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Haploporus odorus: A sacred fungus in traditional Native American culture of the northern plains

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Abstract: The Indigenous Peoples of the northern American plains used *Haploporus odorus* to ornament sacred robes, human scalp necklaces and other cultural properties. The fungus was also a component of medicine bundles and used for protection against illness. Numerous collections, some dating to the early 1800s, from the Blackfoot, Blood, Cree and other northern plains tribes indicate this fungus was used widely as a component of sacred objects and as a symbol of spiritual power. The exceedingly fragrant anise-like scent of *H. odorus* sporophores appears to be the reason this fungus was selected and revered. Collection notes and historic photographs provide additional evidence for the importance of this fungus in traditional Native American culture. The significance of this fungus has remained obscure due to misidentification of the fungus as carved cottonwood roots, loss of information on traditional Native American culture over the last century and lack of previous ethnomycological investigation.

Key Words: Indigenous Peoples of North America, ethnobotany, ethnomycology, Plains Indians, Basidiomycota, Aphyllophorales, traditional medicine

INTRODUCTION

Information about how fungi were used by the Indigenous Peoples of North America is extremely limited. Investigators have compiled information on the use of fungi as traditional food and medicine (Arnason et al., 1981; Beardsley, 1941; Burk, 1983; Kuhnlein and Turner, 1991; Turner, 1978; Turner et al., 1983, 1990), but these studies are relatively few considering the abundance of different types of fungi that were available to Indigenous Peoples (Kuhnlein and Turner, 1991). The lack of familiarity of early ethnologists with fungi and the primary focus of their studies on higher plants are likely reasons that information about fungi is lacking in most older works. Contemporary investigations using interviews with tribal elders to obtain new information has also been limited due to the loss of knowledge about traditional uses of mushrooms and other fungi, lack of specific Native American names for fungi, and apprehension in discussing fungi because of possible taboos or supernatural attributes associated with them.

Important sources of information that have not been studied adequately are museum collections that contain sporophores of fungi. These collections accessioned in many different museums represent a wealth of ethnographic information. The recent discovery of carved *Fomitopsis officinalis* (Vill:Fr.) Bond. & Sing. sporophores in the American Museum of Natural History and in other museum collections are examples of how historic collections can provide crucial data on past cultural uses of forest fungi (Blanchette et al., 1992). *Fomitopsis officinalis,* a fungus well known for its medicinal properties, was used for carving spirit figures by shaman of the Pacific northwest in the 19th Century. These objects were considered to have supernatural powers and were used in rituals for curing the sick. After the death of the shaman, these important objects were placed at the head of the grave to guard the site and protect the shaman's spirit. Collectors of ethnographic materials obtained shaman paraphenalia from graves during the late 1800's and accessioned these materials in museum collections. To date, 15 carved sporophores of *F. officinalis* have been found in collections from seven different Natural History Museums in the United States and Canada (Blanchette et al., 1992; Blanchette unpublished data). Other museum collections have revealed different fungi used by other Native American groups. The results presented here provide new ethnological information on the fungus, *Haploporus odorus* (Sommerf.:Fr.) Sing., used for sacred purposes by the Native Peoples of the North American plains. A preliminary report, made before the fungi on these Indian cultural properties were examined, suggested incorrectly they were small *Fomitopsis officinalis* basidiocarps (Blanchette, 1992).

MATERIALS EXAMINED

Museum collections of cultural properties from the North American Plains Indian contain a considerable

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number of basidiocarps (TABLE I). Many individual sporophores were also present that were used for household or general utility such as polypores used for tinder or dyes (data not presented). Most basidiocarps examined were white and had a similar macroscopic appearance (FIGS. 1–6, 13). The fruiting bodies were often carved into smooth, ellipsoidal shapes and frequently had branded lines burned on the surface in various patterns (FIG. 3). Cultural properties, such as sacred robes and scalp necklaces had 1 to 26 basidiocarps attached to the object by leather thongs or string (TABLE I). Basidiocarps in medicine bundles along with hollow bones, sweet grass and other objects were wrapped within hide or cloth. Collection notes accessioned with a few objects indicated the fungus was obtained from willow trees and had a strong aroma. Initial macroscopic observations suggested the fungus was *Trametes suaveolens* L.:Fr. or *Haploporus odorus*. These two fungi have characteristics that closely match the size of basidiocarps in the museum collections. They also occur on decaying *Salix* spp. and produce a fragrant anise-like odor. Although it was not possible to remove samples of sporophore tissue from all of these rare museum objects and religious materials, sections from pore layers were obtained from four different collections and examined microscopically. In addition, sporophores of *H. odorus* from Alberta, Canada and herbarium samples of *Trametes suaveolens* were examined for comparison.

FUNGAL MORPHOLOGY

A unique morphological characteristic of *H. odorus* is the asperulate, dextrinoid basidiospores. Sections examined from the four museum samples revealed basidiospore characteristics indicating they were *H. odorus*. Scanning electron microscopy was used to show the unusual warty appearance of the basidiospores from the museum basidiocarps as well as recently collected sporophores from Alberta (FIGS. 7–10). Macroscopic characteristics of other basidiocarps in the collections that were not sampled or microscopically examined (TABLE I) appeared identical to the fruit bodies of *H. odorus*. One exception, however, was a stoney necklace (AF-3431, Glenbow Museum, Calgary) with 6 basidiocarps of *H. odorus* and one of *Phellinus igniarius* (L.:Fr.)Quél. Identification of basidiocarps on three objects in the Glenbow Museum, Calgary and eight objects in the Smithsonian Institution National Museum of the American Indian (TABLE I) could only be made from information on collection notes and from photographs. These objects could not be examined since they are considered sacred and access is restricted to only certain members of the Native American community.

NATIVE AMERICAN CULTURE

Cultural properties with *Haploporus* basidiocarps include medicine bundles, sacred robes and other religious materials (FIGS. 1–6, 11–13). Medicine bundles are objects contained in wrappings associated with rituals and considered to have special powers (Wissler, 1912). Articles with "spirit powers" or "magically protective" may be kept in this way (Mandelbaum, 1979). Sacred robes are also symbols of spiritual powers and were important in traditional Native American culture and often considered medicine bundles themselves (Raczka, 1992). The frequent use of *H. odorus* basidiocarps on sacred robes and in shaman or other medicine bundles demonstrates the reverence and spiritual uses the Plains Indians attributed to this fungus. Some documentation exists to support the thesis that the fungus had protective powers. Collection notes for necklace AF-360 from the Glenbow Museum (FIG. 1), indicate the string of basidiocarps was "worn by older persons to ward off illness", and collection notes for V-A-176 (currently in the Canadian Museum of Civilization) state the fungus was "burnt to produce a perfumed smoke in case of sickness". A medicinal use is also reported by Hellson (1974) who obtained ethnobotanical information from Blackfoot tribal elders. His informant told of a "*Polyporus*" sp. that was "taken from the mountains (stolen occasionally from the Kooteney Indians) or detached from willows. Then it was scraped with a knife and attached to weasel robes when it could be used in emergency first-aid treatment. It was styptic on wounds and boiled with *Psoralea esculenta* to treat coughs. The infusion of the fungus was taken to stop diarrhea and treat dysentery". Although it is impossible to determine with certainty that the polypore referred to was *H. odorus*, the occurrence on willow, scraped (or carved) nature of the sporophores and placement on robes strongly suggests this tribal elder was describing *H. odorus*.

Many robes were worn historically for protection in battle and often were considered to have been endowed with supernatural power (Raczka, 1992). The uses of *H. odorus* as an object of spiritual power and a styptic treatment for wounds may help explain how this fungus evolved to become a traditional component of sacred war robes and to be included in medicine bundles. The occurrence of *H. odorus* basidiocarps on necklaces with scalp trophies (TABLE I, FIGS. 5 and 6), presumably taken from enemy warriors in battle, suggests an intriguing association where spiritual power and protection could be used to placate the dead persons spirits. It is also likely that both the scalp and the sacred fungus were trophies obtained from the slain warrior.

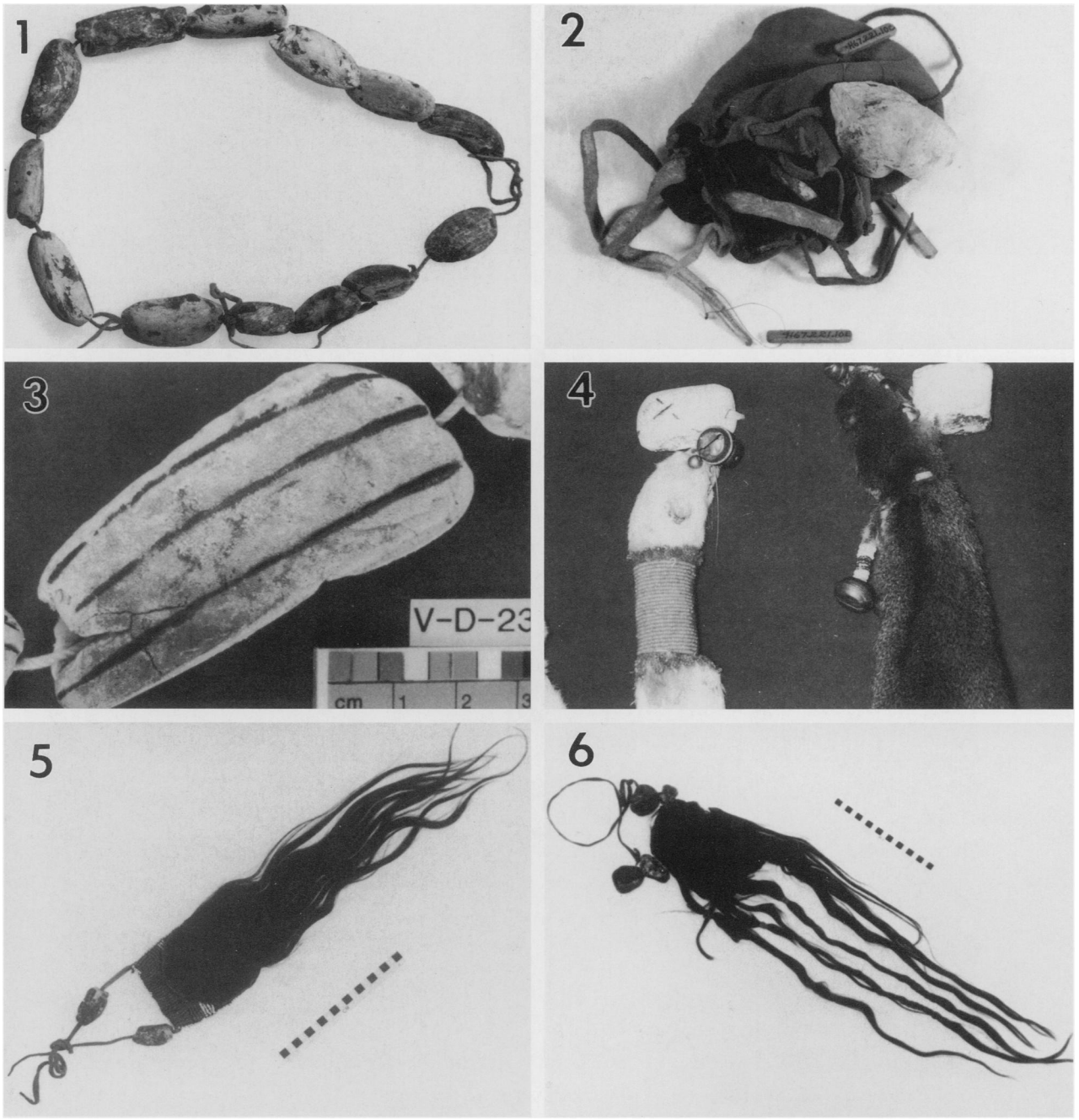
TABLE I. Sporophores from cultural properties of northern Plains Indians in museum collections identified as *Haploporus odorus*

Museum collection	Description	Accession number	Number of sporophores
Alberta Provincial Museum, Edmonton, Alberta, Canada	Sacred ceremonial robe	H66.25.1[a]	5
	Human scalp necklace	H66.181.17	2
	Necklaces or robe attachments	H66.340.5	4
		H62.2.299	21
		H65.270.2	2
		H68.2.87	1
	Medicine bundles		
	Tipi bundle	H89.220.923d	1
	Shaman bundle	H89.220.446	1
	Personal bundle	H66.393.2	1
	Personal bundle	H70.35.1	1
	Shaman bundle	H66.86.6	1
	Shaman bundle	H67.221.7b	1
	Fungus in pouch, or on leather thongs, etc.	H67.321.3	1
		H68.66.3	1
		H66.256.2	1
		H65.96.2	1
		H65.98.2[a]	1
		H66.256.1	1
		H65.224.8[a]	1
		H65.131.10	1
		H67.116.4	1
		H65.227.9[a]	1
	Moss bag for carrying baby	H71.25.1a	2
Canadian Museum of Civilization, Ottawa, Ontario, Canada	Necklaces or robe attachments	V-D-48	16
		V-D-224	2
		V-D-23	6
		V-D-167	7
	Individual sporophores	V-A-225	1
		V-A-176	1
		V-D-268	1
Glenbow Museum, Calgary, Alberta, Canada	Human scalp necklaces	AF-3700	4
		AF-3706	2
		AF-2249[b]	2
		AF-3666[b]	1
	Necklaces or robe attachments	AF-360	13
		AF-3431	6
		AF-2519	20
		RB-8.85	26
		AF-460	1
	Bundle	AF-373[b]	1
	Spear	AF-3788b	1
National Museum of the American Indian, Smithsonian Institution	Necklaces	3-2918[b]	—[c]
		13-2334[b]	—
		13-2398	13
		14-9490[b]	—
		14-9544[b]	—
		15-1685[b]	—
	Other sacred objects	3-2593[b]	—
		3-2594[b]	26
		3-2595[b]	1

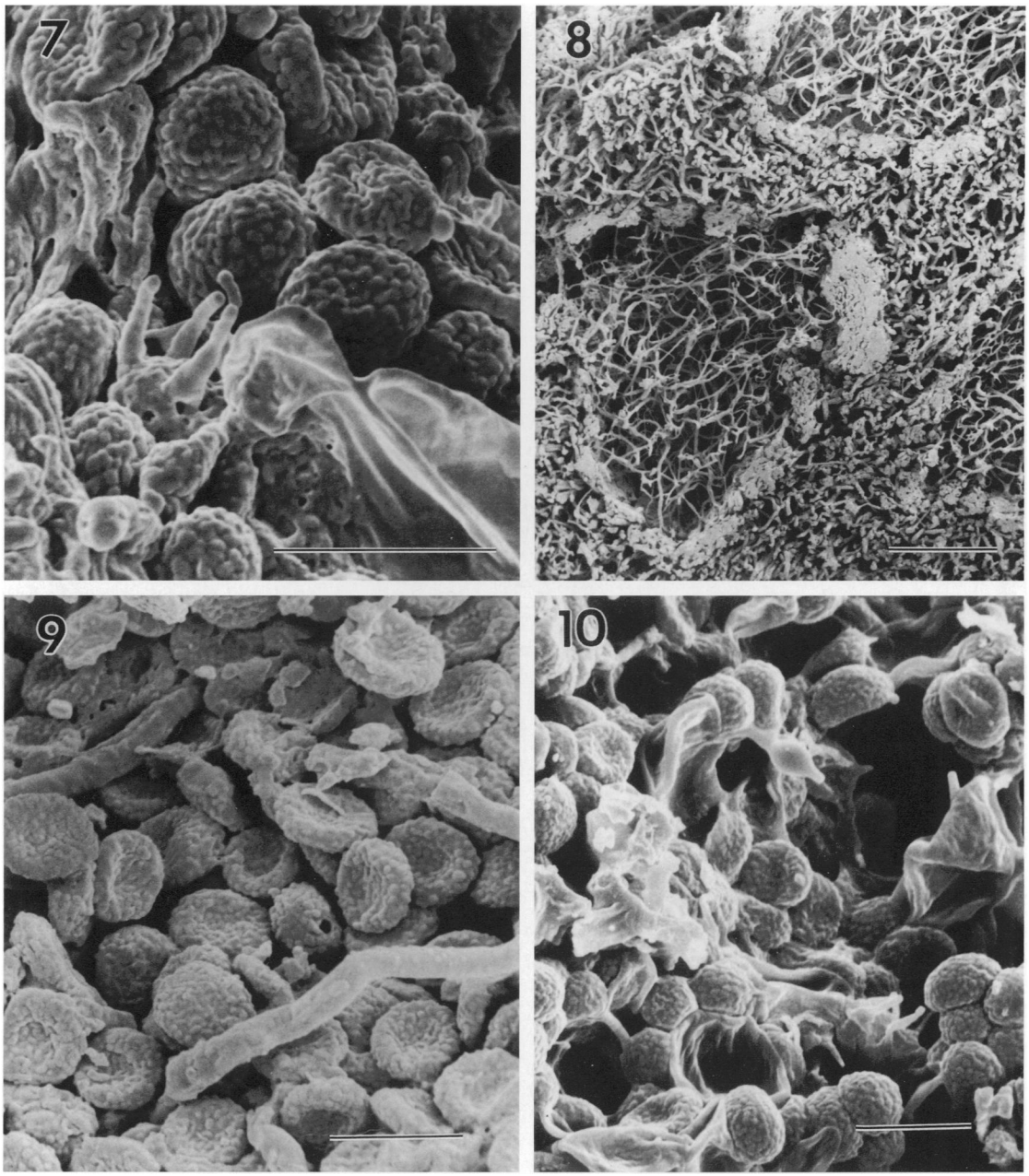
[a] Sporophore tissue was taken for microscopic observations.

[b] Identification was made from photographs or collection notes. These objects are held in the museum's sacred collection and could not be examined.

[c] — Number of sporophores is not known since these sacred objects could not be examined.

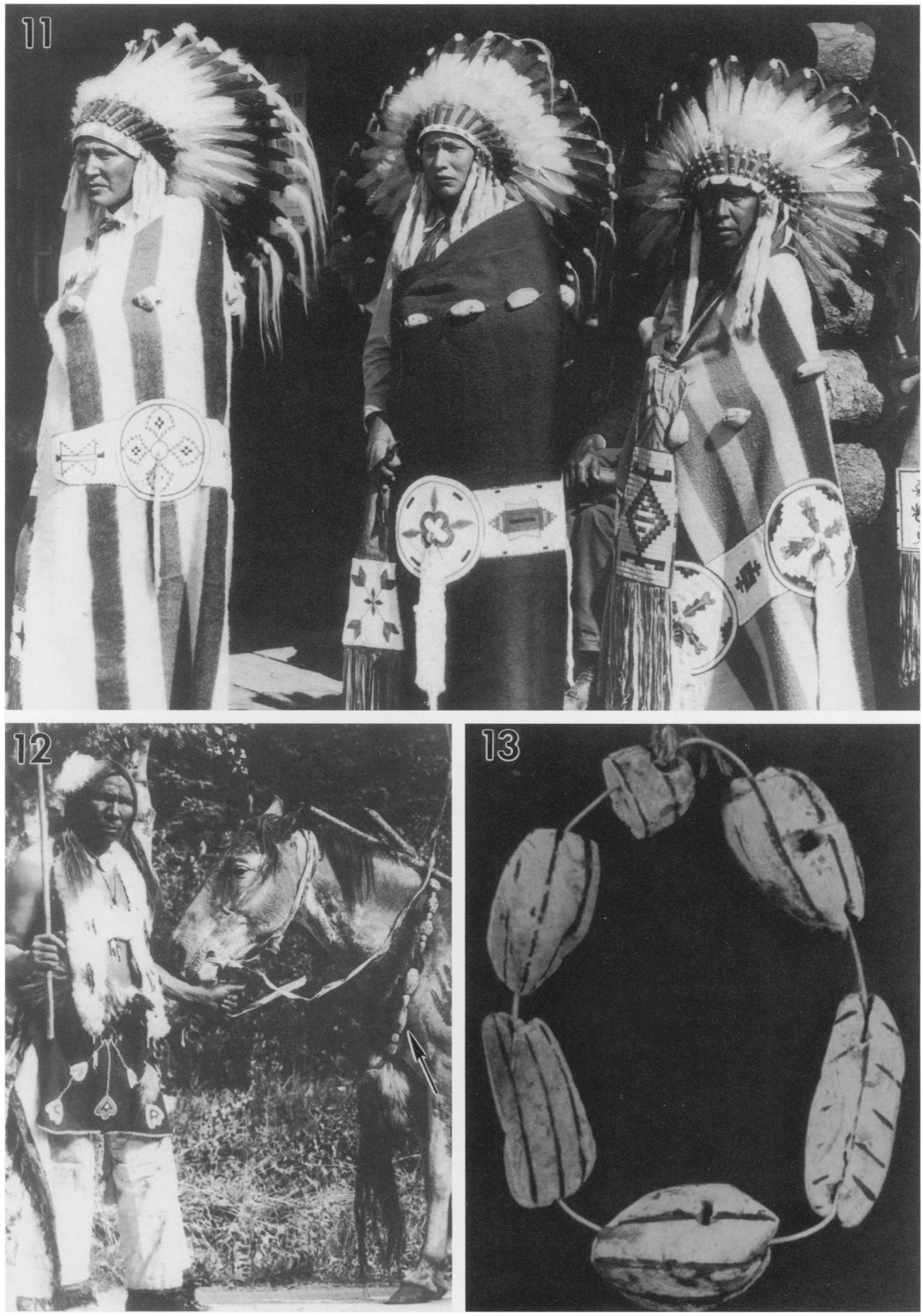


FIGS. 1–6. Cultural properties of North American Plains Indians with basidiocarps of *Haploporus odorus*. 1. A necklace of 13 basidiocarps strung on a leather thong (Blackfoot, AF-360, Glenbow Museum, Calgary). 2. Shaman bundle with basidiocarp of *H. odorus* and other shaman paraphernalia (Peigan, H67.221.10c, Alberta Provincial Museum, Edmonton). 3. Basidiocarp of *H. odorus* from a sacred robe with branded lines on surface of pore layer (Sarcee, V-D-23, Canadian Museum of Civilization, Ottawa). 4. Two basidiocarps attached to a sacred weasel robe (previously thought to be carved from cottonwood roots). Samples from these basidiocarps were used for microscopic observations (Blackfoot, H66.25.1, Alberta Provincial Museum, Edmonton). 5. Human scalp necklace with 2 basidiocarps of *H. odorus* attached on a skin thong (Blackfoot, AF-3706, Glenbow Museum, Calgary). 6. Human scalp necklace with 4 basidiocarps attached on skin thong (Blackfoot, AF-3700, Glenbow Museum, Calgary).



FIGS. 7–10. Scanning electron micrographs of basidiospores from a recently collected basidiocarp of *Haploporus odorus* and from basidiocarps attached to museum cultural properties. 7. Basidiospores of *H. odorus* collected from a basidiocarp growing on *Salix* in Alberta, Canada showing a distinctive warty surface morphology. 8. Section of a "white bead" from a sacred robe in the Alberta Provincial Museum, Edmonton (H66.25.1) with context consisting of fungal mycelia. 9. Basidiospores from section of basidiocarp shown in FIG. 8 with distinct characteristics of *H. odorus*. 10. Section from basidiocarp in the Alberta Provincial Museum, Object #H65.98.2, showing basidiospores with morphological characteristics of *H. odorus*. Bar = 5 μm in FIGS. 7, 9, 10 and 50 μm in FIG. 8.

The identity of "white beads" on Indian cultural properties as basidiocarps of a fungus appears to have been made by Clark Wissler, an early investigator who studied the material culture of the Plains Indians (Wissler, 1910). He reported, "A peculiar necklace worn by some of the men is formed of fungus, prized because of its delicate odor. It consists of various shaped pieces about the size of tennis balls, strung at intervals on a thong". Another reference found in the early literature that may refer to *H. odorus* mentions a necklace that was collected by Isaac Cowie from the Plains Cree for the 1892 World's Columbian Exposition (VanStone, 1991). It is described as a woman's necklace consisting of parallel pairs of willowber-



FIGS. 11–13. Historic photographs showing *H. odorus* basidiocarps and photograph of white beads from a sacred robe. 11. Large white beads, actually basidiocarps of *Haploporus odorus,* are attached to the top of three ceremonial robes worn by 3 chiefs of the Northern Plains (enlarged photograph from negative P61, Pollard Collection, Provincial Archives of Alberta, Edmonton. Approximately, 1912). 12. Necklace of what appears to be basidiocarps of *H. odorus* around the neck of a horse (enlarged photograph from negative P56, Pollard Collection, Provincial Archives of Alberta, Edmonton. Early 20th Century).

ry kernals strung on sinew separated by carved balls of willow fungus approximately 2 cm in diameter (Field Museum of Natural History, Chicago Accession No. 15068). This necklace is reported by VanStone (1991) to be in very poor condition and has not been examined by the author. Three historic photographs have also been discovered in the Provincial Archives of the Alberta Provincial Museum and the Glenbow Archives, Glenbow Museum that document how the fungus was used. In these early 20th century photographs, the fungus is seen attached to sacred ceremonial robes (FIG. 11 and photo NA3824-25, Glenbow Museum Archives, Calgary not shown) and as a necklace on a horse (FIG. 12). Unfortunately, very limited documentation is available with these photographs.

A recent paper on Plains Indian culture reported the "white beads" on a Blackfoot sacred weasel robe to be "hand carved from the roots of the cottonwood tree" (Raczka, 1992). This robe, dating to the early 1800s, is in the collection of the Alberta Provincial Museum (Accession No. H66.25.1) and was one of the objects selected for sampling in the present study (FIG. 4). Microscopic observations revealed the white beads were fungal sporophores (FIG. 8) containing basidiospores with characteristics unique to *H. odorus* (FIG. 9).

Mistakes were also made by Burk (1983) and Johnston (1969) who assumed that the fungi referred to by Wissler (1910) were puffballs. These papers cited Wissler's publication but erroneously stated that the fungi were puffballs. Burk (1983) states "... some blackfoot men wore necklaces of puffballs about the size of tennis balls and strung together on a thong. Such necklaces were prized because of the delicate odor they gave off." Other reports of how puffballs were used by the Plains Indians also are suspect for incorrect information. Johnston (1969) and Burk (1983) indicate "Indian boys sometimes wore a bandolier of puffballs across the chest ... as a means of warding off respiratory diseases." From the information presented in this paper it is likely that these fungal fruiting bodies were *H. odorus*. Reports of puffballs used as incense to ward off ghosts (Hellson, 1974) or as charms (Burk, 1983) also may not be correct, and could actually be basidiocarps of *H. odorus*.

The widespread use of *H. odorus* by the northern Plains Indians appears due to the fragrant anise-like aroma produced by the basidiocarps. The use of fragrant plants such as sweet grass (*Hierochloe odorata*) and sage (*Salvia* sp.) is well known in traditional Native American culture, and these plants are commonly used for purification rituals and other religious purposes. The strong anise-like odor produced by *H. odorus* would be an easily distinguishable feature for selecting these basidiocarps from those of other polypores. The only other fungus with a somewhat similar macroscopic appearance and odor of anise is *T. suaveolens*, but no evidence for use of this fungus has been found among the collections examined. This may be due to the more distinctive aroma produced by *H. odorus* and common distribution in boreal regions occupied by the northern Plains Indians. Unfortunately, accurate distribution information is not available for *H. odorus*, since it was only first reported from North America in, 1961 and few references have been published since that time (Gilbertson, 1961; Gilbertson and Ryvarden, 1986; Jorgensen, 1961). *Trametes suaveolens*, however, has been reported from many areas of the northern United States and Canada on *Salix* (Gilbertson and Ryvarden, 1987). This wide geographic distribution of *T. suaveolens* suggests that basidiocarps would be readily available to many different Indian Tribes. The reason Native Americans did not utilize *T. suaveolens* is most likely because it has only a faint aroma that is completely lost after drying (Hirt, 1932).

A recent anthropological study of healing ceremonies by a Woods Cree medicine man reported the frequent use of a fungus as a smudge and incense (Young et al., 1989). A sample of the fungus currently used in Cree ceremonies was received by the author from Professor David Young, Department of Anthropology and Centre for the Cross-Cultural Study of Health and Healing, University of Alberta, and identified as a basidiocarp of *H. odorus*. This fungus is considered by the northern Cree to be the most powerful smudge available and is carried in Cree medicine bundles as part of the basic repertoire of ritual paraphernalia (Young, personal communication). It is currently used to purify an area prior to conducting a sacred ceremony or healing ritual and is also used to call helpful spirits or to chase out harmful influences. A Cree healer, Russell Willier, has indicated that smudging with the fungus "opens the door to the spirit world and allows me to see and hear the spirits" (Young, personal communication). Russell Willier inherited his medicine bundle from his great-grandfather, Moostoos, and learned much about the contents of the bundle from his relatives,

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13. A group of white beads originally from a sacred robe and now in the collection of the Canadian Museum of Civilization, Ottawa (Sarcee, V-D-23). All white beads are basidiocarps of *H. odorus* that appear to have been carved into a rounded shape. Line patterns are burned marks on the surface of the sporophores.

other medicine men and tribal elders (Willier, personal communication; Young et al., 1989). The Woods Cree word for *H. odorus* is "Wikmasigan".

This paper identifies *H. odorus* as the fungus currently used by the northern Cree and documents a long history of use by Native Americans. The results presented here should help in the discovery of additional cultural properties with *H. odorus* in other museum collections. It should also lead to new ethnomycological studies so a more complete understanding of the widespread and prominent role *H. odorus* had in Native American culture can be realized.

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