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Umbellifere and traditional music

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Abstract: Multipipe flutes (Pan flutes) made of hollow stems of Umbelliferous plants were in use in Russia up until the start of the 21st century in Komi-Permyak, Komi-Zyryan and Russian people. The plant species were identified as *Angelica sylvestris* and *A. archangelica*. The authors collected an interesting plant "zargum" ("zorka") in Komi-Permyak region and identified it as *A. sylvestris*. A pipe is closed, involves a stem node together with an internode fragment. The internode anatomy in *Angelica sylvestris* and *A. archangelica* was studied. The epidermis, collenchyma, and cortex are not lignified, the vascular bundles form a ring, the interfascicular space being completely filled with sclerenchyma, and the central primary parenchyma also becomes lignified. The sturdiness of the musical instrument, retention of its form upon drying, and the sound quality can all be attributed to the presence of this solid lignified cylinder.

Key words: Ethnobotany, Russia, musical instruments, Apiaceae, *Angelica*, stem anatomy

Introduction

Folk musical instruments made of giant herbs' stems of Umbelliferous plants are known on territory of Russian Federation. A number of Russian ethnographers investigated several local sites of traditional music (Belitser, 1952; Kulakovskiy, 1959; Tschistalev, 1980; Zhulanova, 2008). Multi-pipe flute (Pan flute) consists of several tubes of different lenghth that are cut of middle part of plant stem below inflorescens. Every pipe is closed, involves a culm node (constituting the pipe bottom) together with an internode fragment, there are neither whistle nor finger holes. The pitch and sound quality depend upon the pipe diameter, length, structure of tube wall, and plant species in use. After International classification of misical instruments (Hornbostel & Sachs,1914) this is Aerophone, a set end-

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blown stopped flutes (panpipes) with the number 421.112.2.

There are two variants of multipipe flutes in Russia. The first variant consists of 2 large pipes 20-40 cm in length and up to 20 mm in diameter. It is used mostly along Inva river in Yusva district of Perm Teritory by Komi-Permyak people under the name "pelyanez".

The second variant consists of 2-12 small pipes 6-18 cm in length and 9-12 mm in diameter. Russian traditional musicians used this instrument in Bryansk and Kaluga regions under the name "stvoly" or "dudki". Komi-zyryan people in Komi Republic use them under the name "kuima-chipsan", Komi-Permyak people in Perm Terrirory name this instrument "zargum pelyan" or "pikan pelyan". The plant "pikan" was reliably identified by botanists as *A. sylvestris*, and the plant "zargum" (Russian equivalent – "zorka") was nor determined.

The pipes of the flute are not bound, the folk musicians can change the set of pipes and their sequence to play different themes. Muttipipe flute of the peoples in Rusian Federation is always a women's instrument.

Single-pipe men's flutes with whistle hole and open ends are made of large stems of *A. archangelica* 2-3 cm in diameter, Komi-Permyak people name it "umra" and Komi-Zyryan people - "pelyan gum". In classification of Hornbostel & Sachs (1914) it is the number 421.112.11. Closed pipes with whistle and finger holes were made for children of *A. sylvestris* stems (number 421.111.22 in classification of Hornbostel & Sachs, 1914).

Unfortunately, the tradition of herbal flutes is almost extinct and only few old women can make and play this instrument (Figure 1).

Figure 1. Alexandra Kirillovna Mizyova (born in 1932 in the settlement Verkhnaya Lupya, Komi-Permyak region) testing pipes. Photo by M. Zyryanova.

Material and methods

In 2013 N.Zhulanova worked out the plan of expedition, and one of the authors (M.K.) organized an expedition to the region difficult of access of Gainy district in Perm territory, found the plant "zorka/zargum", visited several traditional musicians (Fig. 1), who showed making muptipipe flutes and playing them.

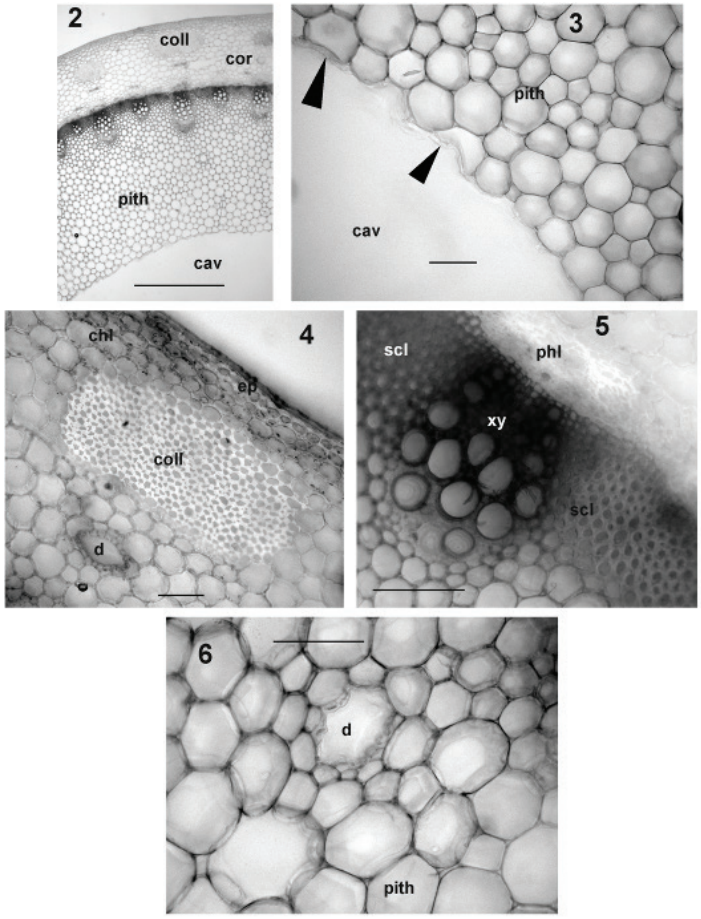
Other author (T.O.) identified the plant and studied stem anatomical structure in *A. sylvestris* and *A. archangelica* in connection with thier musical characteriscics. *A. sylvestris* for anatomical studies was collected in Bitsa forest in Moscow city, and *A. archangelica* was collected in MSU Botanical garden. Free-hand section were processed with phloroglucinos and hydrochloric acid to reveal lignification, photographs made with micriscope OlympusBX41, and camera OlympusDP25.

Results and discussion

The plant "zargum/zorka" is *Angelica sylvestris* L. In Gainy district of Perm teritory it inhabites flooded medows and has slim and firm stem. The plant "pikan" is also *A. sylvestris* inhabiting forests.

Stem anatomy in the middle internodes of *A. sylvestris* and *A.*

archangelica proved to be similar (Figures 2-6). As in many Umbelliferae species (Drude 1897-1898), the stem has epidermis, subepidermal collenchyma strands, chlorenchyma, secretory ducts, cortical parenchyma. Cortex zone is not lignified. Numerous vascular bundles form a ring. Thick-walled sclerenchyma fills the interfascicular space and tightly contacts with vascular bundles. Inner parenchyma is thin-walled and lignified, the ineermost layer is sometimes unlignified and compressed. Stems are hollow, 1-3 cm diam., the tube wall is 1-2 mm thick. The sturdiness of the musical instrument, retention of its form upon drying, and the sound quality can all be attributed to the presence of this solid lignified cylinder.



Figures 2-6. *Angelica sylvestris*, internode transections. Fig. 2. Fragment of hollow stem. Fig. 3. Lignified pith patenchyma, central cavity, unlignified cell remnants (arrowheads).

Fig. 4. Fragment of cortex. Fig. 5. Vascular bundle and interfascicular sclerenchyma. Fig. 6. Lignified pith parenchyma and secretory duct. Abbreviations: cav – cavity, chl – chlorenchyma, coll – collenchyma, cor – cortex zone, d - secretory duct, ep – epidermis, phl – phloem, scl – sclerenchyma, xy – xylem. Scale bars: Fig. 2 = 1 mm, Fig. 3-6 = 0.1 mm.

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