FROM MAGIC TO RESOURCE

© V.B. Kolosova, K.A. Jernigan, O.S. Belichenko

ETHNOBOTANICAL KNOWLEDGE OF AN ESKIMO FAMILY: NAUKAN YUPIK PEOPLE

Keywords: Post-Soviet ethnobotany, ethnomedicine, traditional ecological knowledge, wild edibles, medicinal plants, Chukotka, Naukan Yupik, family knowledge

This article analyzes the Naukan Yupik ethnobotanical knowledge, i.e. the use of plants as food, medicine, household or ritual objects, on the example of one family. Their resettlement from Cape Dezhnev to other settlements led to significant changes in their culture and language proficiency. Fieldwork was carried out in summer 2014 in the village of Uelen, Chukotka, using the methods of structured interviews and participant observation. Informants named 26 species belonging to 18 families; these species gave a total of 170 plant uses. Within one family, there is a sharp decline in the knowledge of the Naukan phytonyms, as well as the repertoire of plants used from older generations to younger ones. The disappearing knowledge includes the collection of plant roots harvested by tundra voles. However, aerial parts of plants, berries, and algae remain popular. The variety of methods for preparing plants is increasing, including due to contact with the Russian-speaking population and access to new technologies.

This article is a translation of: В.Б. Колосова, К.А. Джерниган, О.С. Беличенко. Этноботаническое знание одной эскимосской семьи: науканские юпики // Etnograficheskoe Obozrenie. 2021. No 5. P. 17–32. DOI: 10.31857/S086954150017412-3

The fact that plants play an important role in maintaining life on our planet does not require any proof: they supply the atmosphere with oxygen and they are the basis of many food chains. Thus, for people, they are not only food, but also material for the construction of a house and its heating, as well as raw materials for clothing. Plants are used in transport, medical and magical spheres, in perfumery and cosmetics and in dye manufacture. Also, they can perform a decorative function and many other ones.

Valeria Kolosova | http://orcid.org/0000-0003-3129-1894 | chakra@eu.spb.ru | Institute for Linguistic Studies, Russian Academy of Sciences (9 Tuchkov pereulok, St. Petersburg, 199053, Russia)

Kevin Jernigan | http://orcid.org/0000-0002-8711-1082 | kjernigan@alaska.edu | University of Alaska Fairbanks (505 N Chandalar Dr, Fairbanks, AK 99775, USA)

Olga Belichenko | https://orcid.org/0000-0001-8988-2051 | obelichenko@eu.spb.ru | Ca' Foscari University of Venice (Via Torino 155, 30172, Mestre, Venezia, Italy)

Etnograficheskoe Obozrenie. 2021. № 6. P. 211–223. https://doi.org/10.31857/S086954150017605-5

ISSN 0869-5415 | http://journal.iea.ras.ru

Although information about the use of plants can be found already in the works of Aristotle, as well as in non-European traditional treatises, the word "ethnobotany" as a term was used only in 1895 (*Ford* 1994: 33).

For more than two centuries, ethnobotany has developed into a separate scholarly discipline with its authors (Richard Evans Schultes, Leopold Gluck), scientific societies (*International Society of Ethnobiology, Society for Economic Botany*) and specialized journals devoted not only to general issues (*Ethnobotany, Ethnobiology Letters, Journal of Ethnobotany Research and Applications*), but also to particular ones, for example, the role of plants in traditional medicine (*Journal of Ethnobiology and Ethnomedicine, Journal of Ethnopharmacology, Latin American and Caribbean Bulletin of Medicinal and Aromatic Plants*) or in cooking (*Foods, Appetite*). At the same time, the subject of the study also evolved from "plants used by primitive and native peoples" (Ibid.) to the role of plants in any function and in any society.

The interaction of a particular ethnic group with the plant world depends not only on the set of plants available in a given climatic zone, but also on local ideas about the permissibility (or expediency) of their use, both rational and mythological. So, the use of wild plants for food can be caused not only by a shortage of food, but also by following tradition, fashion for eco- and bio-products, etc. In addition, flora is considered as an important food source in emergency situations (*Sõukand* 2016).

Although the number of publications on agrarian ethnobotany is steadily increasing, only a few of them pay attention to such an important part of the research methodology as the demographic characteristics of informants. These works prove that the ecological knowledge of each community is characterized by its own set of universal and variable features. Even in a book published in 1967, by V.A. Merkulova, it was noted that plants currently used for food only by children may be remnants of a more archaic tradition of habitual consumption (*Merkulova* 1967). The article on medicinal plants of the Brazilian Fulni-ô tribe describes both more or less predictable observations (older people are much more aware of plants used for medical purposes; women and men recognize and use different sets of such plants) and non-obvious ones peculiar to this culture (men name more plants than women; ecological knowledge of people over 75 is at the same level as that of young people) (*Albuquerque et al.* 2011). The authors of the study of *traditional ecological knowledge* (TEK) in Nigeria came to the conclusion that gender and age are important factors affecting the volume and specifics of the TEK. And the results obtained by scholars show that in the studied community, the TEK of children does not include plants used in games, but it contains a wide list of forage plants, since it is their harvesting and sale that children are engaged in (*Dan Guimbo et al.* 2011). Therefore, N.P. Lunelli and co-authors discuss the importance of specialized knowledge, noting that men in the Brazilian Atlantic forest ecoregion are better versed in local tree species used in construction, for heating and in the manufacture of any objects (*Lunelli et al.* 2016). A.A. Ayantunde and colleagues found that in the southwest of Niger, gender differences in knowledge about herbs are more numerous than in knowledge about trees (*Ayantunde et al.* 2008). A study conducted in a peasant community in the Bolivian Andes revealed that the amount of knowledge about plants increased with age, while gender played a secondary role (*Brandt et al.* 2013). The question of the distribution and variability of ethnobotanical knowledge is little studied in Arctic and Subarctic societies. However, S. Yamin-Pasternak described how some demographic variables affect knowledge about mushrooms and their picking in Chukotka and on the Seward Peninsula (*Yamin-Pasternak* 2007). In continuation of the topic, the authors of this article propose a discussion of the knowledge of plants and the practices of their application by the Naukan Yupik.

Despite the scarcity, the local flora plays an important role in the nutrition and traditional medicine of the indigenous peoples of Chukotka (*Ainana, Zagrebin* 2014;

Godovykh et al. 2005). This is important not only during the short summer, but also throughout the year, due to the storage technologies used (drying, fermentation and soaking in fat extracted from marine mammals (*Jernigan et al.* 2016, *Yamin-Pasternak et al.* 2014). The earliest data on the ethnobotany of this region can be found in the works of F.R. Kjellman on coastal Chukchi (*Kjellman* 1882). Bogoraz, in the descriptions of the material culture and social organization of the Chukchi, also gives some information about the use of plants (*Bogoraz* 1904, 1907). In Soviet times, highly specialized publications on the use of local flora appeared. Such outstanding studies as "Data on useful plants of the Eskimos of the southeastern coast of Chukotka" by B.A. Tikhomirov (*Tikhomirov* 1958) and "Wild plants in the diet of the indigenous inhabitants of Chukotka" by G.A. Menovshchikov (*Menovshchikov* 1974) include descriptions of the use of plants by the Chaplino Yupik. The academic works by T.G. Sokolova (*Sokolova* 1961) and I.G. Mimyk-Avtonova (*Mimykg Avtonova* 1992) provide information about Chukchi ethnobotanical practices. A recent study by S. Yamin-Pasternak compares the attitude to edible mushrooms of the Iñupiat from the Seward Peninsula in Alaska and Siberian, the (Chaplino and Naukan) Yupik and Chukchi in Chukotka (*Yamin-Pasternak* 2008). However, there are serious gaps in scholarly knowledge about this region of Russia, and the study of the role of plants in the life of local communities in the post-Soviet period is especially relevant.

Despite the disappearance of the Naukan settlement as such, researchers and local residents made every effort to preserve the memory of it. The history of Naukan and the Naukan people is described most fully in the works of I.I. Krupnik and M.A. Chlenov (*Krupnik, Chlenov* 2013; *Chlenov, Krupnik* 2016). The most valuable memories of former Naukans, including data on the traditional use of plants, are published in a book by V.G. Leonova, published in 2014. (*Leonova* 2014). The current state of the settlement and archaeological finds on its territory are described in articles by K.A. Dneprovsky and N.V. Lopatin (*Dneprovsky* 2016; *Dneprovsky, Lopatin* 2016). The fundamental typological similarity of the Naukan yaranga with the residential buildings of the ancient Bering Sea region and Birnirk cultures is reported in the publication of K.A. Dneprovsky and E.G. Devlet (*Dneprovsky, Devlet* 2017). A special place in the study of the traditional ecological knowledge and language of the inhabitants of the Bering Sea region is occupied by the study of the ice landscape by I.I. Krupnik (*Krupnik* 2018). The currently preserved layer of vocabulary describing the landscape is recorded in the article by I.I. Krupnik and co-authors (*Krupnik et al.* 2013).

The study of the Naukan language deserves special mention. Its grammar and most of the materials on it are published in the works of G.A. Menovshchikov (*Menovshchikov* 1975, 1987). The hypothesis of a greater typological proximity of the Naukan language to the geographically more remote Central Alaskan Yup'ik than to the Chaplin language, which was taken as the basis for teaching the Eskimo language in Russia, was stated by G.A. Menovshchikov (*Menovshchikov* 1975) and M. Krauss (*Krauss* 1980). In 2004, the currently most complete Naukan-Russian dictionary was published under the editorship of E.V. Golovko (*Golovko et al.* 2004). Recently, a collection of texts in the languages of the Eskimos of Chukotka was published from the materials of E.S. Rubtsova, including two texts in the Naukan language (*Vakhtin* 2019).

The least ethnobotanical research was conducted among native speakers of the Naukan language (*Holton* 2012). A number of plant names were included in the Naukan-Russian dictionary (*Golovko et al.* 2004). Also, I.G. Mimyk-Avtonova (*Mimykg Avtonova* 1992) and G.A. Menovshchikov (Menovshchikov 1974) documented some ways of using edible species within the framework of more general works. The beliefs and healing practices of the Chaplino Yupik and Naukan were described within the framework of a broad ethnomedical perspective by researchers V.G. Bogoraz and T.S. Tein and colleagues (*Bogoraz* 1913; *Tein et al.* 1994). The first

special academic work on the ethnobotany of the Naukans, focusing on changes in plant food and phytomedicine, was published in 2017 (*Jernigan et al.* 2017); it was followed by an article on a narrower topic – on the use of mouse stocks in food – from comparative material of the Naukans and Chukchi (*Jernigan et al.* 2019).

Naukan history

The village of Naukan (Naukan – *Nuvuqaq*) was located on Cape Dezhnev, in the east of the Chukotsky peninsula. Subsistence practices here have always been focused on the marine sea-hunting, including hunting of gray whale (*Eschrichtius robustus*), walrus (*Odobenus rosmarus*), spotted seal (*Phoca largha*) and bearded seal (*Erignathus barbatus*). This was supplemented by hunting land mammals and collecting plants and seafood. During the Russian Empire and in the early Soviet period, the Bering Strait served as an important center of commercial and cultural exchange between the Yupik and Chukchi on the one side of the Strait and the Iñupiat on the other. Mixed marriages of Naukan and residents of Big Diomede (Naukan – *Imaqliq*) and Little Diomede (Naukan – *Ingaliq*) were normal and often.

In 1958, Naukan was disbanded as part of a campaign to consolidate rural settlements, and people were forced to move to the neighboring Chukchi villages of Nunyamo, Pinakul and Uelen. Pinakul and Nunyamo, in turn, were closed in 1960 and 1977 (currently, there are hunting bases on their territory), and the locals moved from there to the villages of Lavrentia and Lorino, where most of Naukan people live today.

After the resettlement, the culture of the Naukan underwent a significant transformation, there were changes in the spiritual outlook and everyday practices, in the social structure and language proficiency. Numerous newcomers (military and civilian) from other regions of the Soviet Union, who came into contact with local residents and entered into marriages with them, contributed to these changes. Although the Naukans did not experience the strong acculturation influence of missionary activity, widespread in Alaska, under Soviet rule their shamans were persecuted, and spiritual practices were seriously challenged (*Kerttula* 1997).

After the collapse of the USSR, especially in the second half of the 1990s, the region found itself in a very difficult situation, since the support of the central government during this period was minimal. Since the local population was faced with a shortage of food – the shelves in the village shops were empty – teams of hunters for sea animals are reviving in Chukotka (*Krupnik, Vakhtin* 1997). The economic situation on the peninsula has improved somewhat only in the last decade.

Currently, the Naukan language, which belongs to the Yuit languages of the Eskimo-Aleut language family, is under threat of extinction (UNESCO 2017). This means that only a few representatives of the oldest generation speak it. Despite the fact that the number of Asian Eskimos according to census data remains stable (1,738 people in 2010, 1,719 people in 1989), and the number of native speakers is allegedly growing (65% in 2010 vs 37.5% in 1970), the actual number of speakers is close to 200, as the "census data on language is unreliable: it is known that respondents often referred to as their "native" language, the one whose name coincides with the name of their national identity, not the one which they speak from childhood" (*Vakhtin* 2019: 13).

Methods

This study is part of a larger project aimed to compare the ethnobotanical traditions of indigenous peoples living on the Russian and American sides of the Bering Strait. The project also aims to record and analyze cases of use of edible, medicinal, household and ritual plants among the Naukan and Chukchi of Chukotka and the Yup'ik of Central Alaska. The authors conducted field work during the period from 2013 to 2016. As part of the study,

28 interviews were conducted with Naukans mainly in the villages of Lavrentia, Lorino and Uelen of the Chukotsky district (the Chukotka Autonomous Region), as well as in the capital of the district – the city of Anadyr and in the cities of Nome and Kotzebue in Alaska. All the surveyed areas are located in the Arctic tundra zone (see Figure 1). Non-carbonate rocky mountain tundra complexes with adjacent areas of low shrubs and swampy tundra predominate in the Naukan settlement and immediately around it (CAVM Team 2003). The study was approved by the University of Alaska (Fairbanks Institutional Review Board, IRB, #465620-1) and was conducted in accordance with the ethical principles of the American Anthropological Association (AAA 2012). All the participants gave prior oral informed consent, parental consent was obtained for interviewing minors.

At the preparatory stage, the authors of this study wrote out all the Naukan phytonyms from the dictionary edited by E.V. Golovko (*Golovko et al.* 2004), herbarium samples were collected from these data and photographs of plants were taken for the future presentation to informants (Binomial names of plants are given in the World Flora Online database; see: WF n.d.). In each village, the authors began work with a meeting with members of the local community in order to answer questions, discuss study goals and identify potential participants. Since the Naukan language is under threat of extinction, instead of forming a representative sample, the authors tried to interview as many native speakers as possible. Though L. Dorais in 2010 estimated the number of people for whom Naukan is native at 60 people (*Dorais* 2010), after detailed conversations of the authors with the elderly and a request to list all acquaintances who speak the language, the authors came to a more moderate number – 29 people. The authors managed to interview 21 native speakers who are fully knowledgeable and fluent in Naukan, and seven who partially speak the language.

In the interview, questions were asked about local plants currently used, or used in the past for food or medicine. For each name, the interviewees were asked to list: how and in what areas wild plants are used (in cooking, in the treatment of diseases, in rituals), the time and methods of collection, processing, preparation and storage. Each "use" (plant use) was specified: whether it was practiced in the participant's younger years and whether it is currently being practiced.

As a working hypothesis, it was assumed that knowledge about plants (as part of the TEK) is preserved to the maximum extent possible by the oldest residents, the next generation knows a little less, and children know very little (they master only individual fragments of traditional knowledge). Therefore, at first, the authors mainly tried to interview the oldest generations. But in reality, the picture was not so straightforward. Firstly, knowledge about the use of medicinal herbs was more extensive among younger generations, which indicates a shift away from prevention (including and with the help of proper nutrition) and shamanic treatment for phytotherapy – presumably under the influence of the Russian population (for more information, see: *Jernigan et al.* 2017). Secondly, children of preschool and primary/secondary school age often accompany grandmothers to the tundra during harvesting of plants that are then eaten or used to treat various diseases, while parents are busy hunting or working at local enterprises and cannot pay proper attention to such training.

This article discusses the "herbal knowledge" of one Naukan Yupik family – six of its members belonging to three generations. They are an elderly woman (F66), her daughter (F29), grandson (M13) and granddaughter (F11), as well as her nephew (M64) and niece (F45). Five interviews were conducted in the village of Uelen and one in Kotzebue. F66 was born in Naukan, and her children and grandchildren – in Uelen. She was one of the few who agreed to take the authors to the tundra and demonstrate the harvesting of plants *in situ*, so the authors had the opportunity to take part in the harvest of broad-leaved fireweed picking together with grandchildren and two friends of F66.

Figure 1. The eastern part of the Chukotka Autonomous Okrug (Map base – CC-BY Wikimedia Commons)

Results and discussion

After transcribing the interviews and entering the information into an Excel spreadsheet, the authors compared the data on the names and uses of plants received from all six informants (analyzed all the details they were able to report). In total, the family members mentioned 26 species (including lichens and algae) belonging to 18 families; these species gave a total of 170 uses. To understand the overall picture, it should be noted that 42 local species from 25 botanical families were named by all Naukan informants in general. In addition, one plant was identified as *Polygonum tripterocarpum* A. Gray ex Rothr. (the Naukan name we recorded is *қыӽйъуқ*, while the dictionary gives *qeghhyughhaq*). One type of mushroom was designated as *birch bolete*, one as *honey fungus*, one as semeiki (Rus. 'families'), one – as just a *mushroom*, another – *tuutaghuaq* ("mushroom" in Naukan). It was not possible to determine their scientific names. During the interview, several species of algae were mentioned: *Fucus vesiculosus* L.; *Saccharina latissima* (L.) C.E. Lane, C. Mayes, Druehl, et G.W. Saunders; *elquaq* (Naukan) – apparently, this is *Alaria marginata* Postels & Ruprech. (although one of the informants mistakenly called *Saccharina* in this way); "*cabbage"* (but not *Saccharina*); *nuvakataq* (Naukan) – "slippery algae". Finally, at least two (possibly three) plant species were used from the seized mouse caches (so-called mouse roots), however, it was not possible to identify them by fragments of roots. Based on the comments of our informants, we can hypothesize that it may be *Eriophorum angustifolium* Honck. and *Hedysarum hedysaroides* subsp. *arcticum* (B. Fedtsch.) P.W. Ball.

Food use. The most popular plant was cloudberry *Rubus chamaemorus* L., Naukan – *aqpik* (17 uses), these berries were used for food, and sepals – for tea used in the case of cough. It is followed by *Empetrum nigrum* L. (13 uses) with almost exclusively food use. F66 mentioned that its fruits are a source of vitamins. Ten uses were scored for cranberries

Vaccinium vitis-idaea L., western roseroot *Rhodiola integrifolia* Raf. and broad-leaved fireweed *Epilobium latifolium* L., nine – *Oxyria digyna* (L.) Hill.

It should be noted that, although useful plants are distributed unevenly by categories of use, the "edible" group is the leading one for all informants – the largest number of uses was mentioned by F66, the smallest is M64 (see Figure 2). At the same time, the latter participant notes: "Earlier, when I went to harvest herbs with my grandmother, she made so many dishes from plants! What we are cooking now is so [little]..." He also explained that men, as a rule, know little about plants, they rather know a lot about animals. The children said about a number of dishes that their mothers do not cook it, only their grandmother (F66). In addition, they tried some of these plants, but they did not like them, which is an alarming sign of *taste acculturation* in accordance with the Western diet. As for some edible plants, M13 "didn't eat them, just saw grandmother cooking them". Various parts of plants (fruits, leaves and aboveground parts in general, roots, flowers, algae blades) and mushrooms are used for food. While some types go out of use, the methods of cooking others, on the contrary, multiply. So, borscht, fruit-drinks, boiled fruit and jam were added to such traditional options as boiling with meat of marine animals or mixing with fat. It should be noted that some "vegetable" dishes were characterized by informants as "a cure for everything, like vitamins as well" (F66). M64 remembered that "grandma always mixed cloudberries with fat so that the bellies did not hurt". Thus, part of the plants consumed by the Naukan in food can be attributed to the so-called *functional food*, i.e. products that are useful for health not only in terms of their nutritional value (Pieroni, Quave 2006). M64 said that his grandmother used to collect roots stored by root voles with a special device – a wooden handle ("like a hatchet") and an iron rod attached to it at right angles. The roots were eaten by themselves or mixed with fat. F66 knows about collecting mouse caches from her mother's stories, she herself did not participate in getting them, although as a child she was fed them at home, and later treated in Alaska. Apparently, the roots of *Claytonia tuberosa* Pall. ex Schult are also falling out of use. F66 and F45 remembered that their grandmothers cooked them "like potatoes", for example, boiled in fat (F45).

Berries (crowberry, cloudberry), herbs (saxifrage, sorrel), flowers (dryas) and roots (roseroot, spring beauty) were traditionally eaten mixed with fat – in recent years, these dishes have also gradually disappeared from the diet of Naukans. The boiling of wild plants (willow, fireweed) with meat is still practiced (F66). Today, the leaves of fireweed are dried or frozen to be used in winter, and before they were boiled and kept in barrels under pressure. At the same time, F29 (like M13 and F11) only helps to collect fireweed, but does not participate in preparing it for storage.

In the same way, the aboveground parts of young roseroot plants are harvested, as F66 reported; M64, F45 and F29 know about this, and the children only know that their grandmother collects this plant and "probably puts it into fat". As for roseroot, they responded as follows: "We don't eat such a thing" (M13) and "I tasted it, I didn't like it" (F11). Regarding willow leaves, F29 said: "We do not harvest them, but the Chukchi do it for cooking meat. We gather *wiawiagte* (broad-leaved fireweed – *authors' note*), and they gather this...you know stuff from willow-branches". At the same time, her mother (F66) named not only the food, but also the medicinal use of willow, and both grandchildren remembered that "they harvested the leaves and cooked them, then put them into the meat when cooking" (while the boy said that it was delicious, and the girl – that it was not).

A separate group consists of wild plants, which are eaten mainly by children (in the spring, while the plants are just appearing). These include, for example, the flowers of *Persicaria bistorta* (L.) Samp. – the local inhabitants call them "candy" or "drunken candy" – and the flowers of *Pedicularis verticillata* L. – "cockerels". M13 described the

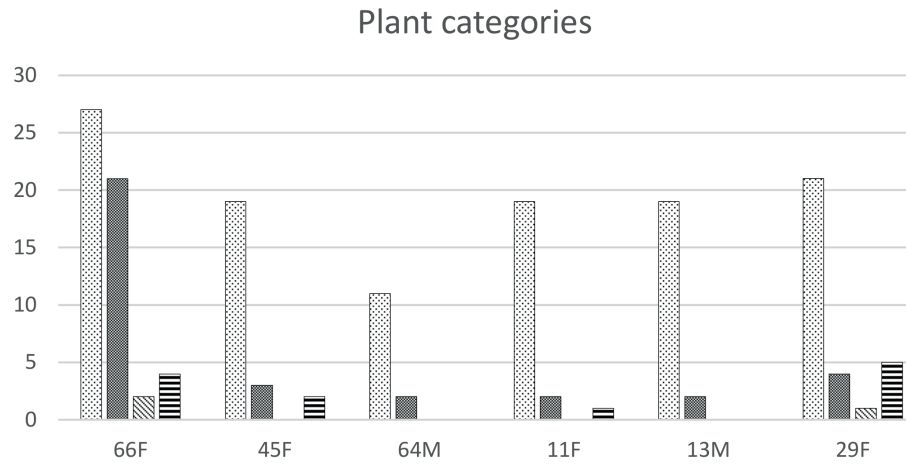

Figure 2. Categories of plants and the number of their uses by different informants

flowers of *Persicaria bistorta* as "delicious and sweet", F11 also tried them, but she did not like them. The flowers of *Pedicularis verticillata* are liked by both of them.

The "children's food" can also include *Oxyria digyna* (L.) Hill and all the berries, although they have other food uses (after heating).

Therapeutic use. A group of medicinal plants is noticeably represented only in the oldest woman in the family, the others have cited from two to four uses (see Figure 2). Among the diseases that are treated with the help of local plants were named: diarrhea (*Salix pulchra* Cham., *Epilobium latifolium* L., *Saccharina latissima* (L.) C.E. Lane, C. Mayes, Druehl, et G. W. Saunders and unidentified algae species), high blood pressure (lingonberry), rheumatism (broad-leaved fireweed), cough (cloudberry, *Petasites frigidus* (L.) Fr., wild rosemary *Ledum palustre* subsp. *decumbens* (Aiton) Hultén) and the common cold (*Angelica lucida* L., *Petasites frigidus*). At the same time, only F66 confidently stated that a cough is treated with wild rosemary. F45 believes that wild rosemary was not harvested in Naukan. F29 noted that it is put in tea, which smells delicious, and added that it seems to be a medicine: "Also, probably, for a cough, also helps for something". The girl and the boy drank tea from this plant, the grandmother brewed the fresh herb, they liked it; at the same time they said that it was not medicine, but "just to drink tea."

About half of the therapeutic uses were reduced to the characterizations: "good for health", "vitamins" or "medicine for everything". Despite the extreme conciseness of the list, we emphasize once again that the largest number of medicinal plants is named by the oldest member of the family. This, perhaps, indicates the borrowing of medical knowledge from visitors at a time when pharmacy drugs were not available and medical workers advised plants of local flora for the treatment of diseases. Thus, cranberries are widely known among the people as a diuretic; cloudberry sepals – as a cough remedy; *Petasites frigidus* – in the local Russian dialect as "*mat'-i-machekha*", "coltsfoot" – may be endowed with the property of treating cough by analogy with a plant called "*mat'-i-machekha*" in mainland Russia (i.e. *Tussilago farfara* L.). On the other hand, the recent work of T.V. Godovykh, L.I. Dokhnova and T.I. Tyneny (Godovykh et al. 2005) testifies to the developed "herbal" tradition among the Chukchi, despite V.G. Bogoraz's remark about their lack of medicinal plants. At the moment, the authors

can state that the Naukan with whom they had a chance to talk have an emphasis on the awareness of the close connection between proper nutrition and human health.

Ritual use of plants was mentioned by only two informants (F66 and F29). Curiously, both pointed to the root of seacoast angelica, which was used to fumigate people, objects and homes ("When someone died, the root of this plant was used to fumigated the house to clean it" [F66]), and also eaten for good luck after the first whale of the year was hunted.

Category "other". It included the use of plants as a repellent (*Artemisia tilesii* Ledeb.), forage for tundra animals (yagel *Cladonia* sp.), as well as for decorative purposes and for play (*Valeriana capitata* Pall. ex Link, chamomile *Matricaria matricarioides* (Less.) Porter and aconite *Aconitum delphinifolium* DC)., the latter two groups were named only by women. In this category, the number of uses ranged from one to five. Finally, it should be noted that M13 recognized (in photographs and among herbarium specimens) four plants that he "saw on the tundra", but could not name their use; F11 pointed to seven such plants, and both children recognized and named only chamomile *Matricaria matricarioides* (Less.) Porter and bearberry *Arctous alpina* (L.) Nied.

It should be noted that, sticking to the data collected throughout the entire Naukan population, the number of edible plant species harvested today has generally decreased by 13% compared to the times of the informants' youth. On the other hand, the number of native species considered medicinal increased by 225% (*Jernigan et al.* 2017). Thus, it can be concluded that the studied family follows the general trend in the use of edible wild plants; there is not enough data to analyze the situation on medicinal plants.

Linguistic notes

According to a number of researchers, the loss of traditional ecological knowledge occurs in parallel with the loss of language, and hence phytonyms (*Gorenflo et al.* 2012; Maffi 2005). So, F66 can be considered as a fluent native speaker. M64 says about himself that he understands Naukan, but cannot speak it, because "starting from the first grade, he has changed different schools throughout Chukotka". F45 has been living in Alaska for a long time and has the opportunity to communicate in Central Alaskan Yup'ik; probably, being in a closely related language environment to some extent supports her knowledge of Naukan. F29, M13 and F11 do not speak the Naukan language and were able to name only individual words.

F29 reported that her mother (F66) spoke to her in Russian, and only her grandmother spoke in Naukan.

Five interviews were conducted in Russian, one (F45) – in English. In all cases, the authors asked about the Naukan name of each plant. F66 gave almost the same number of Naukan and Russian names – 13 and 14, respectively – and after leading questions, confirmed six more in Naukan. M64 recalled nine Russian names (one of them with a hint), two Naukan (plus one with a hint and one erroneous) and one Chukchi name (*juŋew*, *Rhodiola integrifolia* Raf.). F45 recalled 13 Naukan names and only two Russian ones (this can be explained, most likely, by the fact that the interview was conducted in English). It should be noted that she named crowberry, blueberries and lingonberries in Naukan with the same word – *sughhaq*. F29 remembered 17 Russian phytonyms and four Naukan ones (one of them with a hint), as well as two Chukchi ones – *çipʾet* and *rəḷqəŋet* – for *Saxifraga nelsoniana* D. Don, although there is a phytonym *siiqnaq* for this plant in Naukan. The Russian name "*cockerel / cockerels*" is for aconite *Aconitum delphinifolium* DC and *Pedicularis verticillata* L. M13 named 13 Russian phytonyms (two of them with a hint and one mistakenly), and also remembered one in Naukan – *wiawiagte* (broad-leaved fireweed) (perhaps this is the result of the above-mentioned

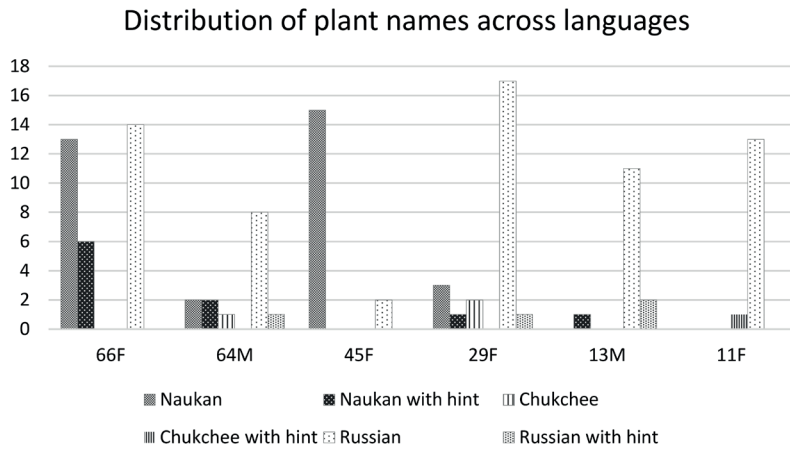

Figure 3. Distribution of phytonyms by languages

trip to the tundra for its leaves). F11 also gave 13 names in Russian (one is wrong) and one in Chukchi – *juŋew* (see Figure 3).

It is obvious that from older generations to younger ones, the number of phytonyms known to informants decreases, and in younger ones they are gradually replaced by Russian and – partially – Chukchi language. The names of significant food plants are best preserved: *wiawiagte* (broad-leaved fireweed), *neqenllaq* (bistort), *llamquq* (*Petasites frigidus*).

* * *

Materials on ethnobotany of different generations of the same Naukan family clearly indicate the loss of both Naukan phytonyms and practices related to the use of wild plants – first of all, in the cases of the plants roots harvested by field mice. It is curious that the Naukan names are being replaced not only by Russian, but also by the Chukchi language, which was also noted in interviews outside of this sample. In part, this may be due to the wider representation of the Chukchi language in the region: a larger number of native speakers; studying it at school; use in the framework of festive events and in the press. For example: since fermented roseroot is an important element not only of the Naukan cuisine, but also of the Chukchi, in recent years the Naukan *saqlak* has been replaced by the Chukchi *juŋew*. Since harvesting plants has traditionally been a female occupation, knowledge in this field is preserved mainly among women, although the practices of collecting and identifying plants can also be passed on to children / grandchildren (regardless of gender) in the process of trips together for wild plants. Despite this, since the availability of fresh fruits and vegetables in Chukotka is limited (the assortment is small, and prices are several times higher than in other regions), the use of local wild berries, herbs and algae remains. Due to contact with the Russian-speaking population, the wide availability of sugar and salt, the availability of various types of containers for canning and household freezers for freezing and storage, the number of ways to prepare and consume local wild plants is increasing.

Availability of data and materials. Interview recordings, field notes and obtained data are stored at the University of Alaska in Fairbanks, the collected herbarium specimens are in the herbarium of the V.L. Komarov Botanical Institute of the Russian Academy of Sciences in St. Petersburg. Some of the results are available on the website

"Plants at the End of the World: Beringian Ethnobotany" (BE n.d.) – here it is possible to find photos of botanical species used by the indigenous peoples of Chukotka and Alaska, their names in Chukchi, Naukan Yupik, Central Alaskan Yupik, English and Russian, nomenclature designations in Latin, brief information about the role of wild plants in the culture of Chukchi and Eskimos, as well as other information related to the project.

Acknowledgements

The authors express their gratitude to the informants who took part in this study and generously shared their knowledge. The authors also thank G.M. Zelensky for logistical support of field work in Chukotka and V.Y. Razzhivin for assistance in determining herbarium specimens. The authors are grateful to the administration of the Beringia National Park for permission to visit Naukan.

Sources and materials

AAA 2012 – Principles of Professional Responsibility. American Anthropological Association. Ethics Blog: Full Text of the 2012 Ethics Statement. http://ethics.americananthro.org/category/statement

BE n.d. – Plants at the End of the World: Beringian Ethnobotany. http://www.beringiaplants.com CAVM Team 2003 – CAVM Team. Circumpolar Arctic Vegetation Map. Scale 1: 7,500,000. Conser-

Golovko et al. 2004 – *Golovko E.V., Dobrieva E.A., Jacobson S., Krauss M.* 2004. *Slovar' yazyka naukanskikh eskimosov* [Dictionary of the language of the Naukan Eskimos]. Fairbanks: University of Alaska at Fairbanks; Alaska Native Language Center.

Holton 2012 – *Holton G.* Overview of Comparative Inuit-Yupik-Unangan. Alaska Native Language Archive. 2012. https://www.uaf.edu/anla/collections/cea/about

Kjellman 1882 – *Kjellman F.R.* Asiatiska Beringsunds-kustens fanerogam-flora. Vega-expeditionens vetenskapliga iakttagelser, bearbetade af deltagare i resan och andra forskare. In A.E. Nordenskiöld (ed.). Stockholm: F. & G. Beijers, 1882, pp. 373–572.

Leonova 2014 – *Leonova V.* (comp.). 2014. *Naukan i naukantsy. Nuvuқaқ, ynkam nuvuқakhmit* [Naukan and the Naukans. Nuvuqaq enkam nuvuqaggmit]. Vladivostok: Dalpress.

UNESCO 2017 – UNESCO. Language Vitality and Endangerment. 2003. http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CLT/pdf/Language_vitality_and_ endangerment_EN.pdf

Vakhtin 2019 – *Vakhtin N.B.* (Prepared for publication and ed.). 2019. *Teksty na yazykakh eskimosov Chukotki v zapisi E.S. Rubtsovoi* [Texts in the languages of the Eskimos of Chukotka recorded by E.S. Rubtsova]. Saint Petersburg: Art-Express.

vation of Arctic Flora and Fauna (CAFF) Map No. 1. Anchorage: US Fish and Wildlife Service, 2003. https://digital.library.unt.edu/ark:/67531/metadc12044/

WF n.d. – World Flora Online. http://www.worldfloraonline.org

References

Ainana, L., and N. Zagrebin. 2014. *S'edobnye rasteniia eskimosov* [Edible Plants of the Eskimos]. Anchorage: Programma Sluzhby natsional'nykh parkov SShA "Obshchee nasledie Beringii".

Albuquerque, U.P., et al. 2011. The Use of Plants in the Medical System of the Fulni-ô People (NE Brazil): A Perspective on Age and Gender. *Journal of Ethnopharmacology* 133 (2): 866–873. htpps://doi.org/10.1016/j.jep.2010.11.021

Ayantunde, A.A., et al. 2008. Botanical Knowledge and Its Differentiation by Age, Gender and Eth-nicity in Southwestern Niger. *Human Ecology* 36 (6): 881–889. https://doi.org/10.1007/s10745-008-9200-7

Bogoraz, W.G. 1904. *The Chukchee: Material Culture*. Leiden: EJ Brill.

Bogoraz, W.G. 1907. The Chukchee: Social Organization. *Memoirs of the American Museum of Natu-ral History* 11 (3): 277–733.

Bogoraz, W.G. 1913. The Eskimo of Siberia: The Jesup North Pacific Expedition. *Memoirs of the American Museum of Natural History* 8 (4): 419–453.

Brandt, R., et al. 2013. Knowledge and Valuation of Andean Agroforestry Species: The Role of Sex, Age, and Migration among Members of a Rural Community in Bolivia. *Journal of Ethnobiologyand Ethnomedicine* 9 (83). https://doi.org/10.1186/1746-4269-9-83

Chlenov, M.A., and I.I. Krupnik. 2016. Naukan: glavy k istorii [Naukan: Chapters to History]. In *Spas- ti i sokhranit'. Kul'turnoe nasledie Chukotki: problemy i perspektivy sokhraneniia* [Save and Preserve. Cultural Heritage of Chukotka: Problems and Perspectives of Conservation. Materials of Scientific- Practical Conference in Anadyr'. 12–14 April 2016], edited by M.M. Bronshtein, 1: 38–74. Mos- cow; Anadyr': Gosudarstvennyi muzei Vostoka.

Dneprovskii, K.A. 2016. Naukan: sovremennoe sostoianie unikal'nogo pamiatnika istorii i kul'tury Chukotki [Modern State of the Unique Monument of History and Culture of Chukotka]. In *Spas- ti i sokhranit': kul'turnoe nasledie Chukotki: problemy i perspektivy sokhraneniia* [Save and Preserve: Cultural Heritage of Chukotka: Problems and Perspectives of Conservation: Materials of Scien- tific-Practical Conference in Anadyr'. 12–14 April 2016], edited by M.M. Bronshtein, 1: 22–38. Moscow; Anadyr': Gosudarstvennyi muzei Vostoka.

Dneprovskii, K.A., and E.G. Devlet. 2017. K voprosu o konstruktivnykh osobennostiakh zhilishch drevnikh eskimosov po materialam arkheologii, etnografii i izobrazitel'nym istochnikam [On the Question of the Design Features of the Ancient Eskimos' Dwellings Based on Materials of Ar- cheology, Ethnography and Visual Sources]. *Problemy istorii, filologii, kul'tury* 3 (57): 210–251.

Dneprovskii, K.A., and N.V. Lopatin. 2016. Arkheologicheskie nakhodki na territorii Naukana [Archaeo-logical Finds on the Territory of Naukan]. In *Spasti i sokhranit': kul'turnoe nasledie Chukotki: problemyi perspektivy sokhraneniia* [Save and Preserve: Cultural Heritage of Chukotka: Problems and Perspec- tives of Conservation: Materials of Scientific-Practical Conference in Anadyr'. 12–14 April 2016], ed- ited by M.M. Bronshtein, 1: 82–96. Moscow; Anadyr': Gosudarstvennyi muzei Vostoka.

Dorais, L. 2010. *Language of the Inuit: Syntax, Semantics, and Society in the Arctic*. Montreal: McGill-Queen's Press.

Ford, R.I. 1994. Ethnobotany: Historical Diversity and Synthesis. In *The Nature and Status of Ethno-botany*, edited by R.I. Ford, 33–49. Ann Arbor: Museum of Athropology; University of Michigan. Godovykh, T.V., L.I. Dokhnova, and T.I. Tyneny. 2005. *Rasteniia v Etnomeditsine Chukotki* [Plants in Ethnomedicine of Chukotka]. Magadan: Chukotskii filial Severo-Vostochnogo kompleksnogonauchno-issledovatel'skogo instituta DVO RAN.

Gorenflo, L.J., S. Romaine, R.A. Mittermeier, and K. Walker-Painemilla. 2012. Co-Occurrence of Linguistic and Biological Diversity in Biodiversity Hotspots and High Biodiversity Wilderness Areas. *Proceedings of the National Academy of Sciences* 109 (21): 8032–8037. https://doi. org/10.1073/pnas.1117511109

Guimbo, I.D., J.G. Mueller, and M. Larwanou. 2011. Ethnobotanical Knowledge of Men, Women and Children in Rural Niger: A Mixed-Methods Approach. *Ethnobotany Research and Applications* 9: 235–242. https://doi.org/10.17348/era.9.0.235-242

Jernigan, K., et al. 2016. A Comparison of Indigenous Health-Related Plant Use of the Russian and Alaskan Sides of the Bering Strait. *Paper presented at the 15th Congress of the International Society of Ethnobiology*. Kampala: Makerere University.

Jernigan, K., O. Belichenko, V. Kolosova, and D. Orr. 2017. Naukan ethnobotany in post-Soviet times: lost edibles and new medicinals. *Journal of Ethnobiology and Ethnomedicine* 13 (61): 1–11. https://doi.org/10.1186/s13002-017-0188-1

Jernigan, K., et al. 2019. Gathering "Mouse Roots" Among the Naukan and Chukchi of the Russian Far East. *Ethnobiology Letters* 10 (1): 129–138. https://doi.org/10.14237/ebl.10.1.2019.1605

Kerttula, A.M. 1997. Antler on the Sea: Creating and Maintaining Cultural Group Boundaries amongthe Chukchi, Yupik, and Newcomers of Sireniki. *Arctic Anthropology* 34 (1): 212–226.

Krauss, M.E. 1980. *Alaska Native Languages: Past, Present, and Future*. Washington, DC: ERIC Clear-inghouse.

Krupnik I., and N. Vakhtin. 1997. Indigenous Knowledge in Modern Culture: Siberian Yupik Eco- logical Legacy in Transition. *Arctic Anthropology* 34 (1): 236–252.

Krupnik, I., and M. Chlenov. 2013. *Yupik Transitions: Change and Survival at Bering Strait, 1900–1960*. Fairbanks: University of Alaska Press.

Krupnik, I., L. Bogoslovskaya, B. Alpyrgin, and E. Dobrieva. 2013. Naukanskii "Ledovyi slovar":k rekonstruktsii kul'turnogo landshafta ["Ice Dictionary" of Naukan: Towards the

Reconstruc- tion of the Cultural Landscape]. *Acta Linguistica Petropolitana. Trudy instituta lingvisticheskikhissledovanii* 9 (3): 166–95.
Krupnik, I.I. 2018. Ledovye prostranstva arkticheskikh morei kak aborigennyi kul'turnyi landshaft [IceSpaces of the Arctic Seas as Aboriginal Cultural Landscape]. *Nasledie i Sovremennost'* 1 (4): 73–91. Lunelli, N.P., M.A. Ramos, and C.J.F. de Oliveira Júnior. 2016. Do Gender and Age Influence Agro-forestry Farmers' Knowledge of Tree Species Uses in an Area of the Atlantic Forest, Brazil? *ActaBotanica Brasilica* 30 (4): 667–682. https://doi.org/10.1590/0102-33062016abb0226
Maffi, L. 2005. Linguistic, Cultural, and Biological Diversity. *Annual Review of Anthropology* 34 (1): 599–617. https://doi.org/10.1146/annurev.anthro.34.081804.120437
Menovshchikov, G.A. 1974. Dikie rasteniia v ratsione korennykh zhitelei Chukotki [Wild Plants in theDiet of the Indigenous People of Chukotka]. *Sovetskaia etnografiia* 2: 93–99.
Menovshchikov, G.A. 1975. *Yazyk naukanskikh eskimosov* [The Language of the Naukan Eskimos]. Leningrad: Nauka.
Menovshchikov, G.A. 1987. *Materialy i issledovaniia po yazyku i fol'kloru naukanskikh eskimosov* [Materials and Research on the Language and Folklore of the Naukan Eskimos]. Leningrad: Nauka.
Merkulova, V.A. 1967. *Ocherki po russkoi narodnoi nomenklature rastenii: travy, griby, yagody* [Essays on the Russian Folk Nomenclature of Plants: Herbs, Mushrooms, Berries]. Moscow: Nauka.
Mimykg Avtonova, I.V. 1992. Edible Wild Plants in Our Foods (Chukchi, Eskimo). *Anthropology and Archeology of Eurasia* 31 (1): 88–97. https://doi.org/10.2753/AAE1061-1959310188
Pieroni, A., and C.L. Quave. 2006. Functional Foods or Food Medicines? On the Consumption of Wild Plant among Albanians and Southern Italians in Lucania. In *Eating and Healing: Tradition-al Food as Medicine*, edited by A. Pieroni and L.L. Price, 101–129. New York: Haworth Press.
Sokolova, T.G. 1961. K voprosu ob ispol'zovanii chukotskim naseleniem dikoi flory v raione mysa Dezhneva [On the Question of the Use of Wild Flora by the Chukchi Population in the Area of Cape Dezhnev]. In *Zapiski Chukotskogo kraevedcheskogo muzeia* [Notes of the Chukotka Museum of Local Lore], 2: 96–97. Magadan: Knizhnoe izdatel'stvo.
Sõukand, R. 2016. Perceived Reasons for Changes in the Use of wild food Plants in Saaremaa, Esto-nia. *Appetite* 107. https://doi.org/10.1016/j.appet.2016.08.011
Tein, T.S., D.B. Shimkin, and S. Kan. 1994. Shamans of the Siberian Eskimos. *Arctic Anthropology* 31(1): 117–125.
Tikhomirov, B.A. 1958. Dannye o poleznykh rasteniiakh eskimosov yugo-vostochnogo poberezh'iaChukotki [Data on Useful Plants of the Eskimos of the Southeastern Coast of Chukotka]. *Bo- tanicheskii zhurnal* 40 (2): 242–246.
Yamin-Pasternak, S. 2007. How the Devils Went Deaf: Ethnomycology, Cuisine, and Perception of Landscape in the Russian North. PhD abstract, University of Alaska.
Yamin-Pasternak, S. 2008. From Disgust to Desire: Changing Attitudes toward Beringian Mushrooms. *Economic Botany* 62 (3): 214–222. https://doi.org/10.1007/s12231-008-9020-0
Yamin-Pasternak, S., et al. 2014. The Rotten Renaissance in the Bering Strait. *Current Anthropology* 55 (5): 619–646. https://doi.org/10.1086/67830White, H.V. 1973. *Metahistory: The Historical Imagination in Nineteenth-Century Europe*. Baltimore: Johns Hopkins University Press.
Wolf, E.R. 1982. *Europe and the People without History*. Berkeley: University of California Press.
Yanagisako, S., and C. Delaney, eds. 1995. *Naturalizing Power: Essays in Feminist Cultural Analysis*. London: Routledge.
Zaloom, C. 2006. *Out of the Pits: Traders and Technology from Chicago to London*. Chicago: University of Chicago Press.
Zerubavel, E. 1981. *Hidden Rhythms: Schedules and Calendars in Social Life*. Chicago: University Chicago Press.

Funding information

The original research was part of a larger study comparing the plant traditions of cultures on the Alaskan and Russian sides of the Bering Strait, funded by the National Science Foundation's Arctic Social Science program, grant number 1304612.