Layman's Report 2023

LIFE Granatha: old and new heathland-smanagement models for the conservation of breeding birds

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LIFE Granatha project

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Coordinating Beneficiary: D.R.E.AM. ITALIA Soc. Cooperativa Agricolo Forestale
Associated Beneficiaries: Dipartimento di Scienze Agrarie, Forestali e Alimentari, Università di Torino; Unione dei Comuni del Pratomagno; Betadue cooperativa sociale
Website: lifegranatha.eu

A project to protect the mountain heaths of Pratomagno

The heaths dominated by *Erica scoparia*, present within the Natura 2000 SPA-SAC Site "Mountain pastures and shrublands of Pratomagno," in eastern Tuscany, are anthropogenic environments. This type of vegetation, classified as "habitat 4030" by the EU Habitat Directive 92/43/CEE, has in fact been established as a result of deforestation and forms of overuse of these lands, which are mainly used for grazing and agriculture. Fires have also played a key role in the spread of this Habitat. In fact, these forms of management have resulted in a reduction of soil organic substance and soil acidification, creating suitable conditions for the development of this phytocoenosis.

Until not long ago, heaths were actively managed for the production of brooms, the so called "granate" in Tuscany and not only, favored to the detriment of other shrub species and even the forest. Since the 1980s, also aided by the large-scale advent of plastics, this activity has almost completely disappeared, and the evolution of vegetation, no longer managed, has profoundly altered these environments, now largely evolving to woodland, making them no longer suitable for hosting the rich biodiversity that characterizes them.

The Granatha project, funded under the European Union's LIFE Program, aims to conserve and restore these environments, also by the recovery of a local production chain, and in particular to improve the conservation status of eight species of birds considered to be of birds that nest and feed in these environments, and that are considered of conservation interest at the at the European level (under the Birds Directive No. 79/409/EEC) that nest and feed in these environments.

The LIFE Program

The LIFE program is the EU's financial instrument for the environment and climate action. Since 1992 to date, it has co-financed more than 5,500 projects in the EU and third countries, mobilizing more than 12 billion euros of investment, five of which have been allocated by the European Commission as co-financing. In Italy, nearly 1,000 projects have been financed, with a total investment of 1.7 billion euros. Divided into subprograms, the LIFE Granatha project falls under Nature and Biodiversity.

More info at:
https://cinea.ec.europa.eu/programmes/life_en

Ornithological importance of heathlands

Heathlands are characterized by a rich biodiversity; apparently uniform and monotonous, in reality they hide a remarkable diversity of environments, often on a small scale, which allows the presence of many species. This was possible also thanks to the forms of management conducted until recently long ago (cutting and grazing). Birds assume central importance, with many species nesting frequenting these environments, for example for feeding, considered rare and threatened by habitat disappearance. Due to their ornithological importance, the Pratomagno heaths are classified as IBAs (Important Bird Areas) by BirdLife International, along with other similar environments in the province of Arezzo.

The specific objective of the LIFE Granatha project is to improve the conservation status of eight bird species: **Montagu's harrier** (*Circus pygargus*), **European nightjar** (*Caprimulgus aeuropeus*), **Woodlark** (*Lullula arborea*), **Tawny pipit** (*Anthus campestris*), **Dartford warbler** (*Sylvia undata*), **Red-backed shrike** (*Lanius collurio*), **Short-toed eagle** (*Circaetus gallicus*) e **Honey buzzard** (*Pernis apivorus*).

Natura 2000 Network

Natura 2000 Network is the main instrument of European Union policy for the conservation of biodiversity. It is an ecological network spread throughout the territory of the Union, consisting of Sites of Community Interest (SCI), identified by Member States on the basis of the Habitats Directive and subsequently designated as Special Areas of Conservation (SAC), to which are added the Special Protection Areas (SPA) established by the Birds Directive.
The areas included in the Natura 2000 network are not rigidly protected reserves where human activities are excluded; on the contrary, one of the objectives of Natura 2000 is to combine the conservation of biodiversity while also "taking into account economic, social and cultural needs, as well as regional and local particularities" (Art. 2)
In Italy, Natura 2000 Network covers a total of about 19% of the national terrestrial territory and more than 13% of the marine territory.

More info at:
www.ec.europa.eu/environment/nature/natura2000/index_en.htm

SPA-SAC IT5180011 "Mountain pastures and shrublands of Pratomagno"

Extended for over 6,700 ha, the SPA covers the ridge area and western slope of the mountain range of the same name, straddling the Upper Valdarno and Casentino, including the territory of six municipalities, in the province of Arezzo: Castel Focognano, Castel San Niccolò, Castelfranco Piandiscò, Loro Ciuffenna, Montemignaio and Ortignano Raggiolo. In addition to the presence of shrublands and heathlands, which cover about 670 ha (including 320 of H4030), the SPA is characterized by extensive woodlands and ridge grasslands, from which the mountain takes its name.

The SPA protects numerous bird species, including, in addition to the project's target species, the Golden Eagle, which has recently nested in a neighboring area, the Black Woodpecker, which has also recently appeared and is still expanding, and many others related to open and shrubland environments, which are present here with conspicuous populations. 40% of the SPA falls within the Pratomagno Valdarno Regional Forest Complex, managed by the Union of Pratomagno Municipalities (Unione dei Comuni del Pratomagno).

The conservation interventions

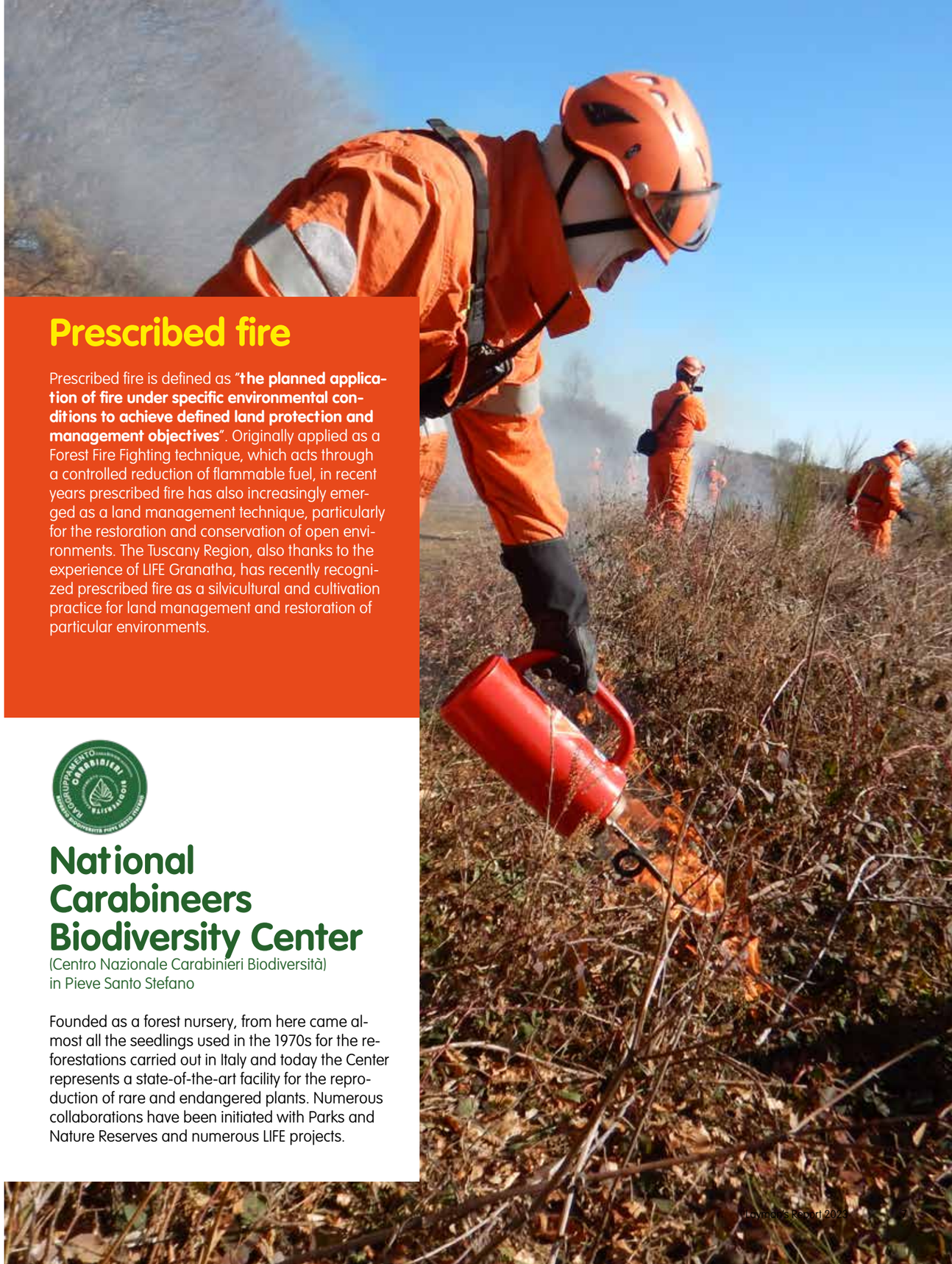
The heathland conservation and restoration interventions involved a total of 172 ha, divided between areas with a productive aptitude, where accessibility, morphology and heather density make these areas suitable for active management, and areas with a naturalistic aptitude, which are difficult to access, with rough morphology and where heathlands represent only one piece of a larger environmental mosaic.

The interventions, also taking into account the different areas included, were carried out using two main techniques: "classic" clear-cutting, automated or manual depending on the characteristics of the areas of intervention, and prescribed fire, applied for the first time in Italy for the conservation and restoration of mountain heaths. Scrub clearance interventions affected 159 ha, 13 were treated with prescribed fire.

With regard to clear-cutting, which involves the removal of all vegetation present except for protected species (such as e.g., *Juniperus* sp.) and fruit trees (important for wildlife), has proven to be the most effective in encouraging the development and spread of heathers. Interventions on tree vegetation involved coniferous reforestation (particularly widespread in the area) and forest regeneration, regardless of species. In naturalistic areas, it was also applied the hole cutting, concentrating the intervention in areas close to and partly overlapping areas with heather cover, so as to make it more likely to recolonize in newly cut areas.

Particular attention was given to the management of cut material. The *Erica scoparia* is an acidophilic plant and prefers poor, mineralized soils; the release of cut material onto the soil would therefore increase the amount of organic material, creating unfavorable conditions for the species. In areas where it was not possible to recover the cut material, it was removed by on-site burning, concentrating the materials in small piles distributed over the entire cut area.

As part of Concrete Conservation Actions, the LIFE project has also initiated some experimental activities aimed at restoring heathlands. Thanks to the collaboration of the National Carabineers Biodiversity Center (Centro Nazionale Carabinieri Biodiversità in Pieve Santo Stefano), *Erica scoparia* seeding and planting tests were carried out with the aim of identifying the best restoration techniques for these environments. The seeds used in the tests were collected from the Pratomagno heathlands and then brought to the Pieve S. Stefano Center where, in addition to evaluating their germination rate, those were partly prepared for field tests and partly stored for future interventions. Part of the collected seeds were used to produce seedlings, which were then planted in the intervention areas. The tests, which are still ongoing, will continue during After LIFE.



Prescribed fire

Prescribed fire is defined as "**the planned application of fire under specific environmental conditions to achieve defined land protection and management objectives**". Originally applied as a Forest Fire Fighting technique, which acts through a controlled reduction of flammable fuel, in recent years prescribed fire has also increasingly emerged as a land management technique, particularly for the restoration and conservation of open environments. The Tuscany Region, also thanks to the experience of LIFE Granatha, has recently recognized prescribed fire as a silvicultural and cultivation practice for land management and restoration of particular environments.

National Carabineers Biodiversity Center

(Centro Nazionale Carabinieri Biodiversità)
in Pieve Santo Stefano

Founded as a forest nursery, from here came almost all the seedlings used in the 1970s for the reforestations carried out in Italy and today the Center represents a state-of-the-art facility for the reproduction of rare and endangered plants. Numerous collaborations have been initiated with Parks and Nature Reserves and numerous LIFE projects.

The impact of the interventions on target species

The LIFE Granatha project set two specific goals, to increase both the population and range of the target species by 20% at the SPA scale. The results of monitoring, carried out throughout all the project, show that these goals were largely met, and in many cases exceeded, for all species except for the Honey buzzard, which showed fluctuating trends throughout the years, apparently not related to the effects of the interventions.

The positive results with particular importance have been registered for Woodlark, with an increase of 13 couples (Figure 5A), Red-backed shrike, which has colonized one of the areas of interventions from 2 to 5 couples and European nightjar which has increased its proper population from 8 - 10 couples resulted at the starting of the project to 14 -18 the following years (figure 2).

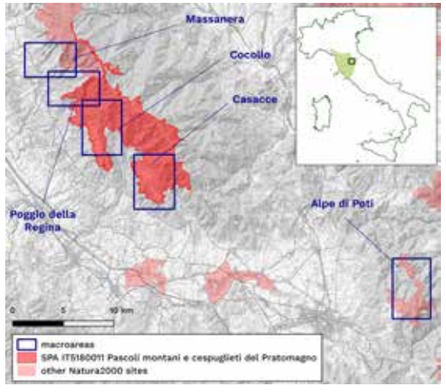


Figure 1. Macroareas in which monitoring has carried out.

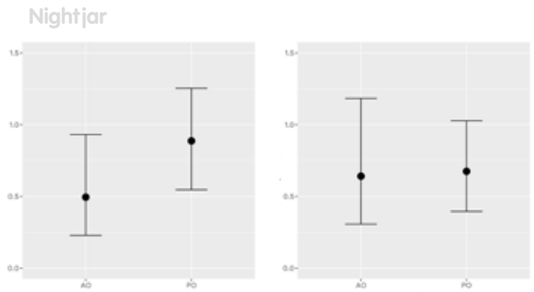


Figure 2. Trend over the years of the observations of Nightjar in intervention (left) and control (right) areas.

Particularly interesting is the situation of Dartford Warbler (Figure 6A); if we simply compare the trend of the species between the project areas and those not affected by interventions, the differences are minimal; in both cases the species has slightly decreased.
For a correct interpretation of the results, however, it is essential for species such as Dartford Warbler, closely related to the presence of shrubs, to consider the time elapsed since the interventions, that is the time required for some regrowth of the plants and for the environment to return to or become capable to host it. In the study area, the species was shown to start frequenting the intervention areas to an appreciable extent three years after the interventions and to reach higher densities the fourth couple year, increasing from about 3.0 couple/hectare to just over 4.0 couple/hectare, an estimated increase of 33% (Figure 7D).

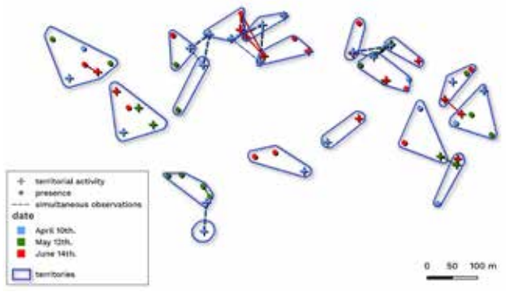


Figure 3. Example of definition of territories (Dartford warbler 2017, Poggio della Regina, routes 17 and 18); in the figure are reported data collected and polygons representing the territories (polygons are not to be understood as the delimitation of territories themselves but only their indicative representation).

This result shows, on the one hand, a generalized increase in Habitat suitability as a result of the interventions, and on the other hand seems to indicate substantial compatibility with productive heathland management, which sees heather cutting shifts of about 5/6 years.

Positive effects were also recorded for Montagu's harrier and Short-toed eagle; both these species colonized one of the two intervention macroareas (where they were not present before the interventions) with a new couple.

The data collected for monitoring purposes have given to us the possibility to evaluate the impact of interventions for other species not considered to European interest, but nevertheless have a negative conservation status at regional and national level. In particular it is referred to Stonechat (*Saxicola torquata*), Skylark (*Alauda arvensis*), Common whitethroat (*Sylvia communis*) and Rock bunting (*Emberiza cia*).

Stonechat e Rock bunting showed a significant increase in the number of territories in the intervention areas, compared to a decrease recorded in some areas not affected by the interventions (Figure 6B and 6F).
The case of Skylark is even more outstanding: absent before the interventions in the project areas, it has been detected with regularity since 2019, with 3-4 couples per year.
A similar result to that highlighted for Dartford warbler also seems to affect the Common whitethroat: in fact, in this case too, the species seems to benefit from the interventions, although the positive effect begins to manifest itself a few years after the intervention (Figure 7F).

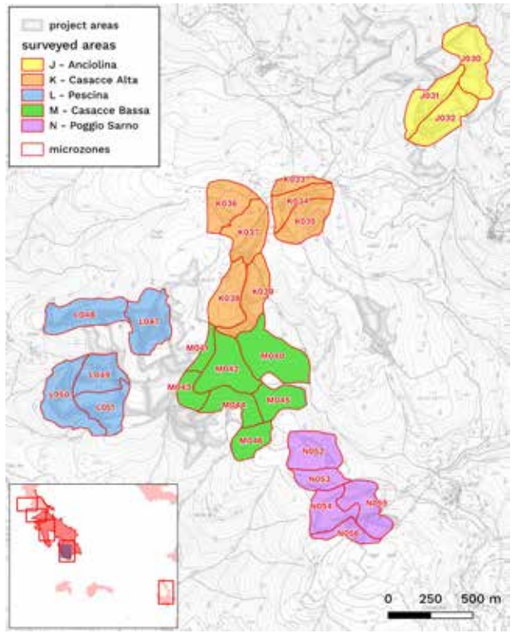


Figure 4. Zones (represented by color) and microzones (indicated by numbers) of the Casacce macroarea used for calculating species densities and trends.

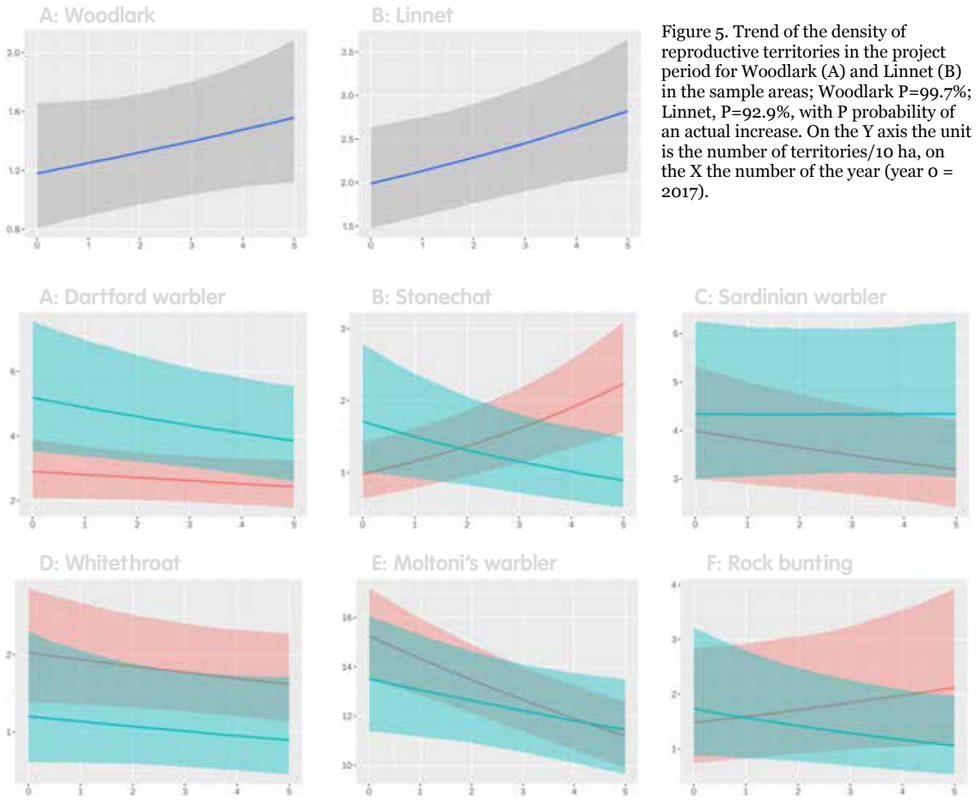


Figure 5. Trend of the density of reproductive territories in the project period for Woodlark (A) and Linnet (B) in the sample areas; Woodlark P=99.7%; Linnet, P=92.9%, with P probability of an actual increase. On the Y axis the unit is the number of territories/10 ha, on the X the number of the year (year 0 = 2017).

Figure 6. Trend of the number of territories in the project years in intervention (red) and comparison areas (blue) for: Dartford warbler (A), Stonechat (B), Moltoni's warbler (C), Sardinian warbler (D), Whitethroat (E), Rock bunting (F). On the Y axis the unit is the number of territories/10 ha, on the X the number of the year (year 0 = 2017).

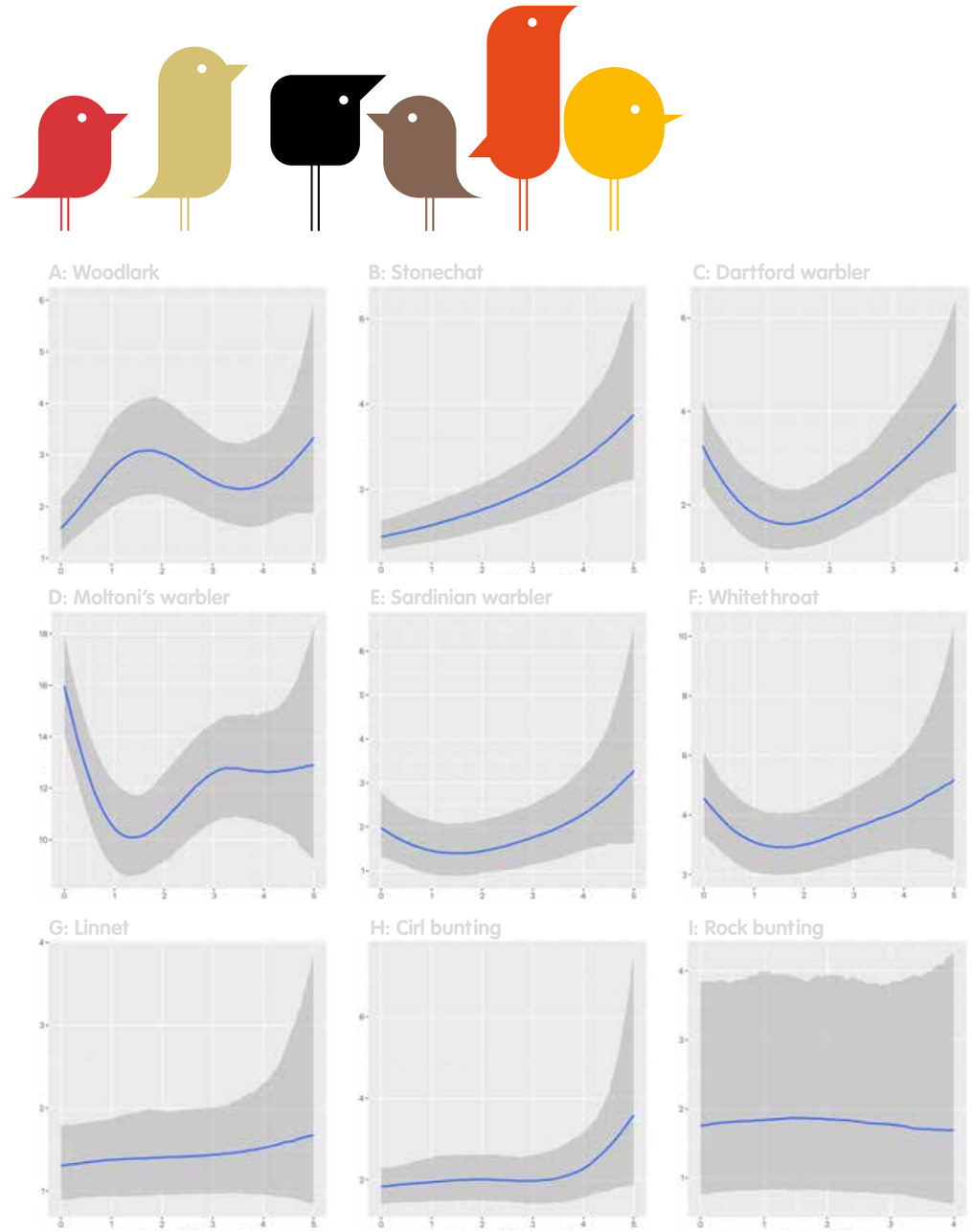


Figure 7. Trend of the number of territories in relation to the time elapsed from the actual date of implementation of the interventions for: Woodlark (A), Stonechat (B), Dartford warbler (C), Moltoni's warbler (D), Sardinian warbler (E), Whitethroat (F), Linnet (G), Cirl bunting (H), Rock bunting (I). On the Y axis the unit is the number of territories/10 ha.

The impact of the interventions for Habitat 4030

The monitoring of Habitat 4030, both at the stand scale, through a phytosociological (Daget-Poissonet method) and physio-sociological study (240 test plots), and at the landscape scale, through the analysis of the evolution of stand structure and composition by means of Sentinel-2 Multispectral Imager satellite images (10-30 m resolution with automatic classification of land cover by NDVI - Normalized Difference Vegetation Index), showed, at both scales of investigation, positive effects of interventions both in terms of restoring habitat structure and increasing heathland diversity and complexity.

An initial interesting result concerns the response of heathers to different treatments. The species responds well and quickly to interventions; although some of the intervention areas were characterized by aged stands (more than 30 years old), more than 99% of the stumps regenerated their foliage by vegetative regrowth from basal buds, confirming the high canopy replenishment capacity of these species. Another interesting aspect concerns the differences recorded in the different treatments: heather regrowth appears faster in areas treated with prescribed fire, where the heathers show a greater ability to compete with the others species.

The positive effect of prescribed fire, makes this technique particularly interesting for the management and conservation of this Habitat, taking into account that this method has moreover already been documented on similar species in other situations, combined with the cost-effectiveness of the treatment, at least compared to "classic" clearing operations and it give the possibility to intervene in areas with complex morphology.

Monitoring also showed that, at both stand and landscape scales, the interventions 4 years after their implementation, resulted in an increase in the number of species present, the average number of species per survey shows a 15% increase also in the structural and functional diversity of heathlands.

The latter result appears to be directly related to the positive effects recorded for birdlife; an increase in the structural complexity of heathlands, which occurred substantially at the expense of invasive shrub and tree components, has evidently made the Habitat more suitable, not only for typical species, but also for those associated with more diverse open environments.

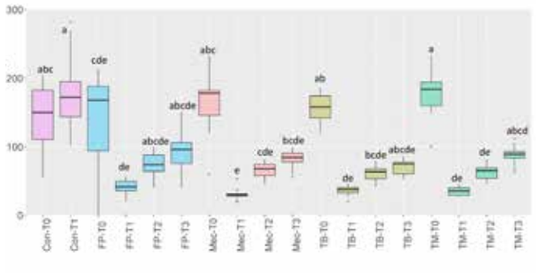


Figure 8. Difference in the height of the spurs of the heathers (reported in the x axis) following the different treatments (on the Y axis is reported the height of heathers, in cm): control (Con), prescribed fire (FP), mechanized (Mec), manual cutting with necromass burning (TB), manual cutting with necromass release (TM), before (time T0) and after treatment (T1, T2, T3). The letters indicate the results of the post-hoc LSD test to identify significant differences in variables between different treatments and treatment times.

Involvement of local communities

Thirty percent of the 172 ha covered by the project falls within private property; this data, 34 ha more than originally planned, is indicative of the level of involvement that the project was able to develop with the communities in the area. All of these lands, many of them of absolute naturalistic value, have been granted for the activities envisaged by the project on free loan for 10 years. From the beginning, LIFE Granatha has heavily invested in the involvement of local communities, particularly in the mountain settlements near the intervention areas, organizing numerous meetings, outreach and restitution activities. Even now that the project finished, new landowners are contacting us to make their land available for project objectives. This certainly represents one of the most important results of the project. After all, heathlands in these areas also have a cultural value, and the memory of heathland work is still alive in many residents, especially the older ones.

Transfer of Best Practices

In pursuit of its objectives, the LIFE Granatha project applied several intervention techniques, some of which were well-known and widely tested, albeit under quite different conditions, such as brush clearing, and some of which were new and experimental, at least for these environments, such as prescribed fire. One of the goals of the project was to make these Good Practices available to anyone working in similar environments, actively promoting their transfer and application. It is in this perspective that must be evaluated the decision taken by the Union of Pratomagno Municipalities (Unione dei Comuni Montani del Pratomagno) to identify a specific intervention module for the conservation and restoration of heathlands, then included not only in the new Management Plan of the Pratomagno Valdarno Regional Complex, but also in another complex, for which the Union is responsible, called "Monte Ginezzo", located in the Municipality of Cortona (AR) and falling within the Natura 2000 Site of the same name. In the future, the intervention module, shared with Tuscany Lands Entity (Ente Terre di Toscana), agency in charge of managing the regional heritage, may also be included in the Management Plans of other Complexes, where heathlands are present.

Heathlands, also mixed with prairie, in the SAC of Monte Ginezzo.

Productive heaths management, an ancient craft that is being renewed

There were many traditional uses of the two species of heather found in Tuscany: with *E. arborea*, for example, "woods" were set up for breeding silkworms, while with the bundles, mainly from *E. scoparia*, in farms were made artifacts, such as brooms, or "granate" to put it in a Tuscan way, used for sweeping stables and farmyards and, later, for cleaning roads.

Over time, heathers have also been used for "industrial" activities: *E. arborea* was the fuel of choice in Etruscan metallurgy and fueled, especially in past decades, the pipe industry (made from the log, the underground organ in which the plant accumulates its reserves). Brooms production, at least until the 1970s, had also taken on an industrial dimension. The manufacture of brooms was traditionally widespread in several municipalities in the province of Arezzo, including those in Pratomagno, where it employed hundreds of workers, including cutters and assemblers of brooms, which were also exported to foreign countries such as Egypt and Switzerland.

Today, unfortunately, little or nothing remains of that economic activity; heather bundles are mostly used to fuel the ovens of pizzerias and bakeries (the plant is rich in essential oils and can bring ovens up to temperature in a short time), or as a cover for roofs and agricultural outbuildings, while the production of brooms is limited to a few realities.

The production of heather artifacts, and of brooms in particular, can find a new development today, and LIFE Granatha demonstrates this, thanks to its characteristics of sustainability and circularity (the supply chain is closed, renewable and produces practically no waste), enhancing what are its multiple positive impacts, not only in terms of biodiversity conservation but also, for example, in terms of fire risk reduction, limiting the development of flammable biomass, maintenance of a historical-cultural landscape and, more generally, as a socio-economic point of mountain areas.

The Granatha Cooperative

Heaths are particularly dynamic environments and evolve, more or less rapidly depending on environmental conditions, first into more complex shrublands and then forests. In the absence of natural disturbances, such as fires, only continuous management of these environments can ensure their preservation. For this to be possible, and economically sustainable, it is necessary to create favorable conditions for these environments to become economically productive again by promoting sustainable resource management. The Granatha Cooperative, established under the LIFE project on 05/28/2020, was created with this goal in mind. There are currently 14 people involved, including members and simple workers, who, thanks to the support of the LIFE project, have started cutting heather and producing brooms again. 73 ha of land and a concessionary premises at subsidized prices, equipment for cutting and making brooms on free loan, and an initial package of sales agreements, this is what the LIFE Granatha project has made available to revive the heather industry in Pratomagno. In recent years, members and workers of the Cooperative have also been involved in numerous training activities, organized thanks to the support of Mr. Mario Carbonai, a lifelong craftsman and broom's maker, who has been always present and supportive with his experience.

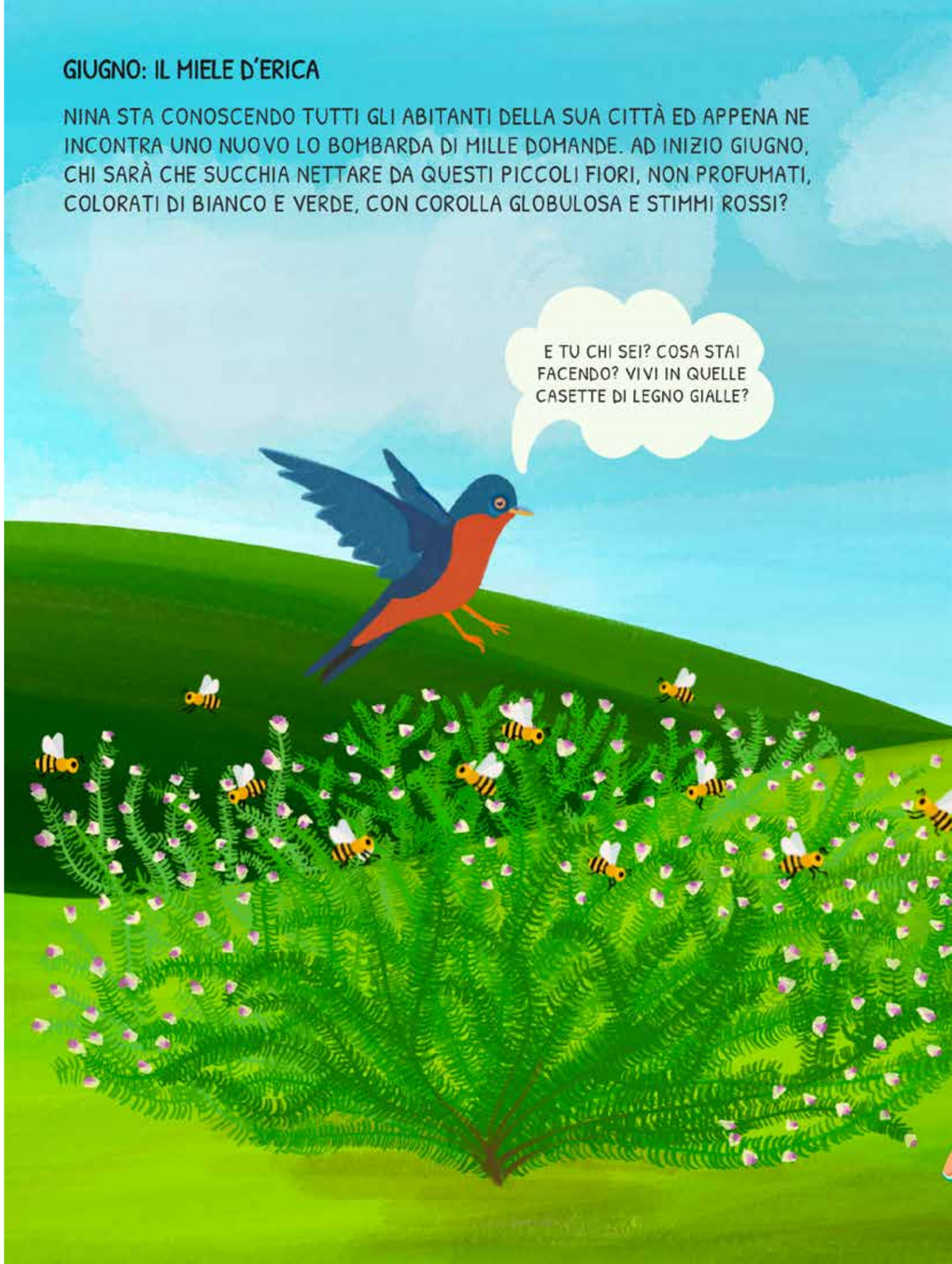
The Pratomagno Community Cooperative

The Granatha Cooperative, supported by the LIFE project, played an important role in the creation of the Pratomagno Community Cooperative. Community cooperatives are a model of social innovation where citizens, but also companies and associations, are producers and users of goods and services. It is a model that creates synergy and cohesion in a community by arranging the activities of all those involved, thus responding to multiple needs. The Tuscany Region, has for several years supported the birth of these realities, which, particularly in mountain areas, represent a strong starting point against depopulation and new opportunities for the birth of small activities linked to the territory. The Granatha Cooperative represents such initiative.




At school with the heaths II

Granatha Kids, this is the name of the environmental education campaign implemented by the LIFE Granatha project in the municipalities of the Pratomagno SPA. 26 fourth and fifth grade elementary school classes from six municipalities for a total of 310 students involved.
An educational platform, accessible from the project website, with educational fact sheets and interactive workshops, a myriad of information about the Pratomagno heaths, their biodiversity and traditional uses. The didactic notebook "Nina the Dartford warbler and the friends of the heaths" was given to all students, through which, in the company of Nina, a young Dartford warbler, we go on a discovery of the Pratomagno heaths and its inhabitants. And then again, for each class, two theoretical lessons and a field trip to the project areas.
A school contest, "Super Granatha Kids," in which the most original broom built by students from recycled materials were awarded.
These are the numbers of an activity that, despite all the difficulties related to the Covid19 pandemic, allowed in the 2021-2022 school year to involve hundreds of children in the discovery of an environment rich in nature and history.



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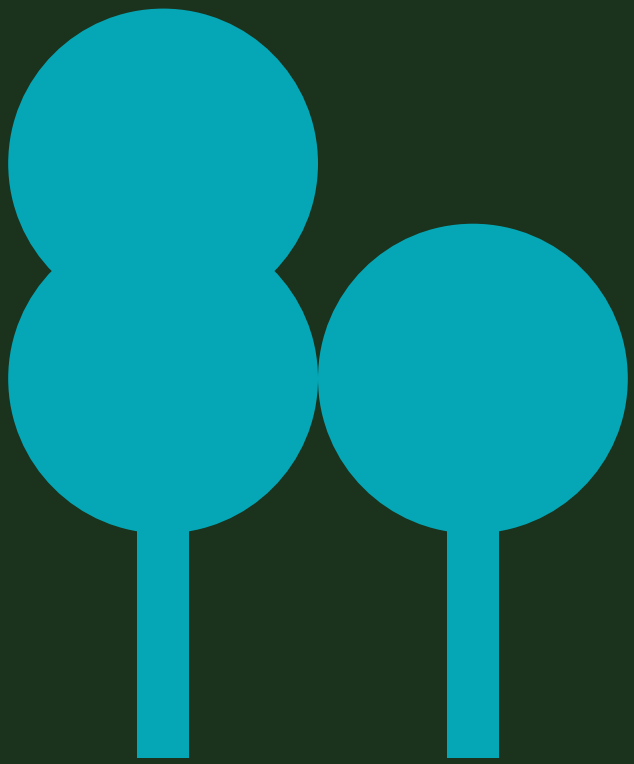

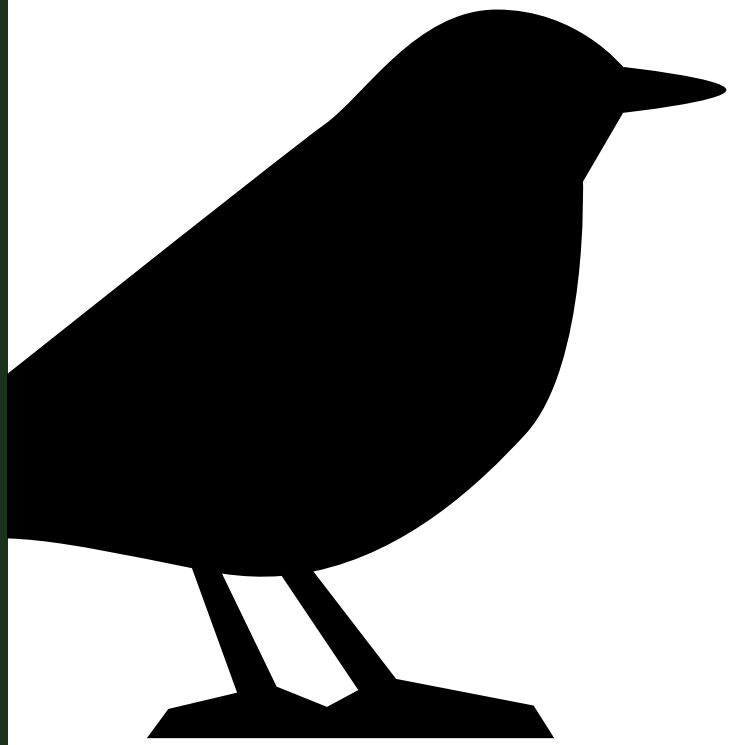

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