

Saint John's Bouquets: Species Composition and Protection Against Evil in the Southern Netherlands

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Abstract: Blessed bouquets and wreaths, hung around homes, have functioned as protective charms for households throughout Europe. This biocultural practice seems to be widespread, although its diversity is not yet fully understood, especially in western Europe. In the Netherlands, we visited all villages where bouquets or wreaths are made and hung around the house on St. John's Day (June 24th), posing the following questions: Which plant taxa were included in the blessed bouquets? Why were these species chosen? Why are the bouquets made? Does bouquet composition differ across villages? We interviewed 93 people and photographed 206 bouquets, identifying 184 plant taxa. The most common plants included *Rosa* spp., *Juglans regia*, *Centaurea cyanus*, and *Hypericum* spp. Motivations for making the bouquets included "tradition" and their beauty. They were mainly used for protection against lightning strikes. While there was a widespread tradition in the Netherlands of making these bouquets, the practice is now confined to a small region. Our interviews revealed that the bouquets were not only valued for their protective anti-lightning powers, but primarily for their role in preserving local cultural heritage.

Keywords: Ritual plants, Apotropaic plants, Religion, Rituals, Europe, Christianity, Catholicism, Saints, Witches, Lightning

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Introduction

Throughout the ages, people have sought to protect themselves against misfortune (Budge 1961). They have searched for methods of protection against envy (Mencej, 2018), angry spirits (Pieroni 2000; Van den Eynden 2013), diseases (Carvalho and Morales 2013), abuse (Andrade Lima et al. 2014), the devil (Skemer 2015), witchcraft (Najem et al. 2022; Pieroni 2000; Uittien 1940), and bad weather (Christanell et al. 2013; Folkard 1892). People have defended themselves from these evils and attracted good fortune by using charms, spells, prayers (Borsje 2016), amulets (Pieroni 2013), and talismans (Budge 1961).

Amulets and talismans are objects carrying protective powers which can be made of non-perishable material such as rocks and minerals, but also (parts of) plants. European documents from the fifteenth century reveal that people protected themselves and their cattle from witchcraft using herbs, some of which were “blessed,” although the species of herbs and details on the practice of blessing these herbs are not clear (Broedel 2003; Summers 1928). Even now, in certain parts of Europe, blessed bouquets are hung as amulets around homes to prevent lightning from striking the house. Species found in these protective bouquets include local wild and cultivated flowering plants and cereals (De Cleene and Lejeune 2000; Łuczaj 2011a, 2011b, 2012; Stryamets et al. 2021). The bouquets are blessed on various Catholic and Orthodox holy days during mass, after which they are hung in or around the house. Currently, these bouquet blessing rituals take place in Poland on Assumption Day (August 15; Łuczaj 2011a, 2011b) and Corpus Christi Octave (68 days after Easter; Łuczaj, 2012); in Croatia on Saint Anthony’s Day (June 13th) and St. John’s Day (June 24th; Łuczaj et al. 2024); and in Ukraine on Corpus Christi (60 days after Easter) and on St. John’s Day, celebrated in that country on the 7th of July (Stryamets et al. 2021). Here, we focus on bouquets blessed on St. John’s Day (June 24) in the south of the Netherlands, which has not been the subject of any systematic ethnobotanical research.

In European religious folk customs, St. John (we refer here to St. John the Baptist, as opposed to the Evangelist) was called upon for protection against misfortune (e.g., Prorok 2017). In the Roman Catholic Church, St. John is considered the harbinger of Jesus Christ, and his birth is commemorated on June 24. On St. John’s Day or St. John’s Eve (the evening of June 23), all across Europe bonfires were lit (e.g., Broedel 2003; Hutton 1996, 2013; Schrijnen 1977) and jumped over (Deane and Shaw 1975). In the Netherlands, people collected the medicinal St. John’s Dew (Ter Laan, 1974), and in several countries, people searched for magical plants (Boekenoogen 1910; Hutton 1996; Jeay 1985; Kleinhempel and Klimov 2022; Ter Laan 1974). In Portugal, they collected extra potent medicinal herbs (Carvalho and Morales 2013), and, in many parts of Europe, floral wreaths or bouquets were and are hung around the house (e.g., Stryamets et al. 2021; Vickery 2019).

Examples dating from the sixteenth to the nineteenth century (e.g., Boekenoogen 1910; Davies and Houlbrook 2021; Folkard 1892; Hutton 1996; Jeay 1985; Lightfoot 1777; Stow 1842; Van den Bossche 1744; Vickery 2019) demonstrate that the gathering of herbs on St. John’s Day or Eve, and specifically the hanging of floral bunches around the house for protection on this day, was not just a local phenomenon, but may have been a western European or even more widespread custom. In (modern) translations of the fifteenth-century work “The Distaff Gospels” (French original: *Les Évangiles des Quenouilles*; Dutch: *Die evangelien van den spinrocke*), there is mention of the collection of herbs on St. John’s Eve that were hung in stables to enhance the cows’ milk production (Boekenoogen 1910; Jeay 1985). In certain parts of sixteenth-century London, it was customary to place bouquets for St. John’s Day over doors, which contained “green birch, long fennel, St. John’s Wort, orpin, white lilies, and such like, garnished upon with garlands of beautiful flowers” (Stow 1842, p. 39). In the Netherlands, possibly the earliest mention of herbs used on St. John’s Day stems from 1685. In a manual on how to be a good Christian, the Dominican

Petrus Van den Bossche (1744, p. 275–276) listed what he considered to be superstitions, including “St. John’s wort harvested before sunrise used to protect against lightning,” although it is not clear if these herbs were gathered around St. John’s Day.

The only recent ethnobotanical studies on St. John’s and other bouquets were carried out in Eastern Europe (Łuczaj 2011a, 2011b; Łuczaj et al. 2024; Stryamets et al. 2021) and Austria (Christanell et al. 2013). The historical writings, however, allude to a wider European distribution of St. John’s bouquets. To gain insight into the current distribution and history of this biocultural tradition, it is necessary to add more pieces to the puzzle. Moreover, as these kinds of plant rituals were already considered dwindling in the Netherlands a century ago (Knippenberg 1929; Uittien 1940), it is urgent to document them before they are lost.

In our analysis of Dutch St. John’s bouquets, based on interviews with people who made, blessed, or used these bouquets, and on photographic documentation of the bouquets, we posed the following research questions: (1) Which plant taxa are used in the bouquets? (2) Why were these species chosen? (3) Why do people make these bouquets? (4) Does bouquet composition differ across villages?

We hypothesized that certain plant species are added in St. John’s bouquets because these are available in the surroundings (Gaoue et al. 2017), medicinal (Łuczaj 2012), and/or because people learned about them from their older relatives. Additionally, we expected that plant symbology plays a role in composing the bouquets, such as choosing yellow flowers due to St. John’s association with Midsummer (Uittien 1940). Following Stryamets et al. (2021) and Łuczaj (2012), we hypothesized that beyond the protective purposes of these bouquets, people may regard them as an important ancestral tradition, or simply appreciate their beauty. Although the Dutch villages where people still make St. John’s Day bouquets are situated in the same region and surrounded by similar landscapes, we expected different plant species compositions between villages. Knippenberg

(1929) already described regional differences of St. John bouquets in the province of Noord-Brabant based upon his correspondence with a local school principal, but he did not conduct a botanical survey. Finally, we will discuss the relationship between St. John’s bouquets and the Catholic church, based on our interview data and the available literature.

Methods

DATA COLLECTION

We sought potential locations where herbal bouquets or wreaths were made on or around St. John’s Day (and dedicated to St. John) and/or blessed during St. John’s Day in local newspaper articles and the Google Search Engine. Dutch search terms included different combinations of “*Sint Janstros*,” “*zegenen*,” “*Sint Janskrans*,” and “*Noord Brabant*.” We then verified the events and asked if they were aware of any other St. John’s Day bouquet blessing celebration taking place in other villages by phone calls to Catholic churches and parishes and local civic shooter guilds (<https://www.immaterieelerfgoed.nl/nl/brabantseschuttersgilden>; <https://mbfs.nl/>). Civic shooter guilds were historically involved with the military protection of their village but now organize local activities and safeguard local traditions and folklore. These guilds are usually named after a saint, such as St. John (<https://www.immaterieelerfgoed.nl/nl/brabantseschuttersgilden>).

Ultimately, we found planned St. John’s celebrations associated with St. John bouquets or wreaths in the villages of Oerle, Duizel, Leenderstrijp, Soerendonk, and Sambeek (Fig. 1). These villages are all situated around the city of Eindhoven, in the southeast of the province Noord-Brabant, except Sambeek, which is in the northeast of the province. In the Netherlands, villages with populations of which the majority are respectively Catholic or Protestant are spread across the country. However, the south and south-east of the country historically house larger populations of Catholics than Protestant

Fig. 1. Map of the Netherlands (inset represents Europe, source: Wikimedia Commons), indicating the villages where Saint John's bouquets were blessed in 2023, all situated in the province Noord-Brabant



compared to the rest of the country (Schmeets and Houben 2023). The villages in our study are mainly inhabited by Catholics.

We visited these villages between the 17th and the 27th of June 2023, attended St. John celebrations and a St. John bouquet workshop, joined plant-gathering walks and bouquet/wreath assembling activities, and conducted interviews. Permission to join these celebrations and activities was procured from the organizers beforehand. Right before and after St. John's Day mass, we asked as many attendees carrying a St. John's bouquet as time allowed whether we could ask them some questions about their bouquets and take some pictures of these (Łuczaj 2011b). Photographs were made of all bouquets present at mass. Interviews were conducted in Dutch and were semi-structured with the aid of a printed-out questionnaire (Vogl et al. 2004). Through the villages' civic shooter guilds, we found participants for in-depth interviews and plant gathering walks, where

participants pointed out plants that they put in their bouquets. During these walks, we collected voucher specimens for a reference collection that was deposited at the Naturalis Biodiversity Center (L). In the Netherlands, it is not possible to submit ethnobotanical research to a university ethics committee for review. This is only required for medical and psychological research, and ethics committees do not take ethnobotanical studies into account. We followed the Code of Ethics described by the International Society of Ethnobiology (ISE 2008) concerning free and prior informed consent. Interviews were held anonymously, and names and addresses were generally not kept. However, we did ask every interviewee if they wanted to know more about our research and be informed on the outcomes, if so, we collected their contact information in a separate file.

We held a total of 93 semi-structured interviews and photographed 206 bouquets. On average, respondents ($n=84$) were 67.2 years old ($SD=13.8$)

and mostly female (73%). When asked about their religion (86), most considered themselves Catholic (74; 86%). Other responses were “no religion” (10; 12%), “Protestant” (1; 1%), and “Christian” without clarifying further denomination (1; 1%).

We gave back to the involved communities by designing and printing an informative poster containing pictures, a summary, and the results of our study in Dutch. Several of both printed and pdf versions were distributed among churches, civic shooter's guilds, local history societies, people that specifically wanted extra information, and our lead interviewees. Also, on our first day of fieldwork, our study was included in a well-read local newspaper (Evertse 2023). Lastly, this article, including a Dutch summary, will be sent to the interviewees that requested to be informed on the outcomes of this research.

DATA ANALYSIS

Plant species were identified in situ during gathering walks and interviews, or ex situ with bouquet photographs and voucher specimens. We followed the Dutch flora monograph (Duistermaat 2020), and for uncertain identifications (concerning both wild and cultivated species), we consulted botanical experts at Naturalis, Utrecht University Botanical Gardens, and Wageningen University & Research. For scientific plant names, we followed Duistermaat (2020).

Interview responses and bouquet plant species data were entered in a spreadsheet. Some bouquets were omitted from further analysis because photographs were unclear, they had been photographed more than once, or they were numbered incorrectly. We excluded bouquets that decorated altars or walls as they were larger and different in composition than those made for personal use. Unidentified plants and those identified only to family level were excluded from further analysis. Species and genera that were morphologically similar and difficult to differentiate from photographs were grouped for further analysis. For example, *Tripleurospermum maritimum* (L.) W.D.J.Koch, *Matricaria chamomilla* L., *Anthemis cotula* L., and *Anthemis arvensis* L. were joined for our analyses as “chamomiles.”

To detect whether there are differences in the species compositions of bouquets between villages, a non-metric multidimensional scaling (NMDS) analysis was performed in R (V4.3.2.

for Windows) and RStudio (V2023.09.1 + 494 for Windows), using the R-packages “vegan” (version 2.6–10; Oksanen et al. 2024), “permute,” and “lattice.” The plot was made using ggplot2. To test if there is a statistical difference between species composition of bouquets between studied villages, we performed an Analysis of Similarity (ANOSIM) test in R (Zorz 2019). Lastly, to uncover which taxa are significantly associated with the different villages, we performed an indicator species analysis using the R-package “indicspecies” (De Cáceres 2024). We used the *multipatt* function within the *indicspecies* package for indicator species analysis with 999 permutations and function *IndVal.g* (De Cáceres 2024). All analyses in R were carried out using presence-absence data.

Results

DIVERSITY IN PLANT SPECIES AND USES

Bouquets were blessed during open-air masses in the villages of Leenderstrijp, Oerle, and Duizel but not in Soerendonk (Figs. 2, 3, and 4). In Sambeek, it was customary for people to make wreaths, which were also blessed (Fig. 4). In Soerendonk, bouquets were not blessed and only shooter guild members made the bouquets. As in other villages, they hung them in front of the door around St. John's Day (Fig. 4).

Through our photographs, we documented a total of 206 bouquets and wreaths containing at least 184 plant taxa belonging to 58 plant families. All plant taxa and corresponding authorities can be found in Electronic Supplementary File I. People included an average of 10 plant taxa in their bouquets/wreaths ($SD = 3.4$). The 10 most common plant taxa we found in bouquets/wreaths were *Rosa* spp. (encountered 198 times in 159 bouquets, some had more than one species or cultivar), *Juglans regia* (139), *Centaurea cyanus* (including five white and purple flowered cultivars, 131), *Hypericum* spp. (*Hypericum perforatum*, *H. maculatum* or *H. × desetangii*, 117), *Alchemilla* spp. (73), the species complex “chamomiles” (73), *Hylotelephium telephium* (L.) H. Ohba (65), *Dianthus barbatus/chinensis* (60), *Achillea millefolium* (51), and *Tanacetum parthenium* (50) (Figs. 5 and 6).



Fig. 2. A St. John's bouquet being blessed by a priest during an open-air mass in Leenderstrijp. Photograph by I. Pombo Geertsma



Fig. 3. Top: St. John's bouquet in Leenderstrijp containing *Arrhenatherum elatius* (L.) J.Presl & C.Presl, *Centaurea cyanus* L., *Dianthus caryophyllus* CV, a species of fern, *Hordeum murinum* L., *Hypericum perforatum* L./*maculatum* Crantz/*desetangsii* Lamotte, *Iris pseudacorus* L./*Typha* sp., *Juglans regia* L., *Knautia arvensis* (L.) Coult., *Leucanthemum vulgare* Lam., *Matricaria chamomilla* L./*Tripleurospermum maritimum* (L.) W.D.J.Koch, *Rosa* spp., *Tanacetum parthenium* (L.) Sch.Bip., *Tilia* sp., and *Viola tricolor* L.. Below: A St. John's bouquet in Duizel containing *Achillea millefolium* L., *Centaurea cyanus*, *Dianthus caryophyllus* CV, *JacobealSenecio* sp., *Lythrum salicaria* L., *Secale cereale* L., *Tanacetum vulgare* L., and *Triticum aestivum* L. Photographs by I. Pombo Geertsma



Fig. 4. Top: A day's old St. John's wreath hanging from a front door in Sambeek, containing *Alchemilla* sp., *Chamaecyparis/Thuja* sp., *Gypsophila* cf. *paniculata* L., *Juglans regia*, *Rosa* sp., *Tanacetum vulgare*, and *Verbena bonariensis* L. Photograph by I. Pombo Geertsma. Below left: St. John's bouquet in Oerle showing the characteristic layering and sewing of the flowers on cardboard typical of this village (although not everyone follows this style). Species in this bouquet are *Centaurea cyanus*, *Dianthus barbatus/chinensis*, *Hypericum perforatum/maculatum*/*desetangsii*, *Juglans regia*, *Rosa* sp., and *Tanacetum parthenium* cf. var. "Ultra Double White." Photograph by M. Duinhouwer. Below right: St. John's bouquet hung next to the front door in Soerendonk, containing *Centaurea cyanus*, *Holcus lanatus* L., *Hypericum perforatum/maculatum*/*desetangsii*, *Juglans regia*, *Matricaria chamomilla/Tripleurospermum maritimum*, *Osmunda regalis* L., *Papaver rhoeas* L., *Rosa* spp., *Secale cereale* L., and *Tilia* sp. Photograph by M. Alcántara Rodríguez

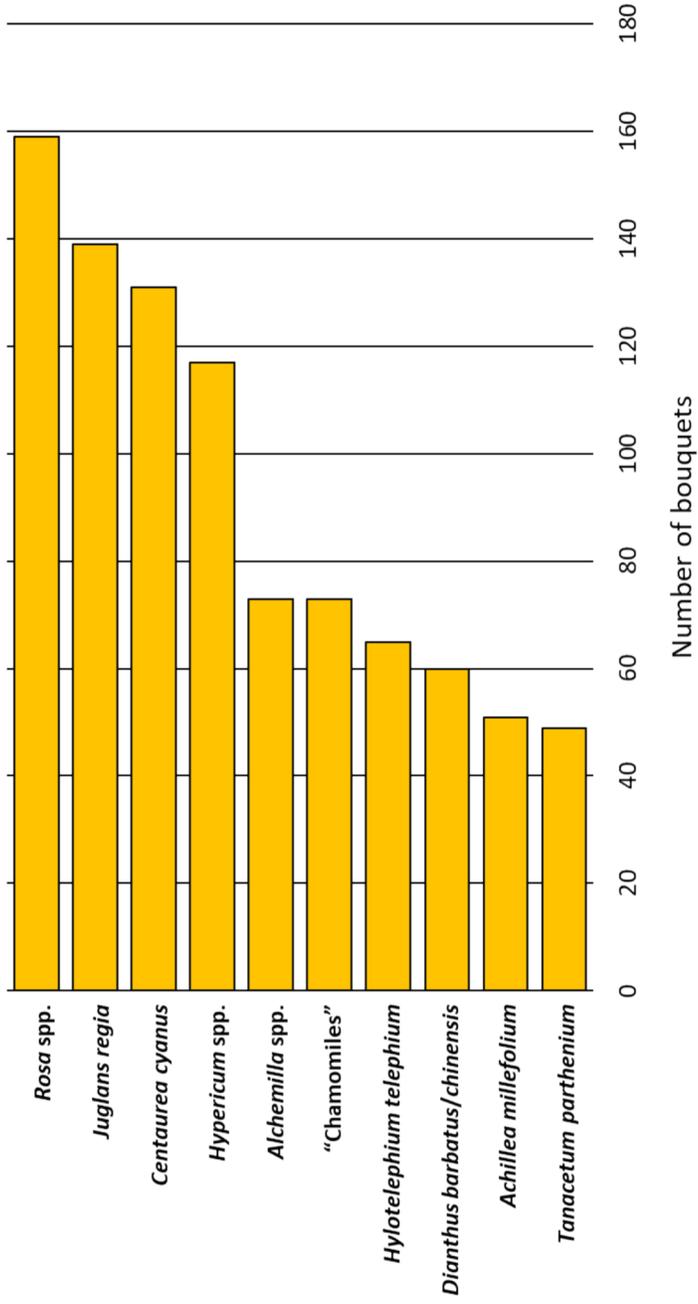


Fig. 5. The 10 most common plant taxa in 206 St. John's bouquets and wreaths in Noord-Brabant, the Netherlands

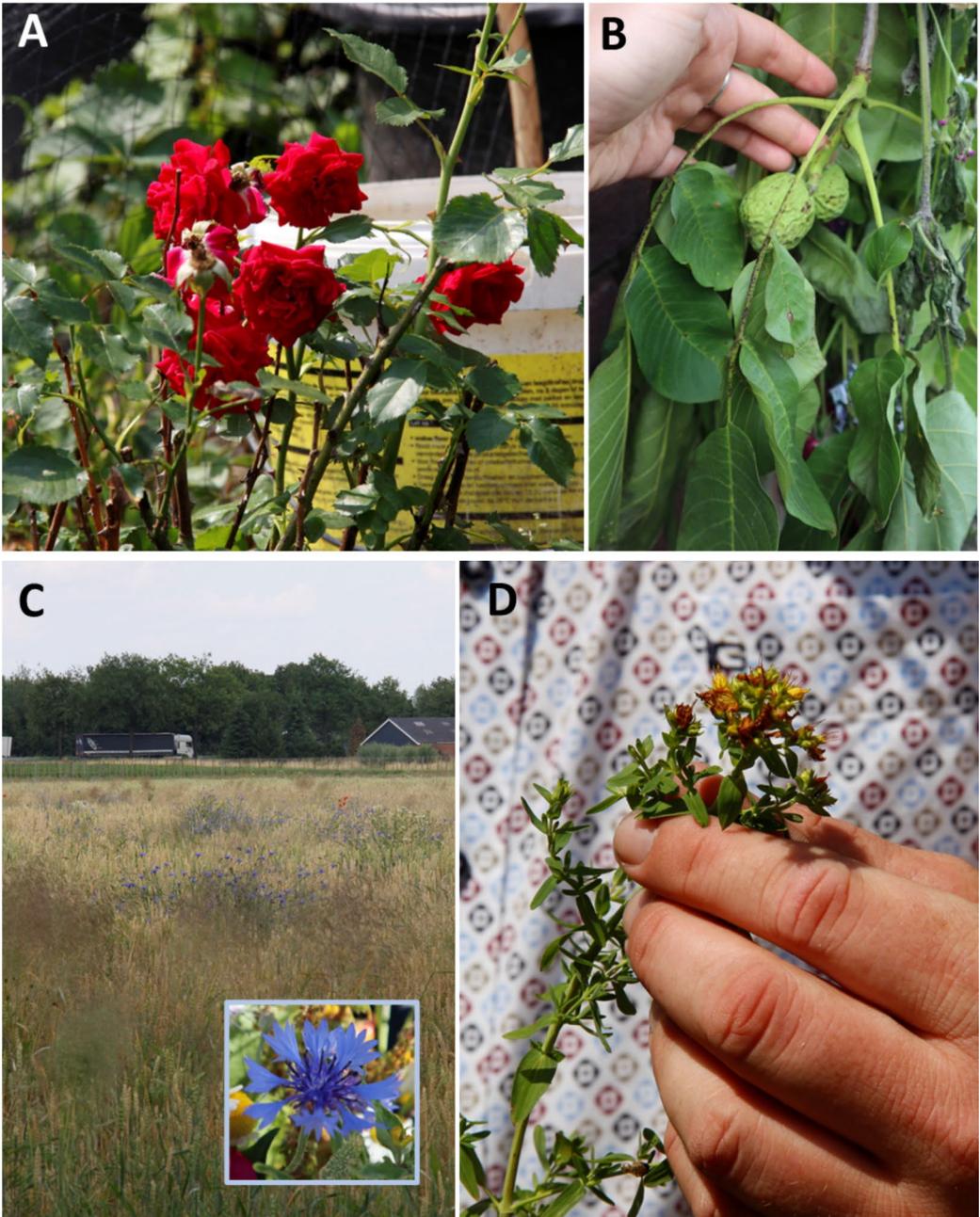


Fig. 6. The four most common taxa found in St. John's bouquets. **A** *Rosa* spp. ("roos"). **B** *Juglans regia* ("noteblad"). **C** *Centaurea cyanus* ("korenbloem") in a field where it was collected for the bouquet by one of our respondents. **D** *Hypericum maculatum* ("Sint Janskruid"). Photographs **A**, **C**, and **D** by I. Pombo Geertsma and **B** by M. Alcántara Rodríguez



Fig. 7. In the folk taxonomy, yellow-flowered Asteraceae species were sometimes confused with *Hypericum* spp., in this case with *Jacobaea vulgaris*

MOTIVATIONS BEHIND CHOOSING PLANTS FOR ST. JOHN'S BOUQUETS

During our interviews, the most commonly mentioned (more than 20 times) plant taxa were “roos” (*Rosa* spp., 58 times mentioned), “Sint Janskruid” (*Hypericum* spp., 49), “noot” or “notblad” (*Juglans regia*, 45), “korenbloem” (*Centaurea cyanus*, 41), “lievemenneke” or “duizendschoon” (*Dianthus barbatus/D. chinensis*, 28), “sedum” or “Sint Janskruid” (*Hylotelephium telephium*, 27), “pepermuntje” (*Tanacetum parthenium*, 22), and “margriet” (*Leucanthemum vulgare*, 21). According to our respondents, the species crucial in a St. John's bouquet were Sint Janskruid (likely *Hypericum* spp. or *Hylotelephium telephium*, but also *Anthemis tinctoria* L., *Jacobaea* spp. or *Senecio* spp (Fig. 7), 31 times mentioned), notblad (*Juglans regia*, 25), roos (*Rosa* spp., 21), and korenbloem (*Centaurea cyanus*, 20). Other taxa were mentioned less than 10 times.

Our respondents sometimes confused yellow-flowered Asteraceae species with *Hypericum* spp. While pointing at *Anthemis tinctoria*, *Jacobaea* spp., or *Senecio* spp., they explained that you had to rub the flower buds between the fingers to release a purple resin, which is a morphological characteristic for *Hypericum*

spp., but not for Asteraceae species in their bouquets (Fig. 7).

When asked why certain species were chosen for the bouquets, most people said “because it is tradition” (21 times), or “I find them beautiful” (19). Additionally, they responded that they chose plants that were flowering (10), flowers with specific colors (9), species that were easy to find (8), species they had learned from others such as (grand)parents (5), and the internet (3). Plants were also chosen for their protection against lightning (1) and sickness (1), to attract love to the home (1), and that lasted a long time without water (2).

USES OF THE ST. JOHN'S BOUQUETS

Of the 88 respondents asked why they still made a St. John's bouquet, most of them ($n=67$, 76%) answered that maintaining the tradition was important to them as well as connecting with the community (18). Some enjoyed making the bouquets (13), and/or they had “always done it” (10). Four people answered that they still made bouquets to protect themselves, against lightning strikes (2), evil spirits (1), and protection in general (1).

Of the 80 people whom we asked how they used their St. John's bouquet/wreath, 57 (71%) responded that it was used for protection. Of

these, 47 (59% of 80) specified that it protected against thunder and lightning — usually through fumigation of (part) of the bouquet — evil in general (14, 18%), spirits or ghosts (6, 8%), and illnesses (5, 6%). One respondent answered that it was used to protect against witchcraft (1%). Answers that were unrelated to protection included “tradition” (8 people, 10%), “for health” (3, 4%), and “for the crops/harvest” (3, 4%).

Some interviewees told us that when they were children and they feared lightning, their parents would go around the house with “palm” branches (usually *Buxus* sp.) dipped in holy water instead of the St. John’s bouquet. This was usually mentioned by respondents who originated from adjacent villages and did not grow up in the villages we surveyed and were not familiar with the St. John’s bouquets from childhood.

STATISTICAL DIFFERENCES BETWEEN VILLAGES

The NMDS biplot showed approximately four clusters representing bouquet species compositions from Sambeek, Duizel, Leenderstrijp, and Oerle, although there is overlap in species composition as well (Fig. 8; Electronic Supplementary File II). The bouquets from Soerendonk were scattered through those found in Duizel, Oerle, and Leenderstrijp.

The ANOSIM test performed in R indicated a significant difference in species composition between the surveyed villages based on Jaccard distance ($p < 0.001$), and the test statistic R (ANOSIM- $R = 0.3952$) indicated some separation between the villages despite a degree of overlap. To identify distinctive taxa associated with each village, we conducted a multi-level pattern analysis using the indicator value index (Table 1). Most villages had several indicator species, including horticultural (e.g., *Agapanthus* sp., *Hosta* CV, and *Gypsophila* cf. *paniculata*) and (semi-)wild (e.g., *Silene dioica* (L.) Clairv., *Viola* sp., and *Digitalis purpurea* L.) taxa, except Sambeek which only showed *Digitalis purpurea* as a potential indicator species. Most taxa shown in Table 1, however, had a low B score, meaning that these species were not often found in the associated village, although they were not present in other villages ($A = 1$).

Discussion

DUTCH ST. JOHN’S BOUQUETS COMPARED TO THOSE ELSEWHERE IN EUROPE

We recorded an extensive variety of plant taxa in bouquets and wreaths made for St. John’s Day in the province of Noord-Brabant in the Netherlands. When we compared our bouquets with those in other European countries, we see that for the Ukrainian Bukovina region, four taxa (*Achillea millefolium*, *Hypericum perforatum*, *Matricaria chamomilla*, and *Thymus* spp.) were explicitly mentioned for bouquets blessed on St. John’s Day (called *Ivana Zillyovogo* or *Ivana Kupala*), along with medicinal plants that were not specifically identified (Stryamets et al. 2021). In the Ukrainian region Roztochya, Corpus Christi is also celebrated around Midsummer, depending on the date of Easter. Here, species that were observed in wreaths included *Dianthus barbatus*, *Fragaria* spp., *Matricaria chamomilla*, and *Senecio vulgaris* (Stryamets et al. 2021). In Croatia, on the island Rab, *Helichrysum italicum*, *Hypericum perforatum*, and *Lavandula* spp. are blessed; while in the village Groboto on the island Šolta, bouquets composed of *Teucrium polium*, *Juglans regia*, and *Salvia rosmarinus* are blessed on Corpus Christi and left on the fields until St. John’s Day (Łuczaj et al. 2024). Bouquets that are made around the midsummer solstice (June 21) across Europe are thus highly diverse and probably relate to the local flora.

The taxa we recorded in St. John bouquets coincide somewhat with taxa found in Corpus Christi Octave bouquets in Poland (Łuczaj 2012), including cultivated roses (*Rosa* spp.), carnations (*Dianthus* spp.), daisies (*Leucanthemum vulgare*), and loosestrife (*Lysimachia* spp.). We also found roses most often, but for the rest, the composition of the flower bunches was quite different: walnut leaves (*Juglans regia*), cornflowers (*Centaurea cyanus*), and St. John’s wort (*Hypericum* spp.) were most often observed in the Dutch bouquets. An important criterion for the choice of species in Polish wreaths was their aromatic properties, likely linked to their use for fumigation (Łuczaj 2012). During our research, only one interviewee mentioned choosing a certain species for its scent. Although the Dutch bouquets were and are sometimes still burnt for protection, a

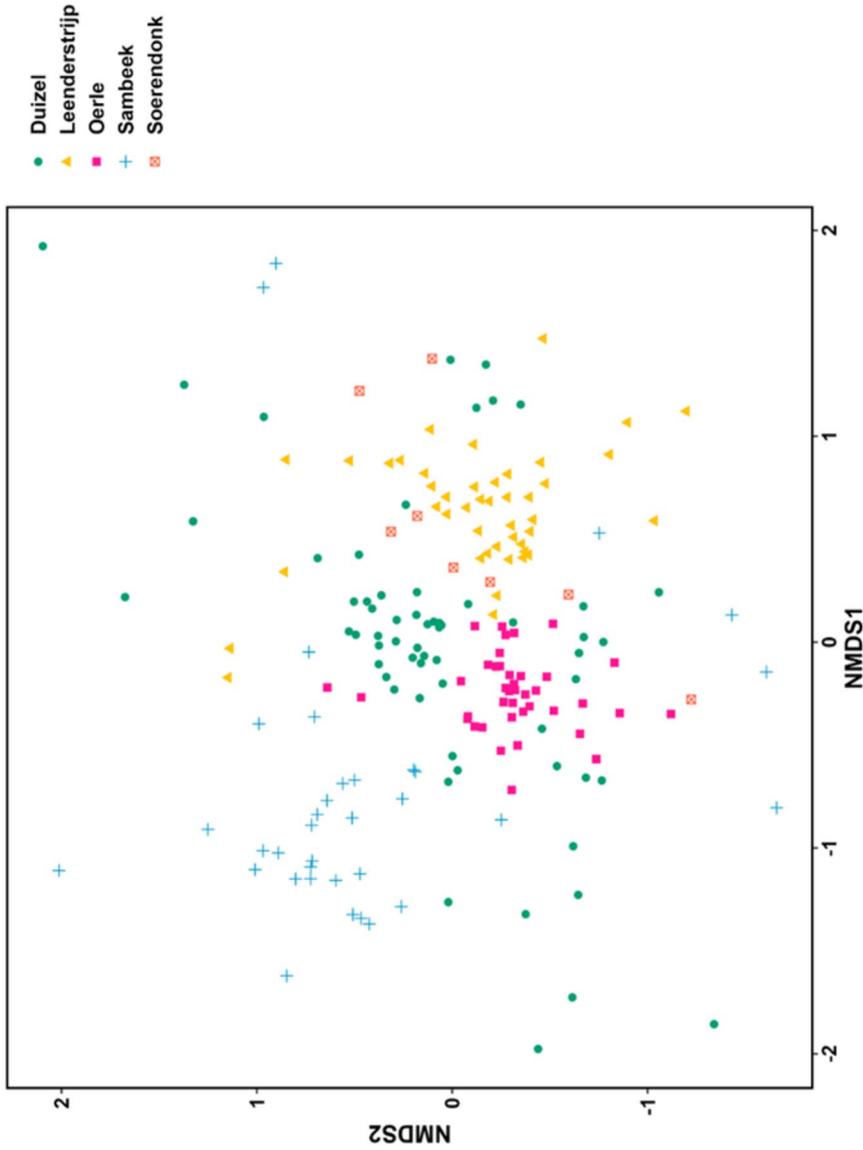


Fig. 8. Non-metric multidimensional scaling (NMDS) ordination biplot (stress = 0.227, $k=2$) based on Jaccard distance. Every dot represents the species composition of one bouquet, organized per village in separate colors. The biplot shows roughly four clusters that represent bouquet species compositions from Sambreek, Duizel, Leenderstrijp, and Oerle, although there is overlap in species composition as well, and Soerendonk's bouquets are scattered through those found in Duizel, Oerle, and Leenderstrijp

TABLE 1. INDICATOR SPECIES FOR EACH VILLAGE. ONLY SIGNIFICANT SPECIES ARE DISPLAYED ($p \leq 0.01$). *A* = SAMPLE ESTIMATE OF THE PROBABILITY OF THE SPECIES BELONGING TO A VILLAGE. *B* = SAMPLE ESTIMATE OF THE PROBABILITY OF FINDING THE SPECIES IN A VILLAGE. FOR EXAMPLE, *AGAPANTHUS* SP. WAS ONLY FOUND IN DUIZEL ($A = 1.0000$); HOWEVER, NOT ALL BOUQUETS IN DUIZEL CONTAIN THIS TAXON ($B = 0.30769$)

Village	Associated taxa	A	B	Indicator Value Index	<i>p</i> value
Duizel	<i>Agapanthus</i> sp.	1.00000	0.30769	0.555	0.003
	<i>Hosta</i> CV	0.66981	0.29231	0.442	0.009
Leenderstrijp	<i>Silene dioica</i> (L.) Clairv.	1.00000	0.42308	0.650	0.001
	<i>Viola</i> sp.	1.00000	0.36538	0.604	0.001
	<i>Arrhenatherum elatius</i> (L.) J.Presl & C.Presl	0.80948	0.28846	0.483	0.004
Oerle	<i>Digitalis purpurea</i> L.	1.0000	0.2391	0.489	0.007
Sambeek	<i>Chamaecyparis</i> sp./ <i>Thuja</i> sp.	1.0000	0.7143	0.845	0.001
	<i>Tanacetum vulgare</i> L.	0.9724	0.5429	0.727	0.001
	<i>Gysophila</i> cf. <i>paniculata</i> L.	0.8814	0.2857	0.502	0.006
	<i>Ligustrum ovalifolium</i> Hassk.	1.0000	0.2000	0.447	0.001
Soerendonk	<i>Secale cereale</i> L.	0.7158	0.5000	0.598	0.002
	<i>Helianthus annuus</i> L.	1.0000	0.2500	0.500	0.004
	<i>Triticum aestivum</i> L.	0.6500	0.2500	0.403	0.007
	<i>Lythrum salicaria</i> L.	0.6019	0.2500	0.388	0.007

plant's aroma is seemingly an uncommon reason for adding it to a St. John's bouquet.

These differences in bouquet compositions between Noord-Brabant and Poland could be due to (a combination of) several factors, such as differences in habitat, function, passed-down recipes, plant associations, or symbology. The majority of respondents chose certain species for their St. John's bouquets for their beautiful flowers and as tradition, as was expected. We, unfortunately, did not have sufficient time to enquire further what was meant by "tradition," although some people clarified that they had learned it from their (grand)parents. We also expected that people would collect species that they considered to be medicinal, because people in other European regions collect medicinal plants on St. John's Day believing that they are extra potent (Carvalho and Morales 2013) and incorporate them into their blessed bouquets (Łuczaj 2012; Stryamets et al. 2021). However, in the Netherlands, we did not find this to be the case and could have been forgotten, or medicinal plants may never have been associated with St. John's Day in this region.

In Polish wreaths that are blessed on Corpus Christi Octave, 124 taxa were recorded (Łuczaj 2012). Furthermore, bouquets are also blessed in Poland on Assumption Day (August 15th), and

233 taxa were found to be used in these bunches (Łuczaj 2011a). The striking difference between the limited number of bouquet/wreath species found in Ukraine (four species and unspecified medicinal plants) and the abundance of taxa in our study (193) and the Polish studies (Łuczaj 2011a, 2012) is likely due to differences in methodology. Stryamets et al. (2021) asked Ukrainian respondents to list plants they used for religious celebrations, and, when possible, the researchers asked them to point out the species mentioned to collect voucher specimens for their herbarium. However, as Łuczaj (2011b) indicated, what people say they use in their blessed bouquets, as recorded in questionnaires, can differ from what they actually use, as recorded in photographs. Although Łuczaj (2011b) only found a small difference between interviews and practice, we presume that the difference in the study done by Stryamets et al. (2021) is considerable, particularly when looking at their illustrations showing St. John's bouquets with more species than mentioned in their paper. This suggests that taking photographs and direct observation of the included species is a method preferable over interviews for analyzing the exact species composition (Quinlan 2005). Furthermore, when the two methods (direct observation and interviews)

are combined, differences between people's opinions and practices can become clear, as well as challenges interviewees face in identifying some of the "essential" species for the bouquets.

CHOICE OF PLANTS

Symbolic associations people had with certain plant species played a role in their choice of taxa. According to some, *Juglans regia* had to be present in the bouquet for its power to protect against insects and lightning strikes (interviewees often told us that lightning never strikes in a walnut tree) and as a symbol of fertility. Historically, villages throughout the Netherlands also used walnut for St. John's bouquets; its use to protect against lightning strikes and insects, and as a fertility symbol, is also attested to in literature (Knippenberg 1929; Schrijnen 1977; Uittien 1935). In the case of walnut as a symbol of fertility, the Distaff Gospels (Boekenooogen 1910; Knippenberg 1929) describes a folk custom to make a husband a better lover: a woman could put a walnut leaf, collected on St. John's Eve, in his left shoe, and he would love her "wonderfully."

In our study, *Hypericum* spp. was also an important ingredient in the bouquets. Interviewees explained that the purple juice that appeared when rubbing the flower buds between your fingers represents the blood of St. John. This refers to the biblical story of St. John's beheading by king Herodes. *Hypericum perforatum* is known for its apotropaic (averting evil) uses that are even encapsulated in certain local Dutch names that translate as "chase away the devil" (Pombo Geertsma et al. 2024). Furthermore, there are numerous folkloric reports mentioning the use of St. John's wort to banish evil in the Netherlands, Belgium, and the UK (Carvalho and Morales 2013; Davies and Houlbrook 2021; De Meyere 1934; Deane and Shaw 1975; Harou 1895; Hock 1868; Owen 1959; Ter Laan 1974; Vickery 1981, 2019).

Roses, cornflowers, ferns, and Crassulaceae were also mentioned as important ingredients that should be included in St. John's bouquets, although interviewees hardly attached symbolical meaning to their presence. These species were all also mentioned as typical St. John's bouquets ingredients by Knippenberg (1929). Furthermore, in literature, *Sedum acre* L. and *Sempervivum* spp. are substantially associated with protection against lightning strikes, not

in bouquets per se, but mainly as living plants planted on roofs (Beirens 1934; Davies and Houlbrook 2021; Folkard 1892; Łuczaj 2012). Ferns, which were often found in the bouquets in Leenderstrijp, are considered magical plants, of which people try to gather the "seeds" on St. John's Eve in some parts of Europe (Dodonaei 1644; Folkard 1892; Vickery 2019). Cornflowers and roses also have symbolical associations across Europe (e.g., Pinke et al. 2022). However, our interviewees did not mention these associations.

Other (non-symbolical) reasons also played a role, according to our respondents, such as having beautiful flowers, also found in Poland (Łuczaj 2012) and Ukraine (Stryamets et al. 2021), which in our case might explain the additions of *Centaurea cyanus*, roses, *Alchemilla* spp., and *Dianthus* spp. Knippenberg (1929) mentioned the use of hardy plants that would last for a long time, but only two of our interviewees mentioned this.

DIFFERENCES IN SPECIES COMPOSITION BETWEEN NOORD-BRABANT VILLAGES

We suspect local cultural preferences to be the underlying factor for the observed significant differences in bouquet species compositions among the villages we studied. Differences found between villages do not reflect the regional availability of flowering plants around the 24th of June, as the villages are close together in a similar habitat. Bouquet ingredients rather reflect local preferences, sometimes instilled by primary school education, during which children learn the ingredients of a "correct" St. John's bouquet, such as in Leenderstrijp, where *Silene dioica* and *Viola* sp. were identified as indicator species (Table 1) and these species are also listed in the "correct" St. John's bouquet recipe. Personal preferences of volunteers also play a role, such as in Sambeek and Duizel. For example, in Sambeek, a group of female volunteers had made a considerable portion of our documented bouquets. One of them was a florist and had ordered many flowers to be used in their bouquets, such as *Chamaecyparis* or *Thuja* sp. and *Gypsophila* cf. *paniculata*, which were also found as indicator species (Table 1). In Duizel, we found that many bouquets contained garden plants (such as *Hosta* CV, also included as an indicator species).

According to one of our main interviewees in Leenderstrijp, a recipe of a correct St. John's bouquet was once written down by a teacher in the 1960's and used from then on to teach in primary school. Written recipes evidently may exert a conservative effect on plant use (Leonti 2011). However, while doing fieldwork in Leenderstrijp, interviewees were sometimes jokingly reluctant to let us make a photograph of their St. John's bouquet, stating that they had not made the correct bouquet that year. Indeed, we found only a small number of bouquets in Leenderstrijp that adhered to the exact "rules."

Knippenberg (1929) described six regions in the southern Netherlands with distinct St. John's bouquet species' compositions. Regional differences described by Knippenberg (1929) are most clear in his description of the bouquets' styles, where bouquets from two regions, Kempen and Limburg, were bound together in pairs of three, in Limburg tied together with a large white bow, and in Kempen using forget-me-nots. People in the other four regions made one bouquet, and in what he called the "Eindhoven type," the plants were stitched on paper, just as we observed in Oerle in 2023. Also, the different regional bouquets were somewhat different in species composition. For example, the bouquets in Helmond did not contain walnut leaves and roses, whereas the St. John's bouquets from Eindhoven and Nuenen did. Knippenberg (1929) did not provide a discussion on the reasons behind the differences between regions.

Two regions specified in Knippenberg's (1929) article correspond with the villages in our study. The bouquets in the region Kempen (this includes the villages Oerle, Duizel, Leenderstrijp, and Soerendonk) "consisted of a central bunch of St. John's wort, fern, sedge, cornflowers, white rose, red rose, and daisies; the side bunches contained St. John's wort, violets, fern, Spanish grass with cornflowers, white and red roses with white campion, wild iris with double carnations and violets; the three bunches were connected by forget-me-nots" (Knippenberg 1929). He also described the St. John's bouquets from Beugen, a village 6 km above Sambeek, based on what he heard, because it was not common practice anymore in his time: "it was a branch of a walnut tree decorated with all kinds of flowers, also with roses or strips of paper." These species were still considered important

by our interviewees and commonly found in St. John's bouquets in our study. Unfortunately, proper historical species composition comparison between our data and that of Knippenberg (1929) is challenging for several reasons. Firstly, it is unclear if his regional bouquet descriptions were made from one or several bouquets per village, through personal communications only, or if it is done exclusively using literature or any combination thereof. Furthermore, it is unclear if he subsequently identified the plant species himself to confirm the species identifications. Lastly, Knippenberg only used folk names to refer to the species he mentioned in his article, which hampers proper comparisons as some plants have dubious folk names—e.g., *St. Jansbloem*, *donderbloem* and *Spaansch gras*—that could be associated with multiple plant taxa (<https://pland.meertens.knaw.nl/>). All considering, these methodological differences and uncertainties unfortunately obstruct a historical comparison over the intervening 100-year period.

PRESERVATION AND REVITALIZATION OF ST. JOHN'S BOUQUETS

The custom of making and hanging St. John's bouquets was once widespread across the Netherlands (Knippenberg 1929; Schrijnen 1977; Uittien 1940; www.verhalenbank.nl; Meijneke 2009). In the twentieth century, the tradition disappeared from many areas and is only now found in a small number of villages. It especially remained or resurged in villages where the local shooters guild's patron saint is St. John, which is the case in Soerendonk, Oerle, Duizel, and Leenderstrijp. For Ukraine, Stryamets et al. (2021) discussed a decline in yearly floral traditions due to the discouragement of these practices by the Communist regime, and since that regime has fallen, they observed a resurgence in these rituals. The revival of these rituals, both in Ukraine and the Netherlands, may be part of a larger European trend of revaluing local traditions of (wild) plant collection and use (Gras et al. 2016; Pardo-de-Santayana et al. 2010; Sansanelli et al. 2017). On a local level, Łuczaj (2012) proposed the preservation of these types of traditions through lessons and workshops. However, this is not necessarily a long-term solution for its preservation, as in Helmond (Noord-Brabant), a century ago, someone tried to

re-popularize the making of St. John's bouquets, but this custom is now completely absent from this town (Knippenberg 1929; Ter Laan 1974). In Oerle, it was suggested that apart from religious motivations playing a role in the conservation of St. John's bouquets, another role is the participants' willingness to preserve their local identity through this ritual. This was demonstrated when the small village Oerle became part of a larger municipality and villagers held on to composing their special St. John bouquets as typical "Oers" cultural heritage (Rooijackers n.d.).

None of the historical sources we reviewed (e.g., Carvalho and Morales 2013; Owen 1959; Schrijnen 1977; Stow 1842; Uittien 1940; Vickery 1981, 2019) mentioned that the bouquets or wreaths were also blessed on St. John's Day, indicating that blessing was not common practice and is a relatively recent addition to the tradition. This was corroborated by our interviews, where respondents from Oerle, Leenderstrijp, and Sambeek explained that St. John's bouquets or wreaths started to be incorporated in official blessing ceremonies during St. John's Mass in the early- to mid-twentieth century. We verified this by consulting the Meertens Instituut Dutch Pilgrimage database (Rooijackers n.d.; Biemans n.d.). By including the bouquets in blessing ceremonies, local church authorities can thus have a significant impact on the preservation and revitalization of these plant rituals. Personalities and personal interests of regional clergy might be one of the most important factors for preservation, where energetic priests sympathetic to local customs can be a driving force in stimulating their local following in preserving these types of traditions, as was the case in Sambeek in the 1930s (Klaassen n.d.) and Oerle in the 1940s (Rooijackers n.d.). Additionally, front(wo)men of the local civic shooters guilds can have the same effect on village traditions, as was the case in Soerendonk where bouquets were not blessed, and in Oerle, Leenderstrijp, and Duizel. These shooters guilds appear to be keepers of local histories. Those in Leenderstrijp, Duizel, and Soerendonk kept recipes of "correct" St. John bouquets, although, as we found, this did not necessarily correspond to what was really present in these bouquets. Lastly, the Catholic women's organization (<http://www.kvo.nu/> accessed 19 December 2024) also plays a role in the maintenance of the tradition of St. John's wreaths in

Sambeek, where they organize wreath-making workshops with adults and children.

A PAGAN CUSTOM TURNED CATHOLIC?

It has often been presumed that early Roman Catholics adopted or kept pre-Christian Midsummer celebrations and associated those with St. John the Baptist (Łuczaj 2012; Ter Laan 1974; Uittien 1940). This might well be the case, as the historian Hutton (1996, 2013) demonstrated that both solstices were appropriated during Christianization and were developed into the festivals of Christmas and of St. John. Additionally, Hutton (2013) set forth that the decoration of homes with greenery is recorded in late antique or early medieval texts, and thus likely performed before the process of Christianization in Europe. Herbal wreaths and bouquets associated with Midsummer or St. John's Day are, to our knowledge, mentioned in texts from the Early Modern Period onwards (e.g., Van den Bossche 1744). That this custom is not mentioned in the Bible, and that in the Netherlands, the bouquets were never said to be blessed until recently, indicates that this custom is not of Christian origin. The fact that these types of floral bunches were reported up until the twenty-first century in diverse parts of Europe indicates that this custom was once widespread and could imply that it was an ancient common phenomenon predating the Christianization of Europe. However, an in-depth historical analysis of this custom in diverse European archives should be undertaken to verify this compelling possibility.

HERBAL PROTECTION

In the Netherlands, there are numerous other plant species that were employed for protection against evil: "lijsterbes" (*Sorbus aucuparia* L.), "duivelsdrek" (*Ferula asa-foetida* L., an imported resin), "rogge" (*Secale cereale*), "zwarte bes" (*Ribes nigrum* L.), "vlier" (*Sambucus nigra* L.), and "palmtakken" (*Buxus* sp.) (www.verhalenbank.nl). In Limburg, a Dutch province adjacent to Noord-Brabant, bouquets were blessed on Assumption Day (August 15th) to protect the house against lightning strikes (Uittien 1940), as in Poland (Łuczaj 2012). These bouquets appear to be similar in function

to the St. John's bouquets, but are made later in the year and associated with Mary instead, and will be explored in a forthcoming paper.

Conclusion

Self-made bouquets and wreaths that were hung around households have functioned as amulets and talismans throughout Europe. In the Netherlands, the custom of making protective bouquets is still found on St. John's Day in the south of the country, mainly in villages where St. John is the patron saint. We found these St. John's bouquets to be composed of a combination of garden and wild harvested plant taxa. According to our interviewees, the most important reasons for adding certain plant species were tradition and their beauty. Similarly, the most important motivator for making the bouquets was that interviewees wanted to maintain the St. John's bouquet tradition. Regarding its use, the bouquets were most often said to protect their house against lightning strikes. The species' compositions of the St. John's bouquets statistically differed between our surveyed villages, although there was also some overlap. Differences between villages were not likely to be caused by differences in the regional availability of flowering plants around the 24th of June, as the villages are close together and in a similar habitat. Local preferences rather drive these differences, such as written down recipes, the villages' primary school education—where children learn the recipe for the correct St. John's bouquet—and volunteers that organize communal St. John's bouquet-making activities and also provide the flowers.

Before the twentieth century, the St. John's bouquet custom was more common across the Netherlands but is now only found in these villages. The preservation or revitalization of the St. John's bouquets' tradition in this region may have to do with the participants' willingness to preserve their local identity through this ritual. Other contributing factors include the eagerness of local civic shooters guilds and the Catholic women's organization to organize wreath-making workshops, share recipes, and remind the villagers to make the bouquets. Interestingly, we found that the St. John's bouquets, although this custom probably existed for many centuries, only started to be incorporated in a blessing ceremony during the Catholic St. John's Day mass relatively recently in

the early to mid-twentieth century, indicating that this custom is not of Christian origin, although more research across Europe is needed to verify this. Ultimately, with this research, we show that today, even in the Netherlands—a highly industrialized country—people are involved with herbal protection and value plant species, although not primarily for their protective powers, but as important local heritage.

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Author Contribution

I.P.G.: conceptualization, data curation, formal analysis, investigation, methodology, resources, supervision, validation, writing – original draft, review and editing, project administration, funding acquisition. B.Z.: data curation, formal analysis, investigation, methodology, resources, review and editing the manuscript, funding acquisition. M.D.: investigation, methodology, resources, review and editing the manuscript, funding acquisition. M.A.R.: investigation, review and editing the manuscript. T.v.A.: conceptualization, supervision, review and editing the manuscript.

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Data Availability

Data is provided within the supplementary information files and data available upon request to corresponding author.

Declarations

Conflict of interest The authors declare no competing interests.

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