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Article

Commercialized "Smudge Sticks" Used as Incense in the Netherlands: An Inventory of Plants and Trends Behind a New Age Fashion

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Abstract :Incense is essential in religious ceremonies, even in relatively new religious movements such as New Age and Neopaganism. These garner little attention from ethnobotanists, although they trigger an international trade in wild-harvested plants. In this paper, we studied the botanical ingredients of *smudge sticks* (dried plant bundles burned for purification) in the Netherlands, and people's motivations to use them posing the following questions: what plant species are included in smudge sticks? what are they used for? and are exotic plants preferred over native Dutch plant species? We visited online and physical shops in Dutch cities, acquiring a total of 29 different smudge sticks containing at least 15 species. We held semi-structured interviews with 11 users, vendors, and herbal experts, and collected data from 33 questionnaires. *Salvia apiana* L. was most frequently found, along with North American species of the genus *Artemisia*. The rise of the New Age movement resulted in North American ritual plant species being easily available in (online) shops and it being used for personal protection and cleansing. Despite its commercial demand there is no data regarding the pressure on wild populations, therefore, we call for the need to monitor the harvesting of these species in the wild.

Keywords: ethnobotany; cultural appropriation; Native American; Europe; California; United States; ritual plants; neo paganism; wicca; witchcraft

1. Introduction

The smoke of incense has been an essential component in sacred religious ceremonies for millennia (Dannaway 2010, Langenheim 2003). Incense is also used in relatively new movements such as New Age and Neopaganism, including Wicca, and resulting popular religions (Chryssides 2007, Cunningham 1989, Jespers 2007, Niebler 2017, Pearson 2000). Although in the last few decades a growing body of literature was published on these movements, in fields such as history and sociology of religion, and anthropology (e.g., Hanegraaff 2007, Kemp and Lewis 2007, Possamaï 2005), from the viewpoint of ethnobotany, New Age, Neopaganism, and contemporary Western popular religions are virtually unstudied. Yet, these relatively new beliefs influence the harvest and trade of wild plants (e.g., De Greef 2020) making them a fascinating case for ethnobotanical investigation.

Incense is made of dried plant material, usually processed as incense sticks, granules (usually tree resins), or bound bundles of dried plant leaves and stems. The smoke produced by fire and incense is used ritually to connect with entities or "energies", to create a certain sacred atmosphere, and for ritual healing by peoples all over the globe. In southwestern China, ritual fumigation is currently practiced to communicate with ancestors, deities and spirits (Staub et al. 2011). In Brazil, fumigation is performed in healing ceremonies, among others by practitioners of the Umbanda

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religion (De Luna Antonio et al. 2011). In Native North American cultures, there are several documented instances of ritual and healing uses of incense (Moerman 1998, naeb.brit.org, accessed 2 May 2024). Incense smoke is not only used in a religious or ritual context, but also purely as medicine against, for example, respiratory tract and skin diseases (Mohagheghzadeh et al. 2006, Staub et al. 2011), for repelling house flies (Baana et al. 2018), disguising bad smells (Niebler 2017), and even measuring time based on how long an incense stick needs to burn up (Bedini 1963). These examples just scratch the surface of a wide and vast variety of incense usage in the world (Langenheim 2003).

Although incense, especially frankincense (*Boswellia* spp.), has been ceremonially used in the Catholic church for centuries (Birhan et al. 2023; De Cleene and Lejeune 2002), including in the Netherlands where this study was conducted, a new and secular market has emerged for *smudge sticks* made from dried plant bundles. Their packaging and sales pitch typically associate them with Native North-American spirituality. Tightly bound dried plant bundles are indeed used by some Native North-American cultural groups in traditional ceremonies (Moerman 1998, naeb.brit.org, accessed 2 May 2024). They are ignited on one end to create smoke which is intended to purify spaces and/or people (McCampbell et al. 2002, Moerman 2003, Stevens and Roberts 2000). In the US, examples of plant species employed for smudging in the Native American Ethnobotany Database (naeb.brit.org, accessed 29 July 2024) are sweetgrass or vanillagrass (*Hierochloe odorata* (L.) P.Beauv.), various species of *Artemisia* and *Salvia apiana* Jepson, grouped under the name 'sage', Eastern Arborvitae (*Thuja occidentalis* L.), and juniper (*Juniperus* spp.), depending on the cultural groups and geographical area. The local terms applied to these plant bundles differ per group, but they are generally referred to as incense or, more commonly, *smudge sticks* in (popular) literature.

These indigenous smudge sticks were adopted for ceremonial purposes in the US by practitioners of New Age (Aldred 2000), Paganism (Blackwelder 2010, Lanahan-Kalish 2019), and Wicca (Blake 2014, Cunningham 2004, Foltz 2011). The definitions and contours of these (religious) movements are debated (e.g., Hanegraaff 2006, Jespers 2007, Kemp and Lewis 2007, Possamaï 2005). Notably, they are growing in the Netherlands (Houtman and Mascini 2002). Especially New Age and to a lesser extent Neopaganism commodify rituals and associated objects from other religions and cultures, not only smudge sticks, but also drums, precious stones, and dreamcatchers (Aldred 2000, Behrendt 1998). This use of ritual objects outside their original native context sparked controversy and is recurrently termed cultural appropriation (Aldred 2000, Jain 2021, Miskimmin 1996, Monture 1994). There are indications that some plants traditionally used for smudging, such as white sage (*Salvia apiana*), are unsustainably harvested to meet the growing demand in Western countries (Adams and Garcia 2005). However, academic literature mentioning plant use by New Age or Neopagan practitioners during ceremonies is hardly backed up by herbarium specimens, photographs of plants, or plant identifications during fieldwork by botanists (e.g., Aldred 2000, Blackwelder 2010, Fatur 2020). Additionally, so far no research has been carried out on 'modern' smudge stick species and their uses.

The aim of this paper is to identify the botanical ingredients in commercialized smudge sticks in the Netherlands, and to find out what lies behind the choice of these plants. We posed the following questions: (1) what plant species are included in these sticks, (2) for what reason are they included, and (3) are exotic plants preferred over native Dutch species, and why? To answer these questions, we collected smudge sticks from shops to identify the species and interviewed users, vendors and herbal experts. We argue that the rise and commercialization of the New Age movement in the 1980's, its idealization of Native North American spirituality favoring certain smudge stick plant species, and the subsequent easy availability of smudge sticks in shops led to its growing popularity and thus demand.

2. Results

2.1. Botanical Ingredients of Smudge Sticks Sold in Dutch (Web)Shops

In the Netherlands smudge sticks are found in (web)shops that specialize in spiritual and esoteric products, but also in (herbal) tea shops with an 'esoteric product corner'. We collected a total

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of 29 smudge sticks, some of them containing several species (Figures 1 and 2). In total, we identified 14 genera in 12 families. Of these, we were able to identify 15 species, but 27 plant ingredients were not identifiable to species level because they missed crucial morphological characteristics (Table 1). In particular, the fragments of *Artemisia* subg. *Tridentatae*, cf. *Pseudognaphalium* and *Eriodictyon* lacked sufficient flower and fruit material and leaf characteristics for proper species identification. The Asteraceae family was best represented with at least six species, of which at least five in the *Artemisia* genus (*A. californica*, *A. ludoviciana, A. tridentata,* and *A. vulgaris*), one or two cf. *Pseudognaphalium* species, and *Matricaria chamomilla*, followed by Lamiaceae with four *Salvia* species (*S. apiana, S. fruticosa, S. officinalis,* and *S. rosmarinus*). Most species that we found in the smudge sticks have their natural distribution range in the United States and were bought from North American wholesalers. *Bursera graveolens* was the only solely woody stick that we found, and has a Middle to South American distribution range (Becerra and Yetman 2024). One vendor made the smudge sticks herself with wild or cultivated plant material collected around her town, these were *Artemisia vulgaris*, *Matricaria chamomilla*, *Hypericum perforatum, Salvia officinalis*, *Rosa* sp., and *Verbena bonariensis*. One couple grew *Artemisia ludoviciana*, which has its natural distribution in North America, on a small commercial scale and made smudge sticks out of this species to sell to an online shop. Of the collected smudge sticks, ten were made of or included leaves and stalks of white sage (*Salvia apiana*), which has its natural range in California. Fourteen smudge sticks were mixed bundles of two or more species, sometimes they had different geographic origins and cultural traditions, such as *S. apiana* (US) combined with *Eucalyptus* sp. leaves, which has an Australian origin but is cultivated world-wide; and *S. apiana* with colored rose petals (*Rosa* sp.) referring to chakras from Hinduism and Buddhism. We were unable to identify one plant specimen because it was painted and too few morphological characters could be recognized (dark blue in Figure 2c).

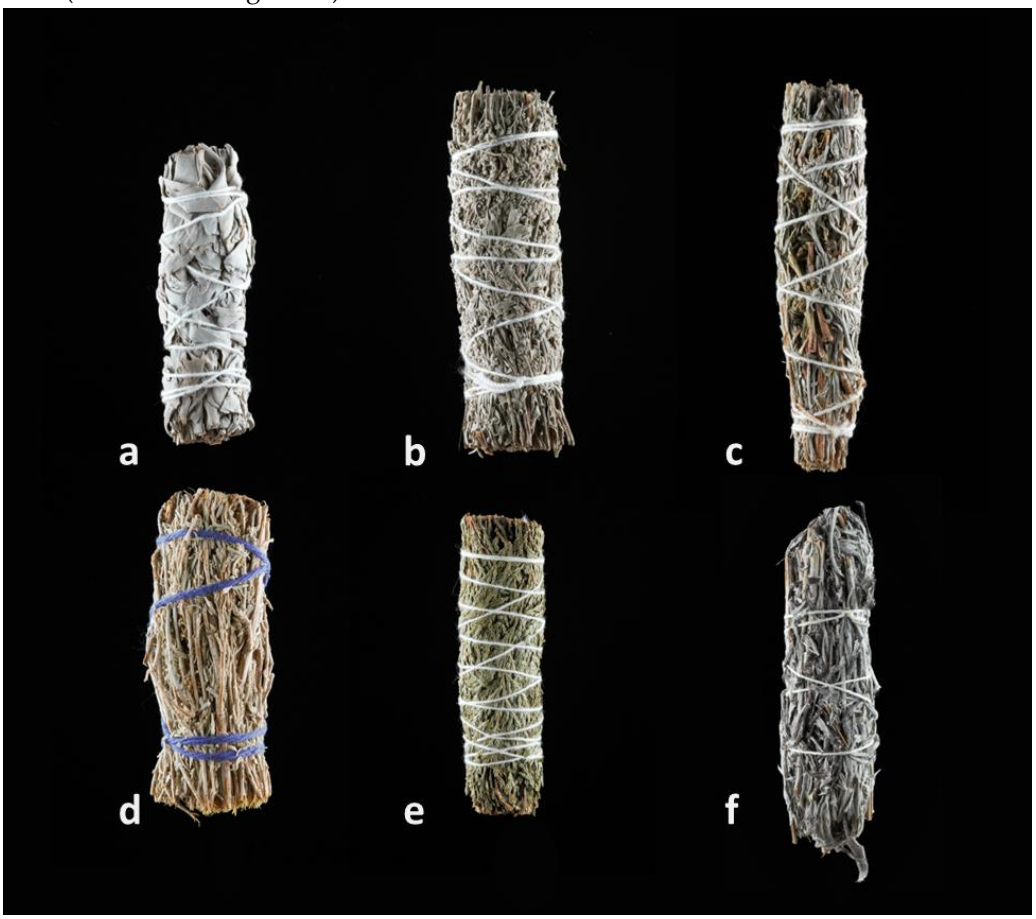

Figure 1. Collage of collected smudge sticks from (online) shops. a) *Salvia apiana*; b) *Artemisia tridentata*; c) *Artemisia ludoviciana* and *Calocedrus decurrens*; d) *Artemisia tridentata* ; e) *Thuja* sp.; f) *Artemisia ludoviciana*. Pictures by I. Pombo Geertsma and C. van der Linden.

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Figure 2. Collage of partly colored smudge sticks composed of *Salvia apiana* mixed with other species, and smudge sticks composed of only European species. a) *Salvia fruticosa;* b) *Salvia apiana*, *Phalaris* sp., and *Anacardiaceae* sp.; c) *Salvia apiana*, *Eucalyptus* sp., cf. *Pseudognaphalium* sp., and one unidentified plant. d) *Salvia apiana* with *Rosa* sp. petals; e) *Eriodictyon* sp., *Limonium sinuatum,* and cf. *Pseudognaphalium* sp.; f) *Salvia officinalis* and *Salvia rosmarinus*. **Pictures by I.** Pombo Geertsma and C. van der Linden.

Table 1. Species found in our collected smudge sticks from online and physical shops in the Netherlands.

Family	Species / Collection	Names product label [1]	Species distribution range
Anacardiaceae	indet. (**not** *Pistacia lentiscus*) / IPG317	Pistacia lentiscus	-
Asteraceae	*Artemisia* subg. Tridentatae / BZ1, BZ3, BZ15, IPG315	Mountain sage (BZ1, BZ3), wee sage (BZ3), shasta sage (IPG315), blue sage (IPG315) (English),	Western US

 doi:10.20944/preprints202409.0772.v1

		blauwe salie (BZ15), woestijnsalie (BZ3) (Dutch)	
Asteraceae	*Artemisia californica* Less. / BZ13	Desert sage (English)	California (US) and Baja California (Mexico)
Asteraceae	*Artemisia ludoviciana* Nutt. / BZ5, IPG183	Dakota witte salie (Dutch)	Canada, US, and Mexico
Asteraceae	*Artemisia tridentata* Nutt. / BZ10	Blue sage, big sagebrush (English)	Western Canada to Baja California (Mexico)
Asteraceae	*Artemisia vulgaris* L. / BZ17, BZ19, BZ22, BZ25	Bijvoet, zwarte salie (Dutch), Mugwort (English)	Temperate Eurasia, introduced in Canada and US
Asteraceae	*Matricaria chamomilla* L. / BZ24	Kamille (Dutch)	Eurasia, introduced in Canada and US
Asteraceae	cf. *Pseudognaphalium* sp. 1 (including colored specimens) / IPG318, IPG319, IPG320, IPG314	Verbascum	-
Asteraceae	cf. *Pseudognaphalium* sp. 2 / IPG313, IPG331	Groene salie (Dutch)	-
Boraginaceae	*Eriodictyon californicum* (Hook. & Arn.) Decne. or *Eriodictyon trichocalyx* / BZ9	Yerba Santa (Spanish)	Western US (Oregon and California)
Boraginaceae	*Eriodictyon angustifolium* or *Eriodictyon altissimum* / BZ16	Yerba Santa (Spanish)	Western US
Boraginaceae	*Eriodictyon* sp. / IPG319	Yerba Santa (Spanish)	Western US
Burseraceae	*Bursera graveolens* Triana & Planch / IPG316	Palo Santo (Spanish), holy wood (English)	Mexico to northwestern Venezuela and Peru
Cupressaceae	*Calocedrus decurrens* (Torr.) Florin / BZ2	Pine (Dutch)	Western US (Oregon and California) and Mexico (Baja California)
Cupressaceae	*Thuja* sp. / BZ6	Cedar sage (English)	US and Canada, introduced in Europe
Hypericaceae	*Hypericum perforatum* L. / BZ18	Sint-Janskruid (Dutch)	Eurasia, introduced in US and Canada
Lamiaceae	*Lavandula dentata* L. / SS2024-5	Lavendel (Dutch)	Western Mediterranean region and north-eastern Africa
Lamiaceae	*Salvia apiana* Jeps. / BZ4, BZ8, BZ11, BZ12, BZ14, IPG318, IPG317, IPG320, IPG324, IPG321	Witte salie, Californische witte salie, salie (Dutch), White sage, White Californian Sage (English), Dragon's blood salie (name given to a red colored smudge stick; English and Dutch)	Western US (California) and northwestern Mexico

 doi:10.20944/preprints202409.0772.v1

Lamiaceae	*Salvia fruticosa* Mill. / IPG323	Griekse salie (Dutch), Greek ceremonial sage (English)	Eastern Mediterranean region
Lamiaceae	*Salvia officinalis* L. / BZ20, BZ23, BZ26, IPG322	Salie (Dutch), smudge salie (both)	Europe and cultivated worldwide
Lamiaceae	*Salvia rosmarinus* Schleid. / IPG322	Rozemarijn (Dutch)	Europe and cultivated worldwide
Myrtaceae	*Eucalyptus* sp. (colored (claiming with red dracaena dye) and uncolored) / IPG325, IPG318	Eucalyptus & Dragon's blood (English)	Australia and cultivated worldwide
Plumbaginaceae	*Limonium sinuatum* Mill. / IPG320, IPG319	Sinuata, Statice sinuata (Latin/Scientific name)	Mediterranean region, introduced in western US and Mexico
Poaceae	indet. / BZ7	Sweet grass (English)	-
Poaceae	*Phalaris* sp. / IPG317	Phalaris (Latin/Scientific name)	-
Poaceae	indet. (painted blue) / IPG320	- [2]	-
Rosaceae	*Rosa* sp. / BZ21	Rozen (Dutch)	Northern Hemisphere and cultivated
Rosaceae	*Rosa* sp. (colored petals) / IPG324	Chakra blaadjes (Dutch)	Northern Hemisphere and cultivated
Verbenaceae	*Verbena bonariensis* L. / BZ27	IJzerhart [sic] (Dutch)	South America and cultivated elsewhere
Indet.	indet. (painted blue) / IPG318	- [2]	-

[1] Vernacular names (local and "scientific") used in trade which do not always reflect official vernacular names as used in floras. [2] Species is not listed on store label.

We found smudge sticks or loose white sage leaves added to "cleansing kits" (Figure 3). Some vendors only included Dutch, wild or cultivated, plant species in their smudge sticks, such as *Artemisia vulgaris*, *Salvia officinalis*, and *Matricaria chamomilla*. One significantly larger smudge stick bought in 2023 contained *Salvia fruticosa* (Figure 2a) and was sold as "Greek Ceremonial Sage". The picture on the packaging placed it on an abalone shell that is normally associated with *Salvia apiana*. The Dutch text on the box was translated as: "*This wild-picked sage from the mountains of Greece has traditionally been used to purify and smudge spaces. In contrast to the North American variant, this sage is much softer. The scent is fresh, feminine, and with a hint of lemon. Partly due to the slow drying process in the Greek sun, the scent and strength of this sage is exceptional.*"

One of our collected smudge sticks contained a woody stick that was incorrectly labeled as *Pistacia lentiscus* (Figure 2b). Although we did find out that this identification was incorrect we were unable to get further than the family level (Anacardiaceae) due to the challenge in finding out where the species originated from, as wholesalers did not respond, answered that they could not disclose that information, or simply said that they did not know.

 doi:10.20944/preprints202409.0772.v1

Figure 3. Energy cleansing packages on sale in a shop in Utrecht, March 2023. To the left a package is sold combining a white sage smudge stick with an iron pan, and to the right an energy cleansing kit combining *white sage* with *palo santo*, Florida water, colorful gemstones ("chakra stones"), an energy card and an instructions booklet. Picture by I. Pombo Geertsma.

2.2. Species and Uses Mentioned in Interviews and Questionnaires

Only two species associated with smudge sticks were mentioned by all four interviewees who were active in the herbal industry: *bijvoet* (*Artemisia vulgaris*) and *lavendel* (can refer to several cultivated *Lavandula* species). And both (*A. vulgaris* and *L. dentata*) were found in bought smudge sticks. The reasons for smudging these species were diverse and differed among the interviewees. Reasons for burning *A. vulgaris* included: to prepare for a workshop, it is easily found, the smell is nice, to gain creative thoughts, to bring a good "vibe" into the house, to cleanse, against angry spirits, and for improving the atmosphere. Reasons for burning *Lavandula* were to cleanse, its calming properties, for love rituals, to protect children, its nice smell, and its protective and cleansing ability 'on another level' compared to other smudge sticks.

In the 33 questionnaires at the witches' fair, 22 people mentioned the use of sage ("*salie*", likely *Salvia* spp.), out of which three people specifically wrote white sage ("*witte salie*" presumably *S. apiana,* but they could also mean *S. officinalis*). White sage and sage were most often (17 people) used for purification (sometimes of the house) while two people mentioned protection. Others did not clarify its use or wrote smoking, disinfecting, cooking, ritual, and spiritual as uses for (white) sage. Two other species were also mentioned specifically for ritual incense: *Artemisia vulgaris* (*bijvoet*) and *engelwortel* (most likely *Angelica archangelica* L. or possibly *A. sylvestris* L.).

2.3. Reasons for White Sage Preference

During our semi-structured interviews, when North American plant species were mentioned, we specifically asked why North American species were preferred over species easily available in the wild in the Netherlands. The following explanations were given: people don't know that you can use native plants for the same purposes; exotic plants work better; native [Dutch] species are boring; white sage is more easily obtainable than native Dutch plants; white sage works better (than native Dutch plants); people don't even know where the plants are from; people don't know the difference between native and exotic plants; it's marketing; white sage smells better; people forgot traditional species; people don't know that there is a difference between exotic and native species.

Some answers revealed knowledge of the Native American origin of white sage: because it is an American tradition, so you should use white sage; there is an ideal image of the Native North American peoples and to come closer to this ideal people incorporate some of their cultural elements

 doi:10.20944/preprints202409.0772.v1

into their own culture; it is from Native Americans, so it should be amazing; it is not a Dutch tradition (at least, not to our knowledge), so no Dutch species are used for this; smudging has to be done with white sage.

3. Discussion

3.1. Sustainability of Smudge Sticks

Our results show that multiple species are used in smudge sticks, of which a considerable portion originate from the US, specifically western US, *Salvia apiana* being the most prevalent one in shops. Unlike the other species that we identified, *S. apiana* was encountered in different forms (sticks, loose leaves, and "torches") and in mixtures with other species. In the wild, it is found in North America in the same ecosystems as *Artemisia californica*, also found in our smudge sticks (Cleland et al. 2016). These types of vegetation, coastal sage scrub and chaparral, are known to be threatened by anthropogenic activities such as urban construction and the establishment of agricultural fields (Cleland et al. 2016). Other taxa that we collected, such as the difficult to identify *Artemisia* subg. *Tridentatae*, cf. *Pseudognaphalium*, and *Eriodictyon* species, are perhaps found in the wild in the same areas and possibly collected at the same time as *Salvia apiana*.

Although previous research has exposed that the (commercial) demand for ritual plants may lead to taboos and indigenous nature conservation strategies (Geng et al. 2017, Quiroz and Van Andel 2015), in the case of white sage there are signals that it is being overharvested in the wild to supply its increased demand (California Native Plant Society n.d., Cannon et al. 2022, De Greef 2020, https://www.gabrieleno-nsn.us/whitesage, McFarlan Miller 2023, Timbrook 2022,). These news articles have drawn attention to a possible decline in wild white sage populations, negatively affecting both the plant species population and the peoples that depend on the species for ceremonial purposes. It is unknown whether the other North American species found in smudge sticks and the *Bursera graveolens* wooden sticks that probably originate from Middle and/or South America, suffer due to a similar growing commercial demand for ritual plants (Becerra and Yetman 2024). Although no ecological research has been done on the effects of commercial wild-harvesting of *smudge stick* ingredients on wild plant populations, the popularity of *S. apiana* (and possibly to a lesser extent *Artemisia californica*) might pose an extra risk for local species' populations resilience, adding significant pressures on the availability of this preferred wild plant species.

Some of our interviewees were concerned about the potential overharvesting of the species from their natural wild populations. One of them, a keen gardener, managed to grow a collection of *Salvia apiana* on his balcony. He gathered seeds to grow new ones which he handed for free to anyone wanting their own "sustainable" stash of white sage for personal ritual use. Furthermore, to cater to the demand for locally harvested smudge stick plants, *Artemisia ludoviciana* is grown commercially on a small scale in the Netherlands and sold to a smudge stick vendor. One vendor stated awareness of the potential over- and illegal harvesting of *white sage* and *palo santo* although still chose to sell it due to its demand by customers. Other exotic smudge stick species (e.g., *Eriodictyon* sp., *Artemisia tridentata,* and *A. ludoviciana*) have a wider distribution range (Table 1), are probably in less demand, and there are no signs of a potential decline in species populations due to overharvesting.

The smudge sticks themselves are also often mixes of plants from all over the world. For example, palo santo (Middle and South America) combined with white sage; *Eucalyptus* (Australia) combined with white sage, palo santo combined with an abalone shell, or white sage combined with colored rose petals probably representing the chakra's (a concept originating from Hinduism and Buddhism). Such combinations seem to reflect an uncritical appropriation of traditions from all over the world (see *Preference for North American species in smudge sticks and New Age* for further discussion). Also, these species may indicate a declining supply or increasing price of *Salvia apiana* on the world market. This might also be the reason behind the commercial presence of Greek ceremonial sage (*Salvia fruticosa*), which we first noticed in shops in the beginning of 2023.

Unfortunately we were unable to identify a number of plant fragments to species level. This was especially the case for *Artemisia* species in the subgenus *Tridentatae* and species in the genus

 doi:10.20944/preprints202409.0772.v1

Eriodictyon. Our specimens were often highly fragmented and lacked morphological characteristics. For a full assessment of species commercialized for smudge sticks and the sustainability issues these species may face, we suggest collecting plant specimens together with the smudge stick plant gatherers themselves in the US.

3.2. Non-American Smudge Stick Ingredients

A native Dutch plant that came up during the in-depth interviews and the questionnaires and is commercialized to a small extent is *Artemisia vulgaris*, clearly the preferred native Dutch herb for smudging. Perhaps this preference stems from the fact that it was sometimes labeled as "black sage" (not to be confused with *Salvia mellifera*), linking it to white sage (*Salvia apiana*), and in this way associating it with smudging. Commonly known in Dutch as *bijvoet*, *A. vulgaris* is a widespread and very common weed in Dutch pioneer vegetation, and easily identifiable. It was historically used for smudging to protect against evil and lightning strikes in the southern parts of the Netherlands (Uittien 1935). However, similar uses are known for many other native Dutch plants that are likewise abundant and easily recognizable, such as *boerenwormkruid* (*Tanacetum vulgare*, Uittien 1935), but do not appear in smudge sticks. Possibly, the custom of burning *A. vulgaris* entered the New Age movements via moxa therapy, a type of acupuncture where this species is burned. Moxa therapy is part of the medicinal corpus of Traditional Chinese Herbal Medicine and is also performed in the Netherlands (Kho 1987, Togo 2003). However, *A. vulgaris* for smudging was only found in the form of dried plant bundles, not as moxa sticks or moxa powder, although these may also be used by New Age practitioners.

Another noteworthy example of a non-American ingredient is *Salvia fruticosa*. Smudge sticks composed of this species are marketed as the feminine variant of the white sage smudge stick. *S. fruticosa* is a Mediterranean lowland species, yet it is advertised as originating "from the mountains of Greece", displaying a careless attitude by the wholesalers towards a correct description of the species in question. Moreover, the label claims that this sage "has traditionally been used to purify and smudge spaces". In the eastern Mediterranean, *S. fruticosa* is known as an ingredient in (medicinal) teas and for the production of essential oils (Gürdal and Kültür 2012, Stefanaki and van Andel 2021), but we did not find records of its use in burning rituals, making it plausible that this was made up to diversify the market of smudge sticks. Although smell is the most important indicator for selecting incense species (Staub et al. 2011), in this case *S. fruticosa* may have also been chosen to substitute *S. apiana* due to morphological resemblance, as both species are covered by dense white indumentum, a common adaptation of plants growing in Mediterranean-type habitats.

3.3. Forgotten Knowledge on Native Plants

As knowledge about common species in industrialized countries like the Netherlands is relatively low in laypeople (Hooykaas et al. 2019, Pilgrim et al. 2007), so is traditional knowledge associated with these species (Aswani et al. 2018). Thus, consumers tend to turn towards (web)shops believing that they have done the correct species selection for them and provide them with the "knowledge" of their use. This was confirmed by one of our herbalist interviewees, who answered that "people forgot traditional species" and "it is not a Dutch tradition to burn plants" (as incense) to the question why people prefer exotic plant species.

Interestingly, in the southern Netherlands similar rituals exist in which plants are burned for protection. There, wild and cultivated plants are picked each year and formed into bouquets, blessed in the church on special Roman Catholic dates, dried and kept to burn for protection against evil and thunder if needed. This custom was more widespread across Europe in the past (Uittien 1935) and has been extensively described for Poland (Łukasz 2011a, 2011b). Remarkably few people know about this ritual in the rest of the Netherlands, but two of our interviewees (both herbal experts) were aware of it. Its connection to the Catholic church might be a throw-off, assuming that most New Age and Neopagan adherents have more secular backgrounds, but according to Jespers (2007) people in the folk religion domain that were influenced by New Age are often also Catholic, so there may have

 doi:10.20944/preprints202409.0772.v1

been some influence of these blessed herbal bouquets on the smudge stick species and their popularity. This would need further investigation.

3.4. Preference for North American Species in Smudge Sticks and New Age

From our interviews and market survey on smudge sticks, we noticed an interplay between the perceived loss of traditional knowledge associated with Dutch plant species (see section above), romanticized ideas about Native Americans, and the wide availability of smudge sticks in (online) shops. The supply of products in New Age shops seems to drive people's choice of ritual plants alongside online blogs, and social media posts, affecting peoples' prior knowledge on types of smudge sticks. This is illustrated in remarks such as "it's marketing" and the fact that hardly any interviewee reported going out to search for potentially useful plants in nature. Smudge sticks were probably introduced through the commercialization of the New Age movement, although none of the interviewees remembered when smudge sticks exactly started appearing on the Dutch market.

Ideas about Native Americans were visible in some participants' answers like "North American plants work better than native ones." The admiration of the natural and Indigenous world is characteristic of New Age and related movements (Aldred 2000, Mulcock 2001, Waldron and Newton 2012). This does not only apply to North American Indigenous peoples, but also, for example, Indigenous South African peoples. Although we did not find this specific smudge stick in the Netherlands, in South Africa a native *Helichrysum* sp. is commercialized for smudging (marketed as "South African Sage Smudge Stick") and labeled to be useful for cleansing, protection, and to connect with "your spirit, guides, and angels" (https://www.michakra.co.za/products/imphepo-smudge-stick, accessed 31 July 2024). Several species in this genus were traditionally used as incense to connect with ancestors, for protection, to drive away sickness, and as medicine (Lourens et al. 2008). This idealization has its roots in Romanticism, an 18th-19th century philosophical, literary, and art movement that idealized the natural and Indigenous world and had a huge impact on current Western thought and significantly influenced New Age and affiliated movements. Although New Age has its origins in Western society, elements from other cultures are transformed and squeezed into its framework (Hanegraaff 2007). The movement developed from the 1950s onwards, and from the 1980s it started becoming commercialized (Hanegraaff 2007). This commercialization incorporated and fused elements and symbols from countless religions or world-view systems, such as yoga, ayurveda, Tibetan Buddhism, and various Aboriginal Australian (Muir 2013) and Native North-American (Miskimmin 1996) ones. It seems to be this commodification of spirituality that turns out to be a strong driver for people to buy certain ritual objects. Just as in New Age, Neopaganistic religions, such as Wicca and contemporary witchcraft that also formed and expanded in the 20th century, are known to tap into the capitalist mindset of Europeans and Euro-Americans, where several objects and artefacts are sold to answer to the demand for spirituality (Cichon 2021).

On the other hand, interviewees also mentioned that white sage smells better, so a preference for white sage could be caused by its volatile aromatic compounds, giving it a biological interpretation. The chemical composition of essential oils present in *Salvia* species is, among other factors, influenced by abiotic variables such as temperature and precipitation (Figueiredo et al. 2008, Karalija et al. 2022). This might be an additional driver for people in the Netherlands, where the weather is generally cooler and wetter than in Mediterranean and Californian regions, to avoid the native flora and look for commercialized species coming from warmer and dryer conditions for its use in smudging.

The appropriation of non-Western cultural elements is often seen in a negative light, especially when these tendencies are commercialized and cause adverse impacts on the culture these elements are originally associated with (Aldred 2000). Commercialized smudge sticks containing North American species are not always labeled as Native American ritual ingredients and Dutch consumers seem generally unaware of the potential negative ecological and social impact on Native American livelihoods. The availability of smudge sticks in the Netherlands may also have inspired people to transform and personalize smudge sticks by creating them with native or cultivated plants, in a sense reminding the Dutch population that plant smoke can be used for cleansing and protection (see

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section *Forgotten knowledge on native plants*). However, more scientific research is needed to study the potential impacts of commercial harvesting, and, if necessary, to provide a guideline for harvest control and conservation plans.

4. Materials and Methods

4.1. Collecting Specimens

We collected smudge sticks, loose leaves for burning (species that were also seen in smudge sticks), and woody material sold to use as incense between September and November 2021, in March 2023 and in May-June 2024 from online and physical shops. Online shops directed to the Dutch market were found through Google queries using the keywords: "smudge sticks" combined with the Dutch terms for ordering ("bestellen") and buying ("kopen"). We visited physical New Age shops in the cities Amsterdam, Utrecht, and Wageningen and attempted to obtain as many different plant species as possible.

Species present in smudge sticks were identified using the Naturalis herbarium and online scans from Kew Data Portal (https://data.kew.org/). Furthermore, for identifying North American species in the Asteraceae family we consulted the Flora of North America (http://floranorthamerica.org), to identify species in the *Salvia* genus and *Eriodictyon* we used Averett (2012), Cain et al. (2010), Hannan (2021), and McMinn (1951). For the identification of a possibly horticultural *Lavandula* we consulted KeyBase (https://keybase.rbg.vic.gov.au/keys/show/7633, accessed 6 August 2024). Woody material was identified by a wood anatomy expert at Naturalis. We checked the current scientific names by consulting The World Flora Online (https://www.worldfloraonline.org/). To aid with plant identification, wholesalers were contacted and asked where certain plant material originated from. Plant species' distributions were found in https://plants.usda.gov and in https://powo.science.kew.org (both accessed 6 June 2024).

Voucher specimens were deposited at the herbarium of Naturalis Biodiversity Center (L) in Leiden, the Netherlands. When species could be identified without disassembling the smudge sticks, we deposited the intact sticks in the Economic Botany collection of the same institute. For the figures we photographed smudge sticks in front of a black velvet canvas and created a collage using PowerPoint.

4.2. Interviews

Semi-structured interviews were held in the same fieldwork periods as above with 11 persons, of which four vendors of smudge sticks, five persons working in the herbal industry (e.g., phytotherapists and organizers of herbal medicine workshops) and two distributors of self-made smudge sticks. Participants were recruited through the first author's contacts, further snowball sampling and Google searches. Most informants were interviewed by phone, while two were visited. After introducing our research and obtaining permission for using their interview data in our research, we asked them the following questions: What plant species are included in smudge sticks? What is the use of each species in a smudge stick? Do you or people that you know prefer white sage instead of native Dutch species (e.g., *Artemisia vulgaris* L.) and why? Interviews were conducted in Dutch, following the ethical guidelines of the International Society for Ethnobiology (ISE 2006).

Apart from these in-depth interviews, we used interview data from 33 questionnaires that were distributed and filled in during the witches fair "Hexfest" in Oss, the Netherlands, in February 2020, where we asked people to freelist plants that they used for medicinal, ritual, and/or religious purposes. The data collected on smudge sticks were used in our analysis. This paper will be shared among the interviewees that expressed the wish to receive it after publication.

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5. Conclusions

To know what the possible impact is of this use of smudge sticks on local plant species' populations, in particular *Salvia apiana*, an assessment of the species' population status and trends is recommended, as well as an inventory of the commercial supply and demand of their herbal products. Also, considering that more steps in the chain of smudge stick commercialization are presumably observed in North America, a collaboration between ethnobotanists on both the European and North American continent, could prove fruitful to give further insights into plant conservation necessities regarding smudge stick plant species.

As capitalist-oriented New Age and Neopagan movements, such as Wicca, modern Witchcraft, and others, attain a growing number of followers, it will be fascinating to keep track of their ethnobotanical journey. What drives people in these movements in the choice of ritual plants? And how will plant preferences change over time? These movements are relatively new, but do not stand on their own, as they assimilate and adapt rituals and ceremonies from all over the globe (Hanegraaff 2007, Possamaï 2007), including plants as we have shown. Smudge sticks are only one example of ritualistic commodified objects containing plant material that were assimilated. Resins are another example, but they are challenging to identify, especially when shops are not transparent about the origin of their products. Other plant species, that are not burned, but, for example, rather used as decoration or ingested (e.g., "cacao ceremonies") in New Age and Neopaganistic ceremonies are still open for investigation. Further research might elucidate if people intrinsically associate smells with protective properties, but "forgot" traditional native ritual plants making it possible for the exotic *smudge sticks* to fill this ethnobotanical niche.

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