



After LIFE PLAN

YEARS 2022-2027

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by:

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1. PROJECT DATA

Project LIFE15 NAT/IT/000914 Cal.Mar.Si. - Measures of integrated conservation of *Calendula maritima* Guss., a rare and endangered species of the Sicilian vascular flora

Duration: 66 Months (from 01/11/2016 to 30/04/2022)

Project location: Sicily - Italy

Total budget: € 1,020,982

EU contribution: € 602,182

% of eligible costs: 58,98%

Coordinating Beneficiary: Consiglio Nazionale delle Ricerche – Istituto di Bioscienze e BioRisorse (CNR-IBBR)

Associated Beneficiary: Dipartimento Regionale dell'Ambiente (DRA) – Regione Siciliana

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Project Website: www.lifecalmarsisi.eu

2. PROJECT OVERVIEW

Calendula maritima Guss. is a very rare herbaceous plant of the Asteraceae family, found exclusively in some small coastal stretches and in micro-insular contexts in the municipal territories of Trapani and Marsala (Western Sicily - Italy). Due to its extreme rarity, it is ranked in the IUCN Red List as CR (Critically Endangered), and is considered among the 50 most threatened plants growing on the Mediterranean islands.

Coastal environments are by their very nature subject to multiple disturbance factors that have or may have severe and irreversible impact on the persistence of the last surviving populations of *C. maritima*. The project aims at reducing or removing the main threats to the long-term conservation of the species, consisting of: a) the reduction, fragmentation and degradation of stands as a result of the destruction of coastal habitats due to heavy anthropisation (e.g. bathing facilities, industrial activities, waste dumps); b) seasonal disturbances associated with beach tourism, such as mechanical beach cleaning, trampling due to the continuous passage of bathers or recreational activities on the beach, access to the beach of motorized vehicles, etc.; c) competition by hybrid plants, originating from the cross between *C. maritima* and the related congeneric species *C. fulgida*, the latter invading the habitat of the target species as a result of human disturbance; d) competition from invasive alien species such as *Carpobrotus edulis*, a plant widely used for ornamental purposes in coastal areas and now widespread throughout the distribution range of the target species.

The objectives of the LIFE CalMarSi Project were to improve the conservation prospects of *C. maritima* by carrying out several actions including: 1) activities aimed at increasing the knowledge on the ecology and genetics of the species to better address conservation strategies, 2) in-situ and ex-situ conservation, 3) implementation of safeguard and policy protection measures, 4) dissemination and awareness raising addressed to the large public, citizens and stakeholders.

3. SHORT REVIEW OF RESULTS

1) Population's geo-referenced inventory and mapping were carried out and a new unknown population was censused. Through specific indicators (e.g. floristic composition, estimated numerical consistency, recruitment, habitat quality, presence of possible hybrids, presence of invasive alien species, etc.) the species' global conservation status was assessed. Only 20% of all populations was classified as good, while over 53% of them were in poor to very poor conditions.

Genetic diversity analyses were performed in order to evaluate the extent of possible hybridisation with *C. fulgida*. The populations from Maraone Islet, Isola Lunga and Ronciglio resulted to be the genetically purest lineages; they were then multiplied by in-vitro techniques in order to produce certified plant germplasm for in-situ and ex-situ conservation actions.

2) With regard to in-situ conservation, reinforcement measures significantly improved the state of conservation of the most depleted populations (i.e. Isola Colombaia and Isola Lunga) and those subject to environmental recovery measures (Ronciglio). Moreover, within the historical range of the species, translocation interventions were carried out in 3 new sites, with the establishment of 3 new viable populations, two of which within nature protected areas. Ex-situ activities involved the cultivation of 75 individuals of various genetic lineages at the Germplasm Conservation Centre of Marianelli managed by the Regional Department of Rural and Territorial Development. Summarizing data are in the table below.

		site	n. nuclei	n. plants	surface m ²
In-situ conservation	Reinforcement	Ronciglio	36	355	1138
		Isola Colombaia	21	210	2169
		Isola Lunga	46	460	2620
		Total	103	1025	5927
	Translocation	Favignana	48	484	2220
		Calcara	61	613	2793
		Fortino	8	80	588
	Total	118	1177	5601	
Ex-situ conservation		CCG Marianelli		75	

3) The issuing of a special Decree by the President of the Region (DPRS n.339/2019) ensured a special protection regime to the target species on the entire regional territory, explicitly forbidding plant collecting, damaging and extirpating in all present (and future) populations of *C. maritima*.

For the scope of physical safeguard, a total of 0.46 km of deterrent barriers were built against trampling and vehicular traffic, whereas 1.21 km of fences allowed to protect from browsing of domestic herbivores and rodents damages. Finally, competition by the invasive exotic species *Carpobrotus edulis* was removed from six different populations on a total area of 0.76 ha.

4) Several activities were performed to involve local public stakeholders, like the signing of a Memorandum of Agreement (MoA) and a formal commitment to take into account the conservation needs of *C. maritima* in any intervention within the area of concern. The objectives and results of the project were presented in various national and local television broadcasts, as well as in popular events, professional training courses, and scientific conferences. Finally, dissemination activities were carried out within schools and private citizens.

4. SWOT ANALYSIS AT THE END OF THE PROJECT

At the end of the project, a SWOT analysis was performed in order to evaluate comprehensively the major results of project implementation, and the pending or unsatisfactory issues.

<p>Strengths</p> <ul style="list-style-type: none">• Achievement of satisfactory knowledge and expertise to address the species' conservation planning• Identification of genetically pure populations• Mastering of an effective in-vitro propagation protocol allowing genetically certified massive plant production and at no risk of offspring depletion from the wild• Raise of viability at species and population level• Mitigation of disturbance in most impacted populations• Removal of competition from IAS in six populations• Conservation of a first stock of diversified germplasm in secured conditions• Establishment of legal protection on the entire regional territory• Improvement of awareness about the species conservation issues among local stakeholder and large public• Involvement of a private stakeholder in the active conservation of the species• Engagement through a MoA of some local Public Institutions and Organisations at promoting actions and initiatives for the conservation of the target species• Consolidation of cooperation with the local WWF Unit of Trapani, which is the Management Body of the Nature Reserve "Saline di Trapani e Paceco", and the Marine Protected Area "Isole Egadi"
<p>Weakness</p> <ul style="list-style-type: none">• Still inadequate awareness among large public• Insufficient competence by territorial management Bodies in applying the protection rules• Lack of appropriate surveillance in the territory of concern• Impossibility to eliminate the risk of hybridisation in the affected populations• Lack of funding for maintenance and restoration• Low availability of new suitable areas for future translocations• High expertise, cost and time consuming for plant material propagation through in-vitro techniques
<p>Opportunities</p> <ul style="list-style-type: none">• Good opportunity for environmental education development• Important source of ecosystem services (education, recreation, culture)• Possible implementation of high quality nature tourism• Social function, citizen engagement in protection, easy access thanks to the vicinity to towns and villages• Value of "flag" species of the target species involving a new type of management of the coastal areas
<p>Threats</p> <ul style="list-style-type: none">• Illegal impacting activities to the current habitat• Impossible long-term control of disturbance by wild fauna (e.g. seagulls trampling and nesting, rabbit browsing, rat predation)• Urban development and uncontrolled beach activities (e.g. kitesurf)• Climate change (increasing summer drought, extreme weather events)

Based on the above the After LIFE Plan was drawn, focusing only on the actions and activities that could contribute to capitalize the results obtained so far.

5. AFTER LIFE PLAN

The implementation of the project included 29 actions. Some of which are definitively concluded, while others require to be pursued in order to maintain and consolidate the most significant outcomes. Among these, some are more properly framed within Concrete and Monitoring actions, whose purpose is preservation or conservation management (C, D), others refer to the requirement of continuing the work of dissemination and outreach to improve the culture of environment sustainability and values (actions E).

ACTION	Post LIFE activity
A. Preparatory actions, elaboration of management plans and/or action plans	
A1 Geo-referenced inventory and characterization of current populations	NO
A2 Physico-chemical characterization of substrates	NO
A3 Exploration of the territory to identify reintroduction sites	NO
A4 Emanation of the Presidential Decree of Protection	NO
A5 Emanation of the guidelines for PUDM e PdU drafting	NO
C. Concrete conservation actions	
C1 In vitro production of propagation material for reinforcement and reintroduction	YES
C2 Reinforcement of natural populations	NO
C3 Establishment of new populations according to the Species Translocation criteria	YES
C4 Building of physical barriers to prevent vehicular access	YES
C5 Control of alien species	YES
C6 Acclimatization in nursery of the new <i>Calendula maritima</i> plants	YES
C7 Ex-situ conservation in CCG (DRSRT) and diffusion in other conservation institutions	YES
D. Monitoring of the impact of the project actions	
D1 Monitoring the impact of concrete actions on the conservation of the target species	YES
D2 Monitoring the socio-economic impact of concrete actions on the beach economy	NO
D3 Monitoring of the genetic stability of the propagated	YES
D4 Monitoring and evaluation of the indicators of the project performances	NO
E. Public awareness and dissemination of results	
E1 Drawing up of a communication plan	NO
E2 Press conferences	NO
E3 Creation and management of the project website	YES
E4 Dissemination materials of the project	NO
E5 Territorial animation for stakeholders	YES
E6 Networking for sharing the conservation actions	YES
E7 Participation to conferences for the dissemination of the project	YES
E8 Layman's report drawing up	NO
E9 Networking activities with other projects	YES

ACTION	Post LIFE activity
E10 Involvement of public and private stakeholders in participatory planning procedures	YES
F. Project management	
F1 Coordination and methods of the project management	NO
F2 External Audit	NO
F3 Elaboration of the "After LIFE Plan"	NO

Overall, with a few exceptions almost all post-LIFE activities will be implemented by the Partner CNR-IBBR with its own permanent staff (i.e. relative costs consist of the personnel salary) and funds, as well as with possible external resources (e.g. INTERREG Euro-Med, 2. Greener Mediterranean - 2.7. *Enhancing protection and conservation of nature, biodiversity and green infrastructure including in urban areas and reducing all forms of pollution*). Furthermore, due to the special scientific concern of results obtained in certain actions (e.g. in-situ conservation by Species Translocation), CNR-IBBR has the interest to continue the monitoring activities and following up the evolution of the newly established populations. The activities described below refer to the actions that will be performed in the period 2022-2027.

5.1. ACTIVITIES RELATED TO CONCRETE CONSERVATION

- Actions C1 and C6 are the basis for future in-situ and ex-situ conservation. The maintenance of the cell cultures and the production of a basic stock of 100 plants/year will be assured by CNR-IBBR in its structures, with internal personnel assigned to this task for 30 persons/days/year. The necessary consumables will be supplied from the ordinary availability of the Institute.
- Action C3 requires specific funding and expertise and will be performed under the responsibility and supervision of CNR-IBBR, who will take charge to find the necessary resources. Potential new reintroduction sites are already identified in the south-western coast of Sicily (e.g. ZSC ITA010006 Paludi di Capo Feto e Margi Spanò).
- Actions C4 and C5 require only the maintenance of the state of fact. Necessary activities will be done through volunteers, with the cooperation of personnel of the WWf Unit of Trapani and the Marine Protected Area "Isole Egadi", under the supervision of researchers of CNR-IBBR. Needed person/day is estimated in 20 unit/year (4 CNR-IBBR researcher, 16 volunteers). Each participant will also provide by its internal budget the necessary funding for travel and subsistence.
- Action C7 will be implemented by CNR-IBBR, who will select the recipient institutions for ex-situ conservation and will engage to provide the plant material to be cultivated therein. It is estimated an engagement of 4 person/day/year and a small funding for plant expedition or transportation that will be provided by internal budget of the Institute.

5.2. ACTIVITIES RELATED TO MONITORING

- Action D1 will be performed by personnel of IBBR-CNR in order to monitor in the medium term the outcomes of Actions C2 and C3, as well as to collect data of scientific interest. It is

estimated an engagement of 8 person/day/year and a small funding for travel and subsistence that will be provided by the internal budget of the Institute.

- **Action D3** requires specific expertise and lab facilities, indeed in the availability of CNR-IBBR. It will be carried out once a year on a sample of newly produced plants and will involve 10 person/day/year. The necessary consumables will be supplied from the ordinary availability of the Institute.

5.3. ACTIVITIES RELATED TO AWARENESS AND DISSEMINATION

- **Action E3** revealed very effective for dissemination and information about the project activities. The website will be active until 30/06/2025 and the relative costs are already payed. An operational prolongation is foreseen until 30/06/2027 and the necessary funds will be supplied from the ordinary budget of CNR-IBBR. Content updating is under the responsibility of the Institute and will require 4 person/day/year.

- **Actions E5, E6, E9 and E10** will be continued mainly by CNR-IBBR, with the cooperation of DRA and the WWF Unit of Trapani. It is planned to organize 3 meetings/year with primary and secondary schools. It is also expected to contribute to any public event organised at local scale and addressed to various stakeholders (the next one is already planned on 20/07/2022 at Favignana within the promotion campaign by Legambiente for the institution of the National Park of Isole Egadi e Saline di Trapani e Marsala), and touristic visits of the Nature Reserve of Saline di Trapani e Paceco. Networking, especially with other LIFE projects to share expertise and results, will be prosecuted by CNR-IBBR as well. It is estimated the involvement of total 10 person/day/year; the cost for travel and subsistence will be covered from the internal budget of each respective contributor.

- **Action E7** will be prosecuted by researchers of CNR-IBBR. It is expected to participate to at least a conference per year (we already can list one conference after the end of the project, cfr. Section 6.1.23 of the Final Report). The relative costs will be covered by the internal budget of the Institute.

A synthesis of scheduling and structure of the After-LIFE Plan is presented in the table below:

Action	Objective and action	When, How often	Where	Who	Source of funds	Needed finances	Priority
C. Concrete conservation actions							
C1	In vitro maintenance and propagation	2022-2027	CNR-IBBR structures	CNR-IBBR	Internal budget	€€€€	**
C3	Establishment of new populations	2024-2027	Various sites along the regional coastal area	CNR-IBBR	Project financing with external fundings	€€€€	*
C4	Maintenance and repair of physical barriers	2022-2027	Ronciglio and Favignana	CNR-IBBR, WWF, PMA Isole Egadi	Internal budget	€	***
C5	Repetition of cleaning	2022-2024	Populations of Pizzolungo, S. Giuliano, Villino	CNR-IBBR, WWF	Internal budget	€	***

Action	Objective and action	When, How often	Where	Who	Source of funds	Needed finances	Priority
			Nasi, Isola Colombaia, Torrente Baiata, Isola Lunga				
C6	Acclimatization and cultural care in nursery	2022-2027	CNR-IBBR structures	CNR-IBBR	Internal budget	€€€€	**
C7	Ex-situ conservation in conservation institutions	2022-2027	Various repositories	CNR-IBBR	Internal budget	€€	**
D. Monitoring of the impact of the project actions							
D1	Monitoring outcome of actions C2 and C3	2022-2027	Sites of actions C2 and C3, and new future sites	CNR-IBBR	Internal budget	€€€	***
D3	Monitoring of the genetic stability	2022-2027	CNR-IBBR structures	CNR-IBBR	Internal budget	€€€	**
E. Public awareness and dissemination of results							
E3	Management of the project website	2022-2027	CNR-IBBR structures	CNR-IBBR	Internal budget	€	***
E5, E6, E9, E10	Territorial animation, networking, information	2022-2027	Various sites in the province of Trapani	CNR-IBBR, WWF, DRA	Internal budget	€€€	***
E7	Participation to scientific conferences	2022-2027	Various locations in Italy and abroad	CNR-IBBR	Internal budget	€€	**

LEGEND:

Budget needed: €=up to 5000 euro; €€= 5000 to 10000 euro; €€€=10000 to 15000euro; €€€€= more than15000 euro.

Priority: *** =the action is absolutely necessary and crucial for reaching the objectives; **= it would be very good to implement this action – it will lead to enlarged scope and efficiency of the project; *= this action may be implemented if financial resources are available/provided