the nursery's limits, **2c)** Construction of the nursery, **2d)** The black geotextile covering the bottom of the alleys

All infrastructures required for the operation of the nursery were constructed from the beginning. More specifically, four alleys, each one measuring approx. 20 x 1.5 m, were constructed out of wooden boards and their bottom was covered by black geotextile to control weeds growth (Fig 2c, d). Above them, removable shadow nets are placed which remain open

only for the summer period (Fig 2e). The irrigation infrastructure was also created combining new pumps, pipes and a water automatic controller-programmer (Fig 2f).

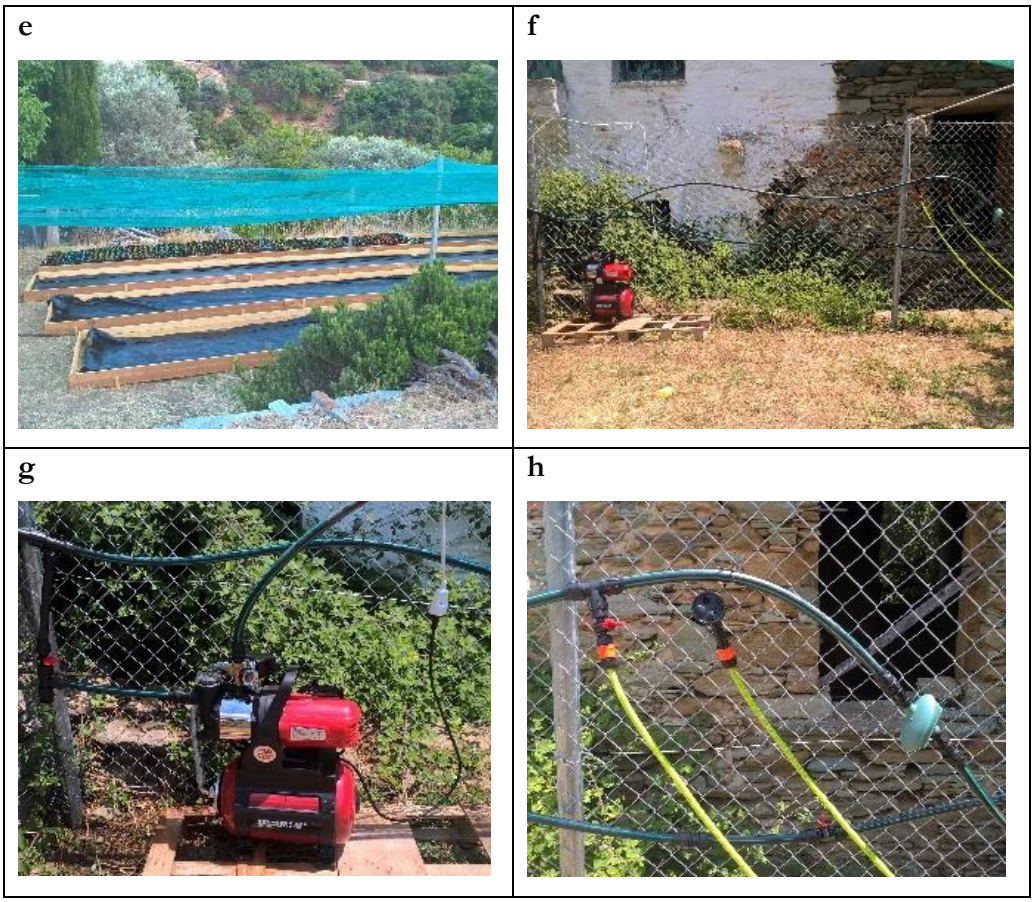
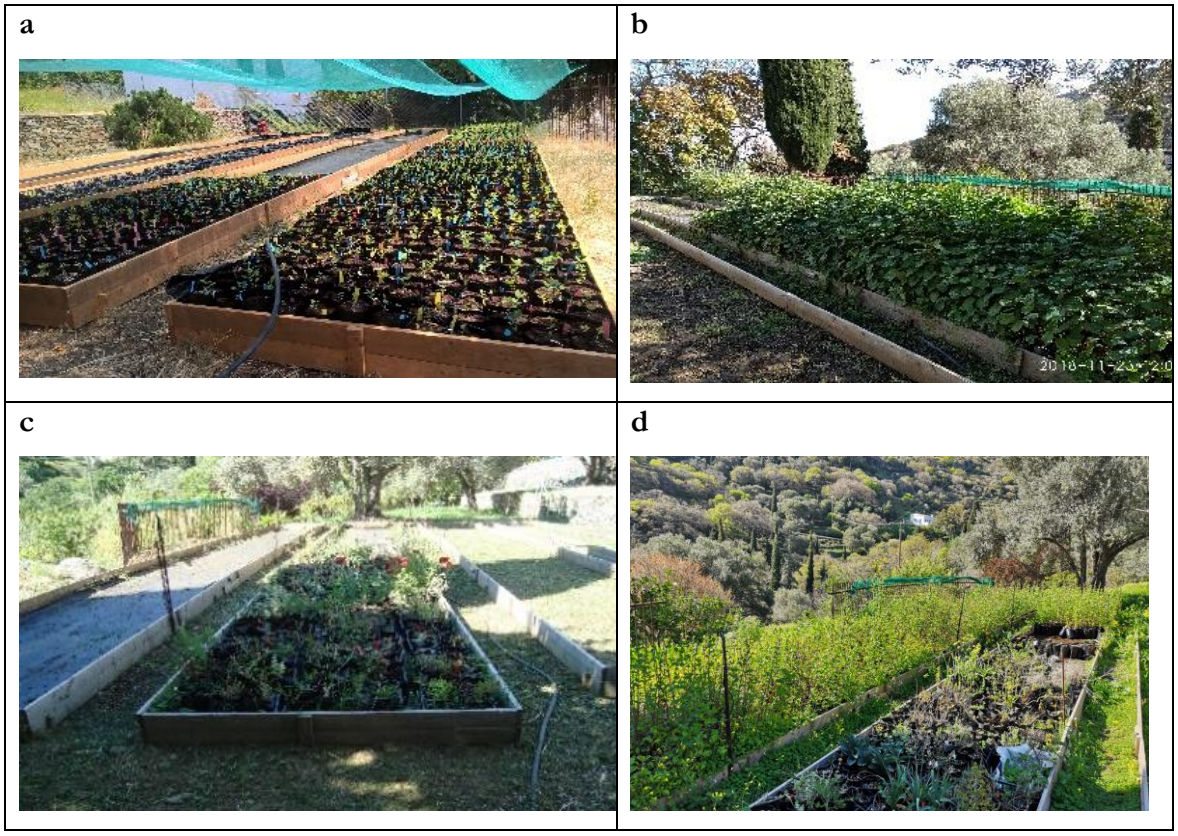


Figure 2e) View of the removable shadow net, **2f)** The irrigation infrastructure, **2g)** The water pump, **2h)** Detail of the watering programmer and the branching for manual irrigation.

The water pump of high capacity was purchased by the Kaireios Library, and is anticipated to cover also the future operating needs of the Botanic Garden (Fig 2g). It is connected the main water supply as well as to a large built reservoir already on site; it is then connected to a large network of polyethylene pipes that lead to above ground sprayers, designed at providing adequate spraying over the alleys, and they are controlled by a watering programmer (Fig 2h). In addition, the pump is connected with flexible pvc hose when manual irrigation is preferred (Fig 2h).

The Agadaki Estate nursery was operational by early June 2018, when transplanting of the first alder seedlings (transferred from AUA) took place. It initially hosted ca. 3500

successfully transplanted seedlings in pots of 3 lt, which covered almost two alleys (Fig 3a,b). In addition, at November 2018, the nursery started to host several candidate plants for the Botanic Garden, which were previously collected from various localities of Andros by the AUA scientific team, which by now occupy an area of about half an alley (Fig 3c). At March 2019, all alder seedlings were removed from the nursery to be transplanted in the restoration sites within the priority habitat.



Figures 3 a) Alder seedling growing at the nursery just after their transplanting at Agadaki Estate, **3b)** Alder seedlings of the nursery at November 2018, **3c)** The remaining candidate plants for the Botanic Garden, **3d)** Nursery hosting both the plants for the Botanic Garden and the alder seedlings prior to final transplanting.

In early June 2019 other ca. 10000 alder seedlings are expected to conclude with the main part of alder restoration activities. Moreover, during the same period, additional candidate plants for the Botanic Garden will arrive to temporarily grow in the nursery; hence, if necessary, extra alleys will be constructed in the adjacent area. Starting from winter 2019-2020, the Agadaki Estate nursery is expected to cover mainly the requirements of the Botanic Garden since alder

restoration needs will be limited to a rather low number of seedlings. Hence, a future re-allocation of the nursery at another area within the Estate will be examined depending on the pertinent needs of the Botanic Garden in conjunction to the possible (alternative) exploitation of the particular terrace where currently the nursery is located at.

Conclusions

The functions and the infrastructure of the plant nursery established for serving the objectives of Actions C.2, C.3 and E.2 of the LIFE Andros Park project were initially separated in two locations. The main (permanent) nursery was constructed at Agadaki Estate of Andros while another one operated at AUA's premises to cope best with provisional needs existing mainly during the first two years of the project. The functionality of the actual infrastructure is adequate and could serve all of the project's current and future needs. Until now the main nursery of Agadaki Estate hosted approximately 4000 plants, while it features a total capacity of about 8-9000 plants according to planning. More importantly still, it could support the full future needs of the Botanic Garden. In addition, the nursery operating at AUA could support propagation of more than 10000 plants placed at seeding trays, and will remain operational as long as needed for potentially serving Actions C.2 and E.2.