


The May Crosses (*'Cruces de Mayo'*) of Piedrabuena, Spain: Ethnobotanical assessment of cultural and biological heritage with conservation implications for *Erica* and bryophyte species

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Abstract. Religious festivities incorporating botanical elements constitute significant components of Spain's cultural heritage, exemplified by Corpus Christi, Palm Sunday, Béjar's "Moss Man" and Nativity scene representations. Among these biocultural manifestations, the May Crosses ('*Cruces de Mayo*') festival represents a notable tradition wherein local communities establish altars featuring a cross adorned with elements from the surrounding natural environment. This ethnobotanical study focuses on the May Crosses tradition in communities along the Guadiana River valley, with particular emphasis on Piedrabuena (Ciudad Real province), where the festival demonstrates exceptional biocultural diversity.

Through systematic field observations and semi-structured interviews with festival participants, we documented three distinct typological categories: Forest Crosses, Heather Crosses (predominantly featuring *Erica* species), and Mixed Crosses—the latter integrating both mineral elements (water and geological specimens) and botanical specimens. Our floristic inventory identified over 100 plant species utilized in these ephemeral botanical installations, with Heather Crosses representing particularly sophisticated botanical artworks deserving special cultural recognition.

The research reveals significant conservation implications, as the tradition involves harvesting of some taxa with vulnerable conservation status. We present a preliminary assessment differentiating between abundant species suitable for sustainable wild collection and those requiring protection due to rarity, threatened status, or ecological sensitivity (including certain orchids, geophytes, and bryophytes). This study contributes to the understanding of biocultural heritage while addressing the urgent need for conservation-oriented management strategies that ensure the long-term sustainability of both the cultural practice and the botanical resources upon which it depends.

Keywords: Biocultural heritage, Cruces de Mayo, Ethnobotany, *Erica* species, Conservation biology, Traditional ecological knowledge, Ephemeral botanical art, Mediterranean flora, Plant harvest sustainability, Guadiana River basin, Religious ethnobiology, Cultural ecosystem services, Bryophyta, Mosses, Liverworts.

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Introduction

Traditional Knowledge

Traditional Knowledge (TK) (United Nations, 1992) constitutes a dynamic corpus of experiential wisdom, innovations, and practices developed and preserved through intergenerational transmission by Indigenous and local communities worldwide (Berkes *et al.*, 2000). This cumulative intellectual heritage, born from centuries of cultural adaptation and ecological observation, is characterized by its oral dissemination, collective custodianship, and holistic integration into cultural life. TK manifests across diverse expressions—including linguistic, spiritual, and practical domains—and is fundamentally pragmatic, integrating functional applications with spiritual significance. Its adaptive capacity allows for continuous evolution while maintaining core principles derived from ancestral experience (Gadgil *et al.*, 1993; Berkes *et al.*, 2000; Iaccarino, 2003).

Globally, botanical elements are prominent in religious expressions; within Christianity specifically, plants constitute integral components of devotional rituals, offerings, and ceremonies. This religious-botanical nexus is evidenced by the documentation of over 150 plant species in biblical texts (Zohary, 1982). As a whole, TK represents an invaluable repository of human adaptation, containing sophisticated understandings of ecological relationships and sustainable resource management that complement scientific conservation approaches (Mathur, 2003; Pardo-de-Santayana & Macía, 2015; Pardo-de-Santayana *et al.*, 2014).

Uses of plants in ritual and religious celebrations

Historically, ethnobotanical research has documented the deliberate incorporation of

psychoactive plants into religious and ritual contexts, such as wine in Christian Eucharistic traditions (Merlin, 2003). In classical antiquity, the discovery of such plants was often attributed to divine figures, as with the hallucinogenic properties of *Hyoscyamus albus* L. being ascribed to Hercules (Baumann, 1993). Scholars have proposed that early human engagement with these botanicals may have even catalyzed primordial religious experiences and theological developments (Merkur, 2000; Dure, 2001; Ruck *et al.*, 2001).

Several plant species serve as symbolic elements within festivities, often bearing specific liturgical names. For instance, *Lavandula pedunculata* (Mill.) Cav. and *L. stoechas* L. are regionally known as "thyme of the Lord," while *Helichrysum stoechas* (L.) Moench is called the "flower of the Corpus," reflecting their consistent use in the celebration of Corpus Christi (Verde *et al.*, 2000; Pardo de Santayana *et al.*, 2018a).

In Spain, numerous religious festivities, including Corpus Christi, Palm Sunday, and the '*Las Enramás*,' integrate plants into their rituals. Corpus Christi, celebrated 60 days after Easter, features processions where streets and altars are adorned with aromatic "plant carpets." These intricate, ephemeral mosaics utilize species such as lavender (*Lavandula pedunculata*, *L. stoechas*), rosemary (*Rosmarinus officinalis* L.), fennel (*Foeniculum vulgare* Mill.), and mastic thyme (*Thymus mastichina* (L.) L.), the latter of which also functions as a veterinary remedy for equine colic (Aceituno-Mata, 2010). The displays are further enriched by a diverse array of other botanicals, including mallow (*Malva sylvestris* L.), everlasting (*Helichrysum stoechas* (L.) Moench.), and oleander (*Nerium oleander* L.) (Pardo de Santayana *et al.*, 2014, 2018a, 2018b, 2018c). These plant carpets

are complemented by decorated altars featuring additional species like peonies (*Paeonia broteri* Boiss. & Reut.) and St. John's wort (*Hypericum perforatum* L.) (López Soler, 1906; Gallejo Carricajo & Gallejo Carricajo, 2008; Garzón Machado, 2012; Pardo de Santayana *et al.*, 2018c).

Palm Sunday, initiating Holy Week, is distinguished by the ritual use of olive branches (*Olea europaea* L.) and palm leaves (*Phoenix dactylifera* L.), which are carried in processions and later kept in homes as protective talismans (Fajardo *et al.*, 2000; Rivera *et al.*, 2008). Similarly, various Spanish pilgrimages feature carriages adorned with wild flora like poppies, rosemary, rush (*Scirpoides holoschoenus* (L.) Soják), broom, terebinth, thyme, and other indigenous plants, a recurring annual tradition (Pardo de Santayana *et al.*, 2014, 2018a, 2018b, 2018c).

In contrast to these religious festivals, 'Las Enramás' is a pagan-derived spring celebration where plants are the central communicative element. Young men place bouquets at the homes of unmarried women, with specific species like cherry branches (*Prunus cerasus* L. or *P. avium* (L.) L.) conveying romantic interest, and others like cotton thistle (*Onopordum* sp. pl), oleander, or scorpion broom (*Genista scorpius* (L.) DC.) signaling rejection (Verde *et al.*, 1997).

A more complex botanical tradition is the May Crosses ('*Cruces de Mayo*'), observed on May 3rd commemorating the Discovery of Holy Cross in Spain and Spanish-speaking countries (González-Cruz, 2004). While its origins are debated—potentially deriving from early Christian commemoration or pre-Christian spring rites—the festival involves constructing elaborate altars centered on the Holy

Cross (Icalendario, 2018; López Velasco, 2006; Jiménez de Madariaga, 2011). While Córdoba and Granada host the most renowned celebrations, many Spanish municipalities observe this festival, which balances religious and popular elements. Towns with particularly strong traditions include Bonares in Huelva province, and Villanueva de los Infantes and Piedrabuena in Ciudad Real province (Jiménez de Madariaga, 2011). In towns like Piedrabuena, these installations are distinguished by their immersive, naturalistic environments. Rooms are entirely covered with heather (*Erica* spp.), lavender (*Lavandula stoechas* and *L. pedunculata*), and mastic thyme (*Thymus mastichina* (L.) L.), and various bryophytes, and are further embellished with water features, rocks, and even live animals to create idealized natural scenes.

A notable parallel to this tradition is the Jewish Feast of Tabernacles ('*Sukkot*'), which involves constructing temporary huts from reeds (*Phragmites australis* (Cav.) Trin. ex Steud., or *Arundo* spp.), willows (*Salix fragilis* L.), and cattails (*Typha* spp.). These cabins are furnished and adorned with flowers, fruits (grapes, pomegranates, figs), garlands, tapestries, paintings, lanterns, and other decorative elements, with food and drinks arranged on a table. During this weeklong celebration, worshippers in the synagogue hold a citron (*Citrus medica* L.), known as etrog, in their left hand, while their right hand holds a bouquet binding together a short piece from the apex of a palm leaf (*Phoenix dactylifera* L.), three myrtle branches (*Myrtus communis* L.), and two willow branches. The etrog is traditionally preserved in homes until the following year's celebration (Rivera *et al.*, 2024). This comparative example underscores



Figure 1. Celebrations of Corpus Christi in select locations within Castilla-La Mancha, Spain. a, procession during the Corpus Christi festival in Bogarra, Albacete; b, street and altar adorned for the Corpus Christi procession in Abengibre, Albacete. Photos: Alonso Verde .



Figure 2. Ritual preparation of the “May tree” during the traditional *Mayo* festivities in Casas de Ves (Albacete, Spain). a, Procession preceding the tree’s installation; b, participants erecting the *Mayo* (the ceremonial tree) in the village square. Photos: Rosa Valiente.

the broader, cross-cultural phenomenon of using elaborate botanical arrangements to frame spiritual observance.

The May Crosses (*‘Cruces de Mayo’*) festival, observed annually on May 3rd, centers on the construction of elaborate altars known as “crosses.” Despite its strong religious associations, the celebration’s popular character often overshadows its liturgical aspects, leading to a historically detached stance from ecclesiastical institutions. Preparations for these installations, which vary regionally in their materials and techniques, often begin over a month in advance.

The festival’s origins are ambiguous, with two primary theories proposed. One account traces it to early Christian tradition, linking it to Saint Helena’s purported discovery of the True Cross and her call for its commemoration on May 3rd (Icalendario, 2018). An alternative hypothesis suggests pre-Christian, pagan roots in spring rituals. This theory connects the “crosses” to the widespread custom of erecting a decorated “May” tree or pole, a practice analogous to Roman festivals for the god Attis (López Velasco, 2006). According to this view, the Cross likely supplanted the “May” as a central symbol during Christianization, serving as an emblem of gratitude and a petition for agricultural and familial well-being within a broader celebration of nature’s resurgence (López Velasco, 2006; Jiménez de Madariaga, 2011).

Symbolism of the Cross

While the cross is a quintessential symbol of Christianity, its iconographic use predates the religion, with variants appearing in ancient Greek and Egyptian cultures—most notably the Egyptian *ankh* (*crux ansata*), which represented life (Díaz Díaz, 2010). Following the crucifixion of Jesus,

early Christians adopted the cross as a clandestine emblem, despite its contemporary function in the Roman Empire as a tool of execution. Its significance transformed following Emperor Constantine’s conversion, which led to the abolition of crucifixion and the cross’s elevation as an official symbol of the faith, representing both the resurrection and the religion itself.

This Christian adoption may have integrated pre-existing pagan traditions. The temporal and symbolic parallels between the cross and earlier tree worship—where the tree was a symbol of life and, in some contexts, equated with the cross—suggest that the May Crosses (*‘Cruces de Mayo’*) festival could be a Christianization of such spring rituals (Jiménez de Madariaga, 2011). This hypothesis is reinforced by the festival’s coincidence with ancestral festivities that explicitly featured a “May” tree. However, while these symbolic and semantic connections are compelling, they currently lack definitive historical substantiation.

Nevertheless, celebrations venerating the cross at the beginning of spring and autumn are a widespread phenomenon across diverse Christian communities, from Spain to Ethiopia, indicating a deep-rooted, transcultural practice within the faith (Kaplan, 2008).

May Crosses (*‘Cruces de Mayo’*) in Piedrabuena

In the Guadiana Valley, particularly in Piedrabuena, the May Crosses (*‘Cruces de Mayo’*) festival is a deeply rooted tradition, though its precise origins are debated. Local records trace its establishment to 1212, following the region’s reconquest by King Alfonso VIII, which led to the erection of a cross and later a hermitage on the Sierra de la Cruz (Freire Martín, 1996; López Velasco, 2006). A pivotal shift

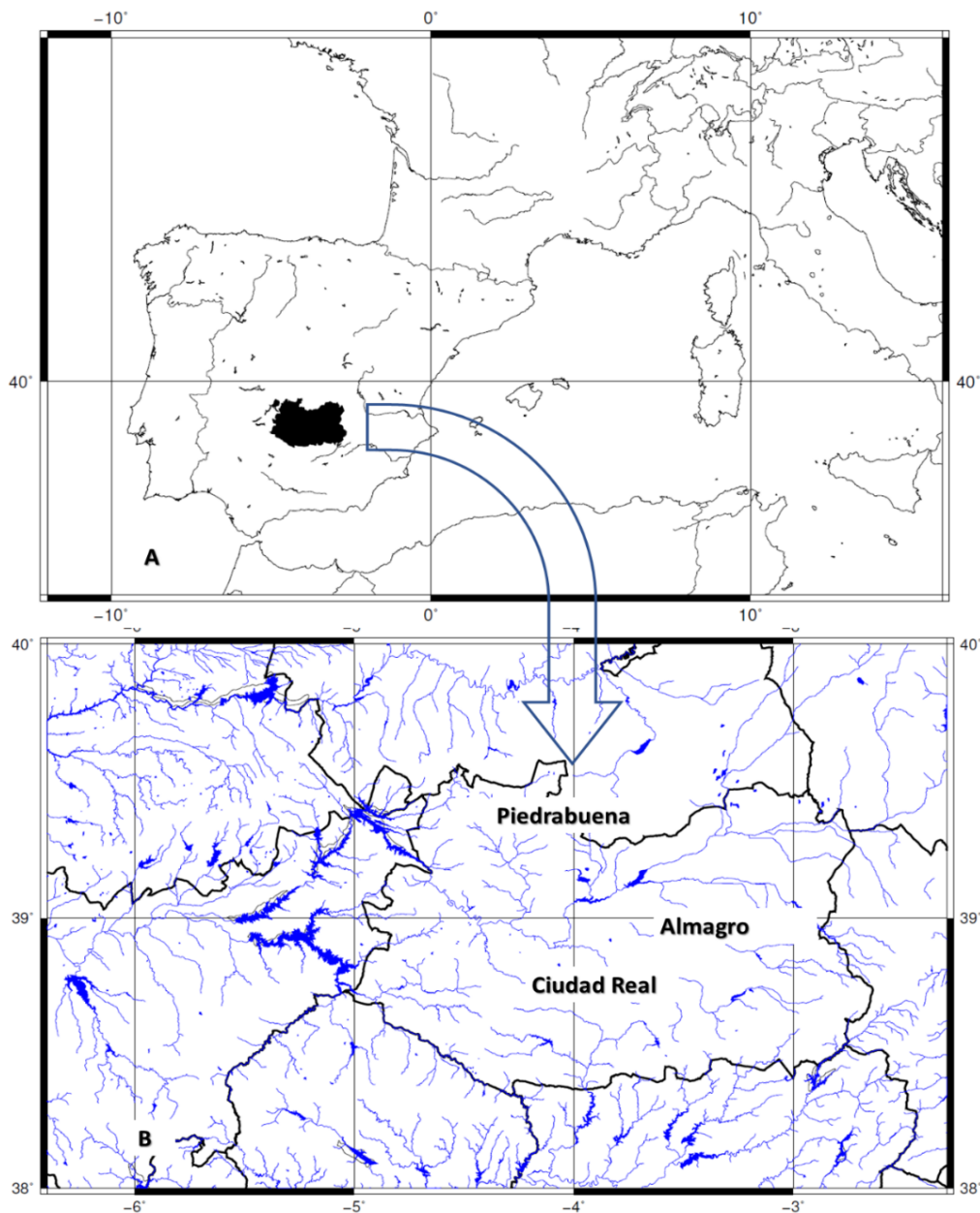


Figure 3. Geographic distribution of the studied localities in the province of Ciudad Real (Spain), highlighting the towns where cross-making traditions are documented: Almagro, Ciudad Real, and Piedrabuena and Porzuna, a neighboring town located twelve kilometers north of Piedrabuena.

occurred in the 19th century due to the Mendizábal disentailment, which privatized the hermitage's land. This restricted public access and prompted the tradition of erecting votive crosses in private homes, often in response to epidemics, war, or agricultural crises (Freire Martín, 1996).

The contemporary celebration in Piedrabuena is a fusion of devotion and artistic expression, where crosses are adorned with natural elements like water, rocks, and plants to create Christian allegories of life and hope (García Bresó, 2006). However, profound sociological changes and increasing secularization since the late 20th century have significantly altered pre-1970s practices. The festival's integrated nature is reflected in the local term '*Cruces y Mayos*,' which encompasses traditional chants ('*mayos*') directed not only at the Cross but also to the patron '*Santísimo Cristo de la Antigua*' and the Virgin Mary, as well as serenades for young women ('*mayos ventaneros*').

Aims of the present study

This research examines a specific dimension of traditional knowledge (TK): folkloric traditions that illuminate the interconnection between natural systems and religious practices. Rather than focusing on plants ingested or administered during ceremonies, this study investigates those species that serve as symbolic elements and hold cultural significance within festival contexts.

Conducted within the framework of the 'Wetland Ethnobiology in the National Parks of Cabañeros and Daimiel' project, this study documents the ethnobiological knowledge associated with the May Crosses (*Cruces de Mayo*) celebration in Piedrabuena and its relationship with the Guadiana River and rangeland ecosystems.

The general objective of this research is to systematically document and analyze the traditional botanical knowledge embedded in the May Crosses



Figure 4. Gathering information during fieldwork. Photo: A. Verde and F. Zamora.

festivity, with particular emphasis on understanding how this cultural practice reflects the relationship between local communities and their environment.

Specific objectives include:

1. To inventory all plant species traditionally utilized in the May Crosses celebration, documenting their vernacular names, collection sites, and symbolic roles within the festivity.
2. To assess the current conservation status and availability of these culturally significant species in the Guadiana River area.
3. To examine the transmission patterns of this traditional knowledge across generations and identify potential erosion of ethnobotanical practices.
4. To analyze the ecological relationship between the seasonal availability of ritual plants and the timing of the celebration.
5. To evaluate the cultural and biological sustainability of plant harvesting practices associated with this tradition.

Materials and methods

This study was conducted within the framework of the research project, “Wetland Ethnobiology in the National Parks of Cabañeros and Daimiel,” spanning the years 2015–2018. The project’s primary objective was to document the ethnobiological knowledge within these two national parks, both situated in the province of Ciudad Real. These parks are located within the Guadiana River basin, which encompasses the town of Piedrabuena, and the “Entreparkes” region, a natural corridor connecting

the two national parks (Figure 3). Field research was centered in Piedrabuena.

Initially, a survey of various localities within the Guadiana Valley was undertaken. However, the Piedrabuena May Crosses (*‘Cruces de Mayo’*) were ultimately selected for focused study. The construction of these crosses was observed and documented throughout March, April, and May of 2017 and 2018, as these years were dedicated to the investigation of the Cabañeros National Park’s surrounding areas.

The methodological approach employed for data collection consisted of direct, semi-structured individual and collective interviews (Fajardo Rodríguez *et al.*, 2008). During 2017 and 2018, field visits were conducted to document May Crosses (*‘Cruces de Mayo’*) in Piedrabuena (Figure 3) and, to a lesser extent, in Porzuna, a neighboring town located twelve kilometers north of Piedrabuena. These visits involved interviewing and accompanying specialists in cross construction, enabling the documentation and photographic recording of all ethnobiological elements present, in collaboration with the individuals responsible for their assembly (Figure 4).

All participants in this study were informed about the objectives and procedures of the research, and their prior oral (verbal) consent was obtained before any interviews or recordings were conducted. Given the cultural and community-based nature of the fieldwork and in accordance with local traditions and participant preferences, written consent was not required or requested. The research was conducted in line with the ethical principles and professional standards of the Code of Ethics of the International Society of Ethnobiology (ISE, 2006), ensuring



Figure 5. Official promotional materials for Piedrabuena's *May Crosses* ('*Cruces de Mayo*') festival, featuring brochure covers from recent editions. Photos: Alonso Verde.

respect, reciprocity, and informed participation. In addition, the study followed the ethical protocols established by the Ethical Committee of the University of Murcia. All methodological procedures adhered to the guidelines established by the *Mediterranean Botany* journal, as outlined in their publication (Benítez Cruz *et al.*, 2022).

Records pertaining to the utilization of biological and non-biological resources were compiled and entered into the ETNOBIO-CLM database, maintained by the Systematic and Ethnobotany Laboratory of the Botanical Institute at the University of Castilla-La Mancha's Botanical Garden.

During fieldwork, fresh material samples were collected from seven crosses. Animals were identified *in situ*, and while physical samples were not collected, photographic records were obtained. Vascular plants, bryophytes, and lichens were subsequently identified in the laboratory. Voucher specimens were deposited in the ALBA herbarium, maintained by the Systematic and Ethnobotany Laboratory. Bryophyte specimens were deposited in the MUB herbarium, University of Murcia, with duplicates of abundant specimens also housed in the ALBA herbarium. Taxonomic nomenclature followed POWO (2025) for vascular plants and Tropicos (2025) for bryophytes, Index Fungorum (2020) and the works of Aragón *et al.* (2006) and Aragón and Giménez (2012) for lichens, and GBIF (2018) for animals.

The conservation status of the vascular plants, bryophytes, and lichens identified in the study was

assessed through a combination of field observations and ethnobotanical information provided by local informants. During interviews, participants were asked about the perceived abundance, rarity, and temporal changes in the occurrence of each species based on their traditional collection practices for materials used in the May Crosses. These qualitative data were complemented with updated scientific sources, including national and regional Red Lists and conservation assessments. For vascular plants, we referred primarily to the *Atlas y Libro Rojo de la Flora Vascular Amenazada de España* (Bañares *et al.*, 2004), *Lista Roja de la Flora Vascular Española* (Moreno, 2010) and the most recent *Portal de búsqueda de especies de la Lista Roja de la UICN en España* (SEBICoP, 2025) as well as regional conservation catalogues for Castilla-La Mancha (Anon., 2011; Anon., 2025). When available, equivalent references were consulted for bryophytes (Garilletei & Albertos, 2012; Brugués & González-Mancebo, 2017) and lichens (Blázquez, 2022; IUCN, 2025).

In addition, a comprehensive literature review was conducted, encompassing specific anthropological works (Freire Martín, 1996; Zamora, 1999; García Bresó, 2006; López Velasco, 2006), ethnobotanical studies (Sánchez-Fernández, 1997; Blanco, 2006; Consuegra Coello, 2009), and ethnobiological research (Pardo de Santayana *et al.*, 2014, 2018a, 2018b, 2018c). To augment the sample repertoire, a compilation of photographic material depicting May Crosses ('*Cruces de Mayo*') from years preceding

the fieldwork was undertaken, facilitating the cross-referencing and identification of biological materials present in the crosses.

Results and Discussion

This section integrates the analysis of the floral and cryptogamic elements utilized in the May Crosses (*Cruces de Mayo*), alongside the zoological components—whether naturalized or living—highlighting their ethnobiological significance. The discussion further explores the *Cultural Landscapes* associated with the May Crosses tradition, with a focus on other distinctive typologies observed: *Forest Crosses*, *Heather Crosses*, *Mixed Crosses*, and *Fabric Crosses*.

To conclude, the section evaluates the sustainability of these practices, proposing strategies to reconcile the preservation of this cultural tradition with the principles of environmental protection and nature conservation and summarizes the contemporary significance (Figure 5) of the May Crosses (*'Cruces de Mayo'*) tradition.

Floral and cryptogamic composition of May Crosses

The Table 1 presents a list of seventy vascular plant species used in the May Crosses (*'Cruces de Mayo'*) tradition in Piedrabuena, categorized by implementation phase (Dressing, Assembling,

Carpet Construction) and plant parts utilized (e.g., aerial parts with flowers, whole plant, trunk, leaves, branch, stem). The majority of species grow wild and belong to diverse plant families, such as Fabaceae, Lamiaceae, Rosaceae, and Cyperaceae. Most plants are used for dressing the cross, with aerial parts with flowers being the most frequently utilized. Only a few species are cultivated, like *Aspidistra* sp., *Pelargonium* sp., and *Punica granatum* L. Regarding conservation status in Castilla-La Mancha (TCL-CLM), nearly all species are not threatened, but some, like *Erica lusitanica* and *Nuphar lutea*, hold Special Interest status.

Regarding vascular plants, the most representative families are Cyperaceae and Fabaceae, each with 6 inventoried species, followed by Rosaceae with 5 species, and Ericaceae, Fagaceae, Lamiaceae, Salicaceae, and Apiaceae, each with 4 species. The selection of botanical species varies depending on their role in the Cross-construction process. Fagaceae, Fabaceae, Salicaceae, and Rosaceae provide species whose trunks and flowering branches are used during the assembly and dressing phases. Conversely, Cyperaceae, Ericaceae, Apiaceae, and other families such as Orchidaceae, Papaveraceae, and Amaryllidaceae contribute to species used primarily in the dressing phase. Lamiaceae species are employed in both the carpeting and dressing phases (Table 1).

Table 1. Botanical composition of vascular plants used in Piedrabuena's May Crosses (*'Cruces de Mayo'*) tradition. Abbreviations are: V.n., Vernacular name (in Spanish); Ph, Implementation Phase: D (Dressing), A (Assembling), C (Carpet construction); P.u., Part used: Apf (Aerial parts with flowers), Wp (Whole plant), T (Trunk), L (Leaves), B (Branch), S (Stem); V, Voucher (ALBA); C.S., Conservation status in Castilla-La Mancha (TCL-CLM): N (Not threatened), E (Endangered), V (Vulnerable), SI (Special Interest); W/C, Wild/Cultivated status: W (Wild), C (Cultivated), N (Naturalized).

Species	V.n.	Family	Ph.	P.u.	V.	C.s.	W/C
<i>Adenocarpus telonensis</i> (Loisel.) DC. In Lam. & DC.	<i>Escurridera</i>	Fabaceae	D	Apf	11057	N	W
<i>Adenocarpus complicatus</i> (L.) Gay in Durieu	<i>Escurridera</i>	Fabaceae	D	Apf	10658	N	W
<i>Allium ampeloprasum</i> L.	<i>Ajoporro</i>	Amaryllidaceae	D	Apf	10285	N	W
<i>Allium roseum</i> L.	<i>Ajo</i>	Amaryllidaceae	D	Apf	10635	N	W
<i>Anacamptis morio</i> (L.) R.M.Bateman, Pridgeon & M.W.Chase	-	Orchidaceae	D	Apf	-	N	W
<i>Anacamptis papilionacea</i> (L.) R.M.Bateman, Pridgeon & M.W.Chase	-	Orchidaceae	D	Apf	-	N	W
<i>Arundo donax</i> L.	<i>Caña</i>	Poaceae	A	S	10298	N	C,N
<i>Asparagus acutifolius</i> L.	<i>Esparraguera</i>	Asparagaceae	D	Wp	10296	N	W
<i>Aspidistra</i> sp.	<i>Pilistra</i>	Asparagaceae	D	Apf	--	N	C
<i>Bellardia trixago</i> (L.) All.	-	Orobanchaceae	D	Apf	5864	N	W
<i>Calystegia sepium</i> (L.) R. Br.	<i>Enredadera</i>	Convolvulaceae	D	Apf	11046	N	W
<i>Cannabis sativa</i> L.	<i>Cáñamo</i>	Cannabaceae	A	S	-	N	W
<i>Carex elata</i> All. subsp. <i>reuteriana</i> (Boiss.) Luceño & Aedo	<i>Lastón de río</i>	Cyperaceae	D	Wp	11079	N	W
<i>Carex flacca</i> Schreb.	<i>Lastón de río, mansieguilla</i>	Cyperaceae	D	Wp	11070	N	W
<i>Carex pseudocyperus</i> L.	<i>Lastón de río, mansieguilla</i>	Cyperaceae	D	Wp	10404	N	W
<i>Cistus crispus</i> L.	<i>Jarilla del diablo</i>	Cyperaceae	D	Apf	10271	N	W
<i>Cistus ladanifer</i> L.	<i>Jara</i>	Cistaceae	D	Apf	10194	N	W
<i>Crataegus monogyna</i> Jacq.	<i>Espino</i>	Rosaceae	D	Apf	10292	N	W
<i>Cyperus longus</i> L.	<i>Juncia</i>	Cyperaceae	A	S	11063	N	W
<i>Cytisus scoparius</i> (L.) Link subsp. <i>scoparius</i>	<i>Mayos</i>	Fabaceae	D	Apf	11096	N	W
<i>Cytisus striatus</i> (Hill) Rothm.	<i>Iniesta</i>	Fabaceae	D	Apf	10647	N	W
<i>Dioscorea communis</i> (L.) Caddick & Wilkin	<i>Espárragos hilachones</i>	Dioscoreaceae	D	Wp	10649	N	W

<i>Echium plantagineum</i> L.	<i>Arcuelas</i>	Boraginaceae	D	Apf	5392	N	W
<i>Erica arborea</i> L.	<i>Berezo blanco</i>	Ericaceae	A	Apf	10073	N	W
<i>Erica australis</i> L.	<i>Berezo colorao, brezo colorao</i>	Ericaceae	A	Apf	11095	N	W
<i>Erica lusitanica</i> Rudolph	<i>Berezo blanco, berezo castellano</i>	Ericaceae	A	Apf	11093	SI	W
<i>Erica umbellata</i> L.	<i>Quirola</i>	Ericaceae	D	Apf	11256	N	W
<i>Eucalyptus camaldulensis</i> Dehnh.	<i>Ocalito</i>	Myrtaceae	D,A	B	10029	N	N
<i>Eucalyptus globulus</i> Labill.	<i>Ocalito</i>	Myrtaceae	D,A	B	5998	N	N
<i>Foeniculum vulgare</i> Mill.	<i>Hinojo</i>	Apiaceae	D	L	10441	N	W
<i>Genista anglica</i> L.	<i>Abulaga</i>	Fabaceae	D	Apf	11097	SI	W
<i>Helichrysum stoechas</i> (L.) Moench	<i>Yesca, zamarrilla</i>	Compositae	D	Apf	10047	N	W
<i>Iris pseudacorus</i> L.	<i>Lirios amarillos</i>	Iridaceae	D	Apf	10977	N	W
<i>Iris xiphium</i> L.	<i>Lirio</i>	Iridaceae	D	Apf	5997	N	W
<i>Jasminum fruticans</i> L.	<i>Jazmín</i>	Oleaceae	D	Apf	7311	N	W
<i>Lavandula pedunculata</i> (Mill) Cav.	<i>Tomillo</i>	Lamiaceae	C,D	Apf	11089	N	W
<i>Lavandula stoechas</i> L.	<i>Tomillo</i>	Lamiaceae	C,D	Apf	10509	N	W
<i>Nuphar lutea</i> (L.) Sm.	<i>Coberteras</i>	Nymphaeaceae	D	Apf	10305	SI	W
<i>Nymphaea alba</i> L.	<i>Coberteras</i>	Nymphaeaceae	D	Apf	7585	SI	W
<i>Olea europea</i> L.	<i>Olivo</i>	Oleaceae	A	B	10191	N	C,N
<i>Paeonia broteri</i> Boiss. & Reut.	<i>Matacosa, Rosa de matacosa</i>	Paeoniaceae	D	Apf	10653	N	W
<i>Papaver rhoeas</i> L.	<i>Amapolas, Ababoles</i>	Papaveraceae	D	Apf	10442	N	W
<i>Pelargonium</i> sp.	<i>Geranios</i>	Geraniaceae	D	Apf	-	N	C
<i>Pinus pinea</i> L.	<i>Pino piñonero</i>	Pinaceae	A	T	10030	N	W,C
<i>Populus alba</i> L.	<i>Álamo blanco</i>	Salicaceae	A,D	T,B	10236	N	W,C
<i>Populus x canescens</i> (Aiton) Sm.	<i>Álamo blanco</i>	Salicaceae	A,D	T,B	11006	N	W,C
<i>Populus nigra</i> L.	<i>Chopo</i>	Salicaceae	A	T,B	1622	N	W,C
<i>Populus tremula</i> L.	<i>Chopo</i>	Salicaceae	A	T,B	10620	SI	W
<i>Punica granatum</i> L.	<i>Granao</i>	Lythraceae	D	Wp	-	N	C
<i>Quercus ilex</i> L. subsp. <i>ballota</i> (Desf.) Samp.	<i>Encina</i>	Fagaceae	A	T,B	10503	N	W
<i>Quercus faginea</i> Lam.	<i>Quejigo</i>	Fagaceae	A	T	11055	N	W
<i>Quercus suber</i> L.	<i>Corcha</i>	Fagaceae	A	T	10025	N	W
<i>Quercus x welwitschii</i> Samp.	<i>Mesto</i>	Fagaceae	A	T	10632	N	W
<i>Ranunculus peltatus</i> Schrank	<i>Coberterillas, cobertetas de arroyo</i>	Ranunculaceae	D	Apf	8756	N	W
<i>Retama sphaerocarpa</i> (L.) Boiss.	<i>Retama</i>	Fabaceae	D	B	10080	N	W
<i>Rosa agrestis</i> Savi	<i>Rosal silvestre</i>	Rosaceae	D	Apf	11054	N	W
<i>Rosa canina</i> L.	<i>Rosal silvestre</i>	Rosaceae	D	Apf	10623	N	W
<i>Rosa micrantha</i> Borrer ex Sowerby	<i>Rosal silvestre</i>	Rosaceae	D	Apf	10903	N	W
<i>Rosa pouzinii</i> Tratt.	<i>Rosal silvestre</i>	Rosaceae	D	Apf	10183	N	W
<i>Rosmarinus officinalis</i> L.	<i>Romero</i>	Lamiaceae	D	B	10452	N	W,C
<i>Scirpoides holoschoenus</i> (L.) Soják	<i>Junco</i>	Cyperaceae	D	S	10338	N	W
<i>Silene latifolia</i> Poiret	-	Caryophyllaceae	D	Apf	11090	N	W
<i>Silene vulgaris</i> (Moench) Garcke	<i>Collejas</i>	Caryophyllaceae	D	Apf	10559	N	W
<i>Stipa tenacissima</i> L.	<i>Esparto</i>	Poaceae	A	L	2610	N	W,C
<i>Thapsia garganica</i> L.	<i>Hinojos de culebra</i>	Apiaceae	D	Apf	10042	N	W
<i>Thapsia nitida</i> Lacaita	<i>Hinojos de culebra</i>	Apiaceae	D	Apf	10657	N	W
<i>Thapsia villosa</i> L.	<i>Hinojos de culebra</i>	Apiaceae	D	Apf	10200	N	W
<i>Thymus mastichina</i> (L.) L.	<i>Agedrea, mejorana</i>	Lamiaceae	C	Apf	11094	N	W
<i>Umbilicus rupestris</i> (Salisb.) Dandy	<i>Embudillo de monte</i>	Crassulaceae	D	Wp	11088	N	W
<i>Zantedeschia aethiopica</i> (L.) Spreng.	<i>Calas</i>	Araceae	D	Wp	-	N	C

Table 2 includes eleven bryophytes and nine lichens used in the May Crosses ('*Cruces de Mayo*') of Piedrabuena, highlighting their life forms (for bryophytes) and growth forms (for lichens) based on established classifications.

Among the bryophytes, species from families such as Leucodontaceae, Hypnaceae, and Pottiaceae dominate, with life forms including tail, pendant, cushion, mat, and short turf. Commonly referred to as "*Murgo*" or "*Murgo del monte*," these mosses contribute to the texture and greenery of the crosses.

Of the eleven bryophyte species identified in the Piedrabuena Crosses, only one is a liverwort (*Frullania dilatata* (L.) Dumort.), with the remainder being mosses. Three moss species, *Homalothecium aureum* (Spruce) H. Rob., *Hypnum andoi* A.J.E. Sm., and *Hypnum* aff. *cupressiforme* Hedw., were particularly abundant. Due to the absence of sporophytes, precise identification of the *Hypnum* specimens was challenging; however, according to Cezón & Muñoz (2013), *H. cupressiforme* is the most prevalent *Hypnum* species in the region. These three species are pleurocarpous and exhibit a mat-like growth form, enabling them to cover extensive substrate surfaces. *Antitrichia californica* Sull. ex Lesq. and *Leucodon sciuroides* (Hedw.) Schwägr, which possess a tail-like growth form, were less common, as they do not form extensive substrate coverings, with their vegetative parts primarily hanging. The remaining species, exhibiting

cushion or short turf growth forms, were likely collected unintentionally as they were intermixed with the dominant species. Among these, the Iberian endemic *Triquetrella arapilensis* was identified (Infante *et al.*, 2017). According to Brugués & González-Mancebo (2017), none of the eleven bryophyte species used in Piedrabuena Crosses are currently considered threatened in Spain. The same applies to Europe, where they are also not classified as threatened. However, *Triquetrella arapilensis* Luisier is listed as Nearly Threatened on the IUCN Red List of Threatened Species (Sergio *et al.* 2019). Nevertheless, the collection of rare, small-sized moss species, such as *Triquetrella arapilensis*, from their natural habitats is discouraged. Furthermore, none of the eleven bryophyte species are protected under the Autonomous Community of Castile-La Mancha's Regional Catalogue of Threatened Species (Decreto 33/1998, de 5 de Mayo, por el que se crea el Catálogo Regional de Especies Amenazadas de Castilla-La Mancha. Diario Oficial de Castilla-La Mancha D.O.C.M. núm. 22, de 15 de mayo de 1998).

For lichens, species from families such as Cladoniaceae, Parmeliaceae, and Ramalinaceae are listed, with growth forms categorized as foliose, fruticose, and squamulose with podetia. Notably, the species *Evernia prunastri* (L.) Ach., *Ramalina fraxinea* (L.) Ach., and *Usnea subfloridana* Stirt. —often called "*Barbas de viejo*" (*Old Man's Beard*)— are frequently used (Table 2).

Table 2. Bryophyte and lichen flora associated with Piedrabuena's May Crosses ('*Cruces de Mayo*'). Bryophyte life forms follow Mägdefrau (1982); lichen morphologies follow Wirth *et al.* (2014). Species with highest frequency/abundance are highlighted in bold. * Indicates the most critically collected species. The most abundant species, in terms of volume used and frequency, are marked in bold characters.

Species	Popular name	Family	Life form	Voucher (MUB)
Bryophytes				
<i>Antitrichia californica</i> Sull. ex Lesq.	Murgo del monte	<i>Leucodontaceae</i>	Tail	59171
<i>Frullania dilatata</i> (L.) Dumort.	Murgo	<i>Jubulaceae</i>	Pendant	-
<i>Grimmia laevigata</i> (Brid.) Brid.	Murgo	<i>Grimmiaceae</i>	Cushion	59174
<i>Homalothecium aureum</i> (Spruce) H. Rob.	Murgo de monte	<i>Brachytheciaceae</i>	Mat	59170, 59177, 59183
<i>Homalothecium sericeum</i> (Hedw.) Schimp.	Murgo de monte	<i>Brachytheciaceae</i>	Mat	-
<i>Hypnum andoi</i> A.J.E. Sm.	Murgo/murgo de monte	<i>Hypnaceae</i>	Mat	59184, 50185
<i>Hypnum</i> sp. (af. <i>H. cupressiforme</i> Hedw.)		<i>Hypnaceae</i>	Mat	59172, 59176, 59181
<i>Leucodon sciuroides</i> (Hedw.) Schwägr	Murgo/murgo de monte	<i>Leucodontaceae</i>	Tail	59175
<i>Syntrichia princeps</i> (De Not.) Mitt.	Murgo	<i>Pottiaceae</i>	Short turf	59173
<i>Tortella squarrosa</i> (Brid.) Limpr (= <i>Pleurochaete squarrosa</i> (Brid.) Lindb.)	Murgo	<i>Pottiaceae</i>	Short turf	59178, 59182
<i>Triquetrella arapilensis</i> Luisier*	Murgo	<i>Pottiaceae</i>	Short turf	59179
Lichens				
<i>Cladonia fimbriata</i> (L.) Fr.	-	<i>Cladoniaceae</i>	Squamulose with podetia	-
<i>Cladonia foliacea</i> (Huds.) Willd.	Murgo blanco	<i>Cladoniaceae</i>	Foliose	-
<i>Evernia prunastri</i> (L.) Ach.	Barbas de viejo	<i>Parmeliaceae</i>	Fruticose	-
<i>Lobaria scrobiculata</i> (Scop.) Nyl. ex Cromb.	-	<i>Lobariaceae</i>	Foliose	-
<i>Parmelina quercina</i> (Willd.) Hale	-	<i>Parmeliaceae</i>	Foliose	-
<i>Pseudevernia furfuracea</i> (L.) Zopf	Murgo blanco	<i>Parmeliaceae</i>	Fruticose	-
<i>Ramalina fraxinea</i> (L.) Ach.	Barbas de viejo	<i>Ramalinaceae</i>	Fruticose	-
<i>Usnea subfloridana</i> Stirt.	Barbas de viejo	<i>Parmeliaceae</i>	Fruticose	-
<i>Xanthoria parietina</i> (L.) Th. Fr.	-	<i>Teloschistaceae</i>	Foliose	-

Table 3. Faunal taxa associated with May Crosses ('*Cruces de Mayo*') installations in Piedrabuena, categorized by ecological status: N (Nesting), A (Live specimens), S (Preserved specimens: taxidermy or naturalization).

Species	Vernacular name	Family	Status
<i>Anas platyrhynchos</i> Linnaeus, 1758	Azulón	Anatidae	S
<i>Mauremys leprosa</i> (Schweigger, 1812)	Galápago	Bataguridae	A
<i>Vulpes vulpes</i> (Linnaeus, 1758)	Zorro	Canidae	A, S
<i>Columba livia</i> Gmelin, 1789	Paloma	Columbidae	N, A
<i>Streptopelia turtur</i> (Linnaeus, 1758)	Tórtola	Columbidae	A
<i>Cyanopica cyanus</i> (Pallas, 1776)	Mongino	Corvidae	N
<i>Emys orbicularis</i> (Linnaeus, 1758)	Tortuga, Galápago	Emydidae	A
<i>Timon lepidus</i> (Daudin, 1802)	Lagarto	Lacertidae	A
<i>Oryctolagus cuniculus algirus</i> (Loche, 1858)	Conejo	Leporidae	A
<i>Lepus granatensis granatensis</i> Rosenhauer, 1856	Liebre	Leporidae	A
<i>Mus musculus</i> (Linnaeus, 1758)	Ratón	Muridae	A
<i>Turdus merula</i> Linnaeus, 1758	Mirla	Muscicapidae	N
<i>Alectoris rufa</i> (Linnaeus, 1758)	Perdiz	Phasianidae	A/S
<i>Coturnix coturnix</i> (Linnaeus, 1758)	Codorniz	Phasianidae	A/S
<i>Sus scrofa</i> Linnaeus, 1758	Jabalínes, Rayoncillos (wild boar pups)	Suidae	A, S
<i>Genetta genetta</i> (Linnaeus, 1758)	Gineta	Viverridae	S

Faunal associations in May Cross displays

The Table 3 presents sixteen faunal species associated with the May Crosses ('*Cruces de Mayo*') tradition in Piedrabuena, detailing their vernacular names, families, and form of use. The species belong to various taxonomic groups, including birds, mammals, and reptiles. Their status indicates different levels of involvement: some living individuals are presented, others naturalized, and a few are represented by their nests.

Notable species include the wild boar (*Sus scrofa* Linnaeus, 1758) and red fox (*Vulpes vulpes* (Linnaeus, 1758)), both considered ecologically and symbolically relevant. The European turtle dove (*Streptopelia turtur* (Linnaeus, 1758)) and common quail (*Coturnix coturnix* (Linnaeus, 1758)) are linked to the local environment, while aquatic reptiles such as the European pond turtle (*Emys orbicularis* (Linnaeus, 1758)) and the Spanish pond turtle (*Mauremys leprosa* (Schweigger, 1812)) highlight the presence of water-associated fauna. This selection of species (Table 3) reflects both the ecological richness of the region, and the cultural symbolism embedded in the May Crosses ('*Cruces de Mayo*') tradition.

Contemporary Crosses rarely feature animals, and when they do, they are typically domesticated species like pigeons or abandoned nests found in the field. The species listed in Table 3 represent a compilation of animals displayed in past years, as reported by informants. This list includes species protected under the Castile-La Mancha catalogue, a practice that is currently prohibited.

Cultural landscapes of May Crosses: craft practices and regional diversity

Contemporary May Crosses ('*Cruces de Mayo*') in Piedrabuena are typically erected in both public and private spaces, including residences, garages, caves, courtyards, and other dwellings. These installations are frequently organized by cultural associations, municipal institutions, and, in some instances, private families. Notably, the Piedrabuena Crosses, along with

those in neighboring towns, are consistently displayed in enclosed spaces, a practice that contrasts with the open-air exhibitions prevalent in other Spanish regions where the tradition persists. The creation and display of a Cross often originate from a vow ("promise") made by a family member, prompted by circumstances such as severe illness or familial separation.

To enhance visibility, the municipal government installs pennants and festive lighting along streets where Crosses are displayed. A donation tray is typically positioned in front of each Cross, near or within an artificial pond or lake (where visitors frequently deposit coins), allowing for financial contributions. Seating, such as a sofa or bench, is provided to accommodate elderly visitors and the individuals responsible for maintaining vigil at the Cross each evening from 8:00 PM to midnight. This seating area also serves as a space for rest, communal gathering, and, occasionally, recitation of the rosary. A designated area near or behind the Cross is customarily set aside for offering refreshments to visitors, including traditional homemade sweets, such as egg donuts ("rosquillos de huevo"), wafer-like sweets ("barquillos"), and flower-shaped pastries ("flores"), accompanied by lemon and lemonade soda.

This investigation identified three primary categories of May Crosses ('*Cruces de Mayo*'), differentiated by their structural composition, altar design, and the recreated environment: Forest or Heather Crosses ('*Cruces de Monte o de Brezo*'), Fabric Crosses ('*Cruces de Tela*'), and Mixed Crosses ('*Cruces Mixtas*'), which incorporate both plant materials and fabrics. In addition to these established typologies, a distinct Cross type, the Cross of Saint Mark ('*Cruz de San Marcos*'), is observed in Piedrabuena. Celebrated prior to the main May Crosses ('*Cruces de Mayo*') festivities, this less visually elaborate and less widely known manifestation is described by local practitioners as "the mother of all crosses," and is considered, according to oral traditions, to be the oldest Cross and the progenitor of all other crosses within the municipality (Freire Martín, 1996).

Historical evidence indicates that by the early 19th century, the Cross of Saint Mark was displayed within a private residence, under the custodianship of a family that also organized a procession to bless the fields on Saint Mark the Evangelist's Day (on 25 April). While the precise chronology of the emergence of Heather Crosses remains uncertain, it is postulated that they likely developed at a later period.

Structure and construction process of the standard May Cross in Piedrabuena

Following the preparation of the designated space for the Cross, typically a quadrangular or rectangular room proximate to the street (historically, rooms or spaces adjacent to courtyards or water release pens were utilized, when available), the assembly of the Cross structure commences (Figure 6b and 6c). This process involves the organization of the framework, including supports, iron rulers, mesh, wire netting, and, where applicable, water and electrical connections. Aged tree trunks, representing species such as gall oak (*Quercus faginea* Lam.), cork oak (*Quercus suber* L.), holm oak (*Quercus ilex* subsp. *ballota* (Desf.) Samp.), poplar (*Populus* spp.), and eucalyptus (*Eucalyptus camaldulensis* Dehnh. and *E. globulus* Labill.), are then integrated into this framework (Figure 7a). A network, formerly woven from esparto grass (*Stipa tenacissima* L.), galingale (*Cyperus longus* L.), or hemp (*Cannabis sativa* L.) strings, but now commonly replaced with metallic mesh, is affixed to this structure. This network serves as the base for the upholstery, which primarily consists of red heather (*Erica australis* L.), heath (*Erica umbellata* L.), and white heather (*Erica arborea* L. and *E. lusitanica* Rudolph), supplemented with bryophytes (up to ten identified species, Table 2).

The subsequent stage involves the collection of heather, a task typically undertaken by men. Heather is harvested from the field and bound into manageable bundles for transport. Over a period of approximately one month, contingent upon the number of collaborators and their expertise, the heather is meticulously "punctured" onto the mesh in small clusters, measuring ten to twenty centimeters in length (Figure 7b). Maintaining a uniform level of the heather flowers is crucial for aesthetic consistency (Figures 6a and 6b).

Achieving this uniform level often necessitates trimming the heather, a practice that elicits varying opinions among observers. While some consider it unorthodox, others view it as a means of attaining near-perfect uniformity. The residual heather clippings, known locally as 'encendajos' (lighters), are utilized as kindling, hence their designation. These clippings are typically taken home by participants who possess wood stoves or fireplaces.

The process of "puncturing" or affixing the heather is the most time-intensive aspect of construction, involving collaborative efforts from family, friends, and neighbors. This task is generally performed during evening hours, excluding weekends, with participants dedicating one to three hours per session following dinner. These sessions foster a sense of communal intimacy, relaxation, and convivial interaction.

Different heather species are strategically employed to create decorative patterns that alleviate the monotony of the walls or ceiling (Table 1). White heather (*Erica arborea* L. and *E. lusitanica* L.) is frequently used to form small crosses, accent corners, finish edges, or serve other decorative purposes (Figure 7c and 7d).



Figure 6. Assembly process of traditional *Forest Crosses* (*Cruces de Monte*) and *Heather Crosses* (*Cruces de Brezo*). a, initial construction phase showing the wire mesh framework for heather integration; b, structural details of a Municipal Cross (May 2001) during early heather insertion, featuring primary struts and mesh, with project supervisor Benito Laguna Albalade; c, composite view of a Mixed Cross (Democratic Union of Pensioners' Cross, May 2009) revealing internal components: iron reinforcements, wire mesh, cabling, and non-native slate fragments. Photos: A. Verde (a), F. Zamora (b, c).



Figure 7. Construction techniques and final presentation of Forest/Heather Crosses (*Cruces de Monte/Brezo*). a, hydrological features frequently incorporated into displays, showing small streams and waterfalls; b, detail of heather insertion technique, with *Erica* spp. clusters (10-20 cm) being secured to the wire mesh; c, decorative wall patterning using chromatic contrast between white (*Erica arborea*) and red (*Erica australis*) heather varieties; d, roof construction demonstrates similar dichromatic design principles. Photos: A. Verde (a, c, d), F. Zamora (b).

The complexity and aesthetic refinement of the Crosses are contingent upon the expertise and creative vision of the individuals leading the construction, the availability of assistance, and the temporal constraints. Historical evidence, including narratives from elderly residents and photographs from 1958, suggests a long-standing commitment to elaborate and meticulously crafted Crosses, exemplified by the incorporation of running water in periods predating the widespread use of motorized pumps for closed-circuit systems. This dedication to achieving near-perfection in every detail is a hallmark of the Piedrabuena Crosses, reflecting a profound passion and collective endeavor.

Following the completion of the heather application, attention shifts to the creation of the Cross's base or ground, typically designed as a miniature landscape with a rugged relief, utilizing locally sourced lithic materials, primarily quartzite and basalt. However, the selection of these materials is also guided by aesthetic considerations, emphasizing elements that capture the natural beauty of the surrounding environment. Consequently, quartzites exhibiting *Cruziana* ichnofossils, basalt bombs, boulders, slates, and limestones, both local and imported, are incorporated (Figure 7a, 8a, 8c, 8d). A particular emphasis is placed on incorporating tree trunks partially or fully encrusted with lichens or bryophytes, especially mosses, a characteristic feature of the May Crosses (*'Cruces de Mayo'*). This practice bears resemblance to other religious festivals, such as Nativity scenes in Catholic Europe and Latin America, and the "Moss Men" festival in Béjar, Spain, a Corpus Christi celebration where

up to six individuals are completely enveloped in moss. Predominantly pleurocarpous moss species from the genera *Antitrichia*, *Homalothecium*, and *Hypnum* are employed, with up to 200 m² of moss carpets utilized in their preparation (Martínez-Abaigar & Núñez-Olivera, 2001). In the case of the May Crosses (*'Cruces de Mayo'*), lichens are generally not collected, as they are already present on the trunks and rocks used in construction. However, bryophytes are gathered from surrounding natural areas, and occasionally lichens, particularly *Cladonia* species, are collected as they frequently grow intermixed with bryophytes. Certain materials are preserved and reused from year to year, with dedicated individuals meticulously searching and selecting these elements, demonstrating a profound appreciation for nature. Ultimately, the selection of stones is subject to the aesthetic preferences of the individual constructing the Cross.

Utilizing a diverse array of materials, ranging from wood and tables to stones and bricks, the foundation of the Cross is constructed to simulate a natural landscape, ultimately adorned with plants and, notably, moss. In many instances, these landscapes incorporate miniature streams, rivers, waterfalls, or ponds, featuring recirculated running water (Figure 7a). Oral accounts from early 20th-century residents describe the use of drums or portable basins (*"zafas"*) to supply water, creating the effect of fountains or streams and generating the auditory ambience of flowing water. Historically, water was discharged into adjacent wells or directly onto the street. The integration of water features posed significant challenges, often



Figure 8. Contemporary Forest/Heather Crosses (*Cruces de Monte/Brezo*) exhibited in Piedrabuena (2018); a, municipal Cross created by artist Pedro Castrortega, demonstrating traditional techniques with artistic interpretation; b, Los Frescolabis club's Cross representing community participation; c, friends of the Crosses Association's Cross showing organizational involvement in heritage preservation; d, La Corchea club's Cross illustrating musical-cultural thematic elements. Photos: A. Verde (a, d), F. Zamora (b, c).

necessitating the partial disassembly of the Cross to rectify leaks. Contemporary installations benefit from advanced technologies, such as diffusers, which produce visually striking effects (Figure 8 and Figure 9a).

This phase involves the application of fresh wild vascular plants and bryophytes to the constructed framework of rocks and trunks. These plants are collected the day prior to installation to ensure their freshness, and are subsequently irrigated and monitored daily, with replacements made as needed to maintain visual appeal and optimal flowering.

A diverse array of vascular plant species is utilized, as detailed in Table 1. The majority are wild species, harvested during their flowering period. Herbaceous and shrubby species predominate, with some tree species contributing branches. Certain species, such as Scotch broom (*Cytisus scoparius* (L.) Link), Spanish broom (*Cytisus striatus* (Hill) Rothm.), and common hawthorn (*Crataegus monogyna* Jacq.), are consistently employed due to their flowering periods coinciding with the festival. A total of 70 vascular plant species, representing 44 genera and 32 families, have been documented. The remaining species vary annually, depending on their flowering cycles.

Many Crosses incorporate both stuffed and live animals. A total of 17 animal species, representing 17 genera and 13 families, have been identified, encompassing both wild and domesticated animals (Table 3). Due to evolving social norms and legislative changes, the presence of protected

fauna has been reduced, mitigating practices such as the display of live ocellated lizards (*Timon lepidus* (Daudin, 1802)), a protected species in Spain. Historically, stuffed wild animals, including wild boar young (*Sus scrofa* Linnaeus, 1758), partridges (*Alectoris rufa* (Linnaeus, 1758)), and ducks (*Anas platyrhynchos* Linnaeus, 1758), were exhibited, along with live animals (typically restrained with ropes), such as doves (*Columbia livia* Gmelin, 1789), turtledoves (*Streptopelia turtur* (Linnaeus, 1758)), rabbits (*Oryctolagus cuniculus algirus* (Loche, 1858)), hares (*Lepus granatensis granatensis* Rosenhauer, 1856), various aquatic turtle species, and unidentified aquarium fish. Nests with eggs, and a bird species locally known as "Titurilines" (unidentified), are also commonly incorporated.

The Cross, the central element, is typically positioned at an elevated and prominent location. Wood is the primary material, although branches or trunks selected for their aesthetic qualities are occasionally used. Some Crosses are crafted by local carpenters, while others utilize materials such as ropes or heather (Figures 8 and 9).

As previously mentioned, the design of Piedrabuena Crosses has undergone a process of evolution in recent years. Increasingly elaborate Crosses, featuring innovative designs that manipulate perspectives, openings, volumes, and lighting, are being constructed (Figure 9a). In 2018, for instance, renowned plastic artist Pedro Castrortega (Piedrabuena, 1956) designed and constructed the Municipal Cross, incorporating novel materials, colors, and forms (Figure 8a).

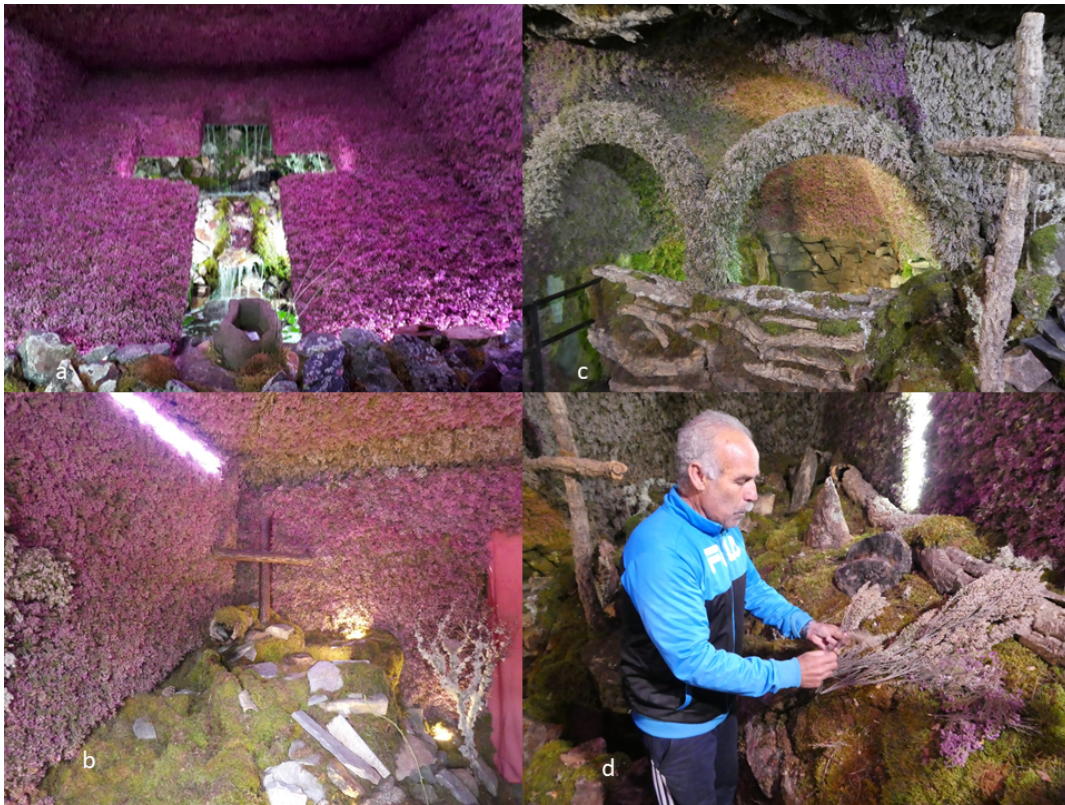


Figure 9. Forest/Heather Crosses (*Cruces de Monte/Brezo*) exhibited in Piedrabuena (2018); a, *Brezo a Brezo* association's Cross demonstrating traditional craftsmanship techniques; b, de *Buena Piedra* association's Cross featuring innovative design elements; c-d, *Castle Cave Cross* with detailed heather arrangement; d, Domingo Navas Sampablo displays characteristic *Erica* spp. bouquets used in construction. Photos: F. Zamora (a), A. Verde (b-d).

The ground space in front of the Cross and the surrounding entrance are covered with aromatic plants, primarily Spanish Marjoram (*Thymus mastichina* (L.) L.) and Spanish Lavender (*Lavandula pedunculata* (Mill.) Cav. and *L. stoechas* L.). Traditionally, it is believed that these plants were used not only for their fragrance but also to mask the scent of candles used for illumination.

This practice aligns with other festivals, such as Corpus Christi, where aromatic plants are used to carpet procession routes. Fennel is a particularly prevalent plant in this context across Spain (Verde *et al.*, 1997; Pardo de Santayana *et al.*, 2014, 2018a, 2018b, 2018c).

Antecedents and typologies: Forest Crosses and Heather Crosses

Forest Crosses - Heather Crosses (*'Cruces de Monte - Cruces de Brezo'*): Although direct historical records of these specific Cross constructions are limited, a potentially relevant account is found in Diego de Jesús María's (1650) *Historia de la imagen de Nuestra Señora del Prado de Ciudad Real*, which describes events in a proximate location, approximately 20 kilometers distant. This text offers insight into the potential origins of the practice of staging and decorating spaces dedicated to religious iconography, such as depictions of the Virgin Mary or, conceivably, the Cross. The author narrates the fortuitous arrival of the Virgen del Prado's image in Pozuelo Seco (a precursor to present-day Ciudad Real), following the Battle of Alarcos and the subsequent population displacement, where large

crowds gathered to witness the image. He states, "*De los quales muchos de ramas estaban cubriendo el Lugar, do vio que estava la Soberana Virgen...*" (Of which many men were covering the place with branches, where he saw that the Sovereign Virgin was).

This "covering of branches" bears a striking resemblance to the meticulous and elaborate preparations undertaken over nearly a month to create aesthetically pleasing, natural, and serene environments for the Cross in Piedrabuena, Porzuna, Arroba de los Montes, Puebla de Don Rodrigo, and Alcolea de Calatrava.

The staging of Forest - Heather Crosses involves the strategic integration of lighting, flora, fauna, and textiles, combined with mineral elements (rocks) and flowing water, all arranged upon a framework (originally constructed from sticks or logs, now often replaced with iron supports) over which a heather tapestry is affixed. Additionally, aged, gnarled trunks of olive, ash, cork oak, oak, or gall oak, frequently adorned with various lichen species (up to ten identified species, Table 2), are incorporated, overlaying the heather tapestry.

The construction of a Heather Cross adheres to a structured, sequential process, encompassing three distinct phases. The initial phase involves the assembly of the Cross's framework, a process that can extend over a month and typically concludes two to three days prior to the Feast of the Cross. The second phase focuses on the adornment of the Cross itself. Finally, the third phase entails the carpeting of the access and surrounding areas with aromatic plants.

Mixed Crosses

Mixed Crosses represent a hybrid form, incorporating sections or walls of both heather and fabrics. They are a more recent development compared to Forest or Heather Crosses and Fabric Crosses and are less frequently encountered. They share fundamental characteristics, including the structural framework, the use of wild plants in specific areas, and the carpeted ground. However, they also incorporate ornamental plants, which tend to be more abundant (Figure 10d). This type of Cross exhibits similarities to altars constructed for Corpus Christi and other local festivities, such as those dedicated to Saint Isidore the Laborer and Saint Mark the Evangelist, observed in other Spanish localities (Verde et al., 1997; Rivera et al., 2008; Garzón Machado, 2012; Pardo de Santayana 2018a, 2018b, 2018c).

The Fabric Crosses

If the hypothesis that the Crosses of Saint Mark represent the earliest form in Piedrabuena holds true, then Fabric Crosses likely predominated in earlier periods, although definitive bibliographical or documentary evidence is lacking. Some informants suggest that the adoption of fabrics stemmed from increasing difficulties in sourcing heather, leading to its substitution. While contemporary Fabric Crosses share structural and formal similarities with those

observed in other Spanish regions (Espadas Pavón, 1987; González Cruz, 2004; Jiménez de Madariaga, 2011), significant changes have occurred over the past four to five decades. Historically, these Crosses were constructed from readily available household materials, such as curtains, bedspreads, and tablecloths. In contrast, modern Fabric Crosses often utilize commercially purchased fabrics, although some individuals continue to incorporate household materials.

The fundamental construction process remains consistent. However, a distinguishing characteristic of Piedrabuena's Fabric Crosses, akin to the Heather Crosses, is the meticulous attention to detail. In the case of Fabric Crosses, fabrics must be perfectly smooth, impeccably ironed, and devoid of wrinkles or creases. Similarly, folds or "curves" are executed with precise symmetry (Figure 10). Furthermore, a defining feature in Piedrabuena is the creation of a perfectly smooth, taut fabric ceiling, resembling a plastered and painted surface.

In recent years, some individuals have engaged designers and decorators to create these Fabric Crosses. Conversely, Heather Crosses are sometimes constructed by individuals with specialized expertise, operating as professionals in Piedrabuena and surrounding towns, including the provincial capital, Ciudad Real. While indoor plants are predominantly used in Fabric Crosses,

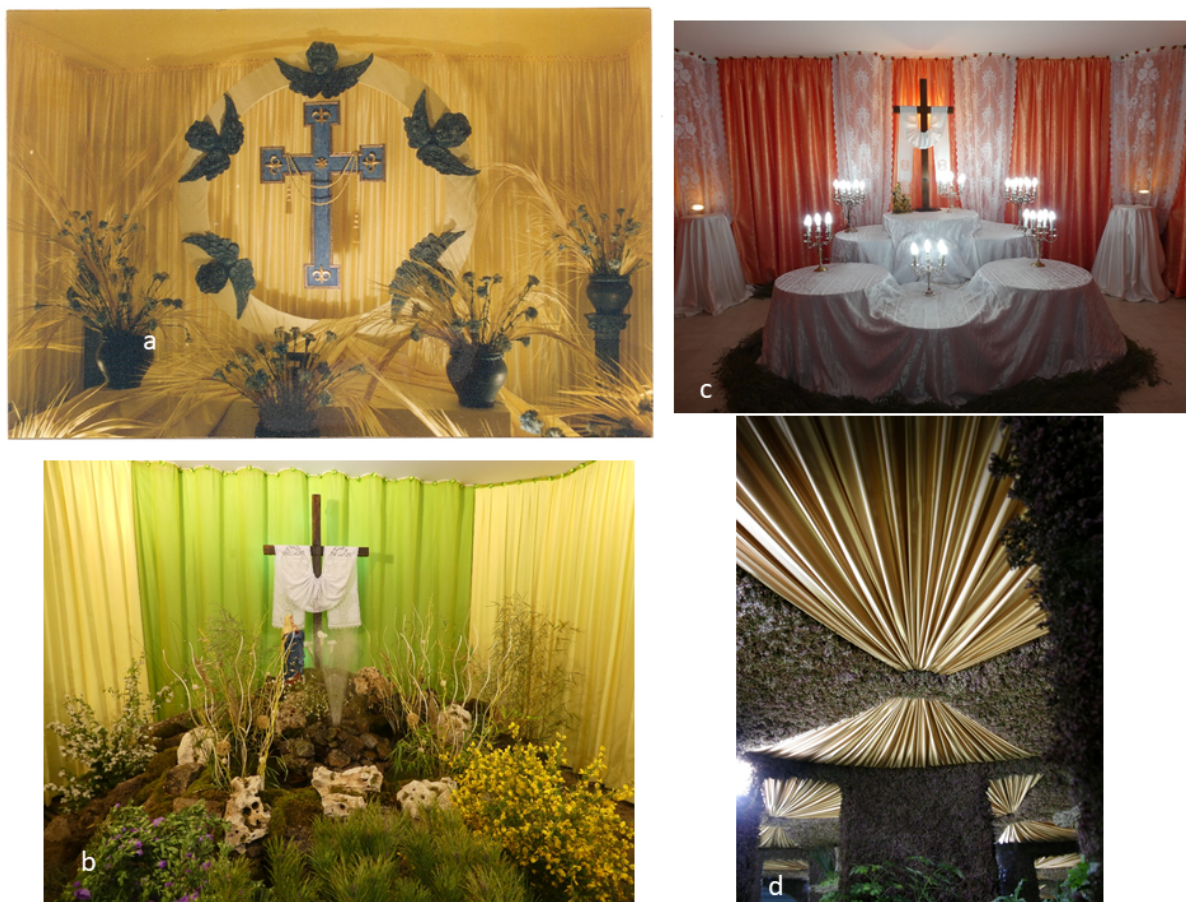


Figure 10. Evolution of Fabric Crosses (*Cruces de Tela*) and Mixed Crosses (*Cruces Mixtas*) in Piedrabuena; a, early *Fabric Cross* (1990s) demonstrating professional decorative techniques; b, Contemporary *Mixed Cross* (2018) showing material hybridity; c, community-created *Fabric Cross* by the Piedrabuena Housewives' Association (2018); d, structural detail of a *Mixed Cross* from the Democratic Union of Pensioners (2009), illustrating traditional-modern synthesis. Photos: F. Zamora (a, d), A. Verde (b, c).

the tradition of carpeting the entrance with wild aromatic plants, specifically Spanish Lavender (*Lavandula pedunculata* (Mill.) Cav. and *L. stoechas* L.) and Spanish Majoram (*Thymus mastichina* (L.) L.), persists, mirroring the practice observed in Heather Crosses.

Sustainability of the Spanish Crosses tradition

While the cultural significance and heritage value of this activity are undeniable, its long-term sustainability and environmental impact necessitate careful consideration. The substantial use of certain species, coupled with the inclusion of rare or protected taxa, raises concerns. A critical assessment is required to identify abundant resources suitable for wild collection and to delineate scarce or threatened species that should be excluded (e.g., orchids, bulbous plants, bryophytes, lichens) or whose collection should adhere to regional legal regulations.

Vascular Plants: Notably, only four inventoried vascular plant species are listed in the Castile-La Mancha Catalogue of Threatened Species: *Erica lusitanica* Rudolph, *Populus tremula* L., *Nymphaea alba* L., and *Nuphar lutea* (L.) Sm. (Anon., 2001). However, species experiencing significant collection pressure include red-flowered heathers, such as *Erica australis* L. and *Erica umbellata* L., and bulbous species, particularly orchids. The sustained use of unprotected species like *Erica australis* L. and *Erica umbellata* L. presents long-term sustainability challenges, necessitating regulatory measures to mitigate collection pressure. The extent of this pressure is exemplified by instances where individuals travel hundreds of kilometers to Extremadura or Castile-León to collect these species when local populations are insufficient due to unfavorable winter conditions.

Bryophytes and Lichens: The primary concern regarding bryophytes and lichens stems from the difficulty non-specialists encounter in accurately identifying these species. Consequently, indiscriminate large-scale collection, as practiced for the Piedrabuena Crosses, can lead to the depletion of abundant species and the potential extirpation of rare taxa. While pleurocarpous bryophytes with mat or tail growth forms and foliose/fruticose lichens are predominantly used, small-sized species, often overlooked by collectors, frequently grow intermixed with these dominant forms. Given the slow growth rates of bryophytes and lichens (Richardson, 1981), even partial removal can require extended periods for biomass recovery.

Beyond the “Moss Men” of Béjar, the collection of bryophytes and lichens for Christmas nativity scenes is a widespread tradition in Spain and other European and Latin American countries (Arrocha, 1996; Salazar-Allen, 2001; Lara et al., 2006; Anastacio Martínez et al., 2017). However, this practice is declining, with some regions, such as Madrid, banning the sale of these organisms (Llimona & Masó, 2007), and specialists increasingly discouraging their ornamental use (Forte, 2020). Modern hobbies and landscaping trends, such as aquaria, specialized plant cultivation (carnivorous plants, Bromeliaceae, Orchidaceae), and minimalist

or vertical gardens, particularly in North America, Northern Europe, and East Asia, incorporate bryophytes, driving an unsustainable global market (Glime, 2007; Martin, 2015).

More sustainable practices, such as Zen gardens and Bonsai/Kokedama techniques prevalent in Japan, cultivate bryophytes *in situ*, avoiding wild collection (Schenk, 1997; Glime, 2007; Oshima & Kimura, 2017). While *in vitro* bryophyte culture is employed for scientific and conservation purposes, laboratory studies indicate slow growth rates, suggesting that wild extraction significantly hinders natural recovery (Tacoronte et al., 2009). The emergence of moss gardening enterprises that sell commercially produced bryophytes and lichens in bulk (Mountain Moss, 2025) offers a potential alternative for maintaining the tradition of using these organisms in Piedrabuena Crosses without negatively impacting the bryophyte-rich Guadiana River area (Cezón & Muñoz, 2013).

Animals: As previously stated, due to the protected status of fauna in the surrounding Cabañeros National Park, contemporary Crosses primarily feature nests or stuffed animals, a stark contrast to past practices where live animals, often restrained, were exhibited.

The contemporary significance of the May Crosses tradition

Within the study area surrounding the Guadiana River (Figure 3), the tradition of May Crosses (*‘Cruces de Mayo’*) has experienced a notable resurgence in recent decades, particularly in Piedrabuena. This revival, driven by local cultural associations and institutional support, has transformed the festival into both a significant community practice and a growing tourist attraction.

The artistic and ornamental complexity of the crosses has drawn increasing visitor numbers, prompting municipal authorities to formalize their promotion through dedicated informational materials. These include published brochures detailing the annual displays, their locations, and recommended itineraries (Figure 5), reflecting the festival’s institutionalization as a cultural resource.

Conclusions

The May Crosses (*‘Cruces de Mayo’*), particularly the Heather Crosses, constitute a significant component of the biological and cultural heritage of the middle Guadiana River region and, notably, of Piedrabuena. This tradition embodies the region’s Traditional Ecological Knowledge (TEK), seamlessly integrating biological and religious elements into a unique folkloric expression.

The festival serves as a microcosm, reflecting the ecological richness of the Guadiana environment by showcasing a diverse array of biological and mineral resources within a confined space. While the May Crosses (*‘Cruces de Mayo’*) have undergone a process of evolution, adaptation, modernization, and consolidation, they have largely retained their distinct characteristics and peculiarities.

Despite the predominantly unregulated collection of materials for Cross construction, the ecological

impact of this activity warrants attention. The potential for depletion of abundant species and the accidental extirpation of rare or threatened taxa necessitates a strategic approach. Therefore, a comprehensive assessment is crucial to differentiate between abundant resources suitable for wild collection and scarce or threatened species requiring protection (e.g., orchids, bulbous plants, certain bryophytes). For endangered species, cultivation protocols within the region should be established to ensure the continuation of the May Crosses (*'Cruces de Mayo'*) tradition without compromising natural populations, while also fostering local resource generation. Regional environmental authorities should consider existing cultivation practices for mosses and liverworts developed elsewhere.

The May Crosses (*'Cruces de Mayo'*) represent a vital popular cultural manifestation of Piedrabuena and a pivotal annual event for residents of the Gadiana River Valley. Their ephemeral artistic nature not only serves as a valuable tourist resource but also promotes the appreciation of the region's natural environment. Consequently, local and regional authorities should actively support and promote this tradition beyond regional boundaries.

The implementation of regulated and controlled harvesting practices, supplemented by materials sourced from specialized suppliers, demonstrates the compatibility of cultural heritage preservation with ecological sustainability. This approach ensures the continued vitality of the May Crosses (*'Cruces de Mayo'*) tradition while safeguarding the region's natural resources.

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Authorship

AV: Conceptualization, Research field investigation, Supervision, Data curation, Resources (local knowledge), Writing – first draft –, Methodology and discussion; FZS: Research Field investigation, Data curation, Resources (local knowledge); JF: Research Field investigation, Data curatio, Resources (local knowledge); DRN: Supervision, Data curation, Formal analysis, Writing – review and editing; VC: Research Field investigation, Data curatio, Resources (local knowledge); SR: Management of the project, Resources, Fundraising; EL: Visualización and Methodology and discussion; CO: Research Field investigation and Methodology and discussion;

AV: Research Field investigation, R Resources (local knowledge); PFG: Visualización, Methodology and discussion; VMF: Writing – review and editing; FQA: Methodology and discussion, Software; RMR: Research, Methodology and discussion; JG: Formal analysis.

Conflict of interest

None.

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