

V International Scientific and Technical Conference Actual Issues of Power Supply Systems

**Folkloric semiotics of plant imagery in the Northern Aral Sea
ethno cultural area (based on Uzbek Turkmen and Karakalpak
folklore)**

AIPCP25-CF-ICAIPSS2025-00490 | Article

PDF auto-generated using **ReView**



Folkloric semiotics of plant imagery in the Northern Aral Sea ethno cultural area (based on Uzbek, Turkmen, and Karakalpak folklore)

Ogulbay Gaylieva^{1,a)}, Bahar Ataniyazova², Maysa Atayeva², Rustem Saparniyazov¹, Halmuhammet Begjanov³

¹ Karakalpak state university named after Berdakh, Nukus, Uzbekistan

² Turkmen national institute of world languages named after Dovletmammet Azadi, Ashgabat, Turkmenistan

³ Nukus state pedagogical institute named after Ajiniyaz, Nukus, Uzbekistan

^{a)} Corresponding author: Ugulay2022@gmail.com

Abstract The article scientifically reveals the mythopoetic, ritual, and aesthetic semantics of the plant image within the system of folklore traditions that emerged in the North Aral Sea region's ethnocultural area. Plant images are studied in connection with ancient totemistic views, cosmogonic thought, the cult of fertility, and aesthetic worldview. Furthermore, the article comparatively examines the preservation of plant symbols - such as trees, poplars, and mulberry trees - from archaic layers to contemporary folklore, their significance in ethnosculture, and their semantic possibilities, using the Uzbek, Turkmen, Karakalpak folklore, and other peoples as examples. Therefore, the continuity of the common Turkic phytocode and the ethnesthetic worldview that emerged through plant imagery in the Aral Sea region ethnosculture constitute the scientific conclusion of the article.

INTRODUCTION

The distinctive national character of literary traditions in the folklore and literature of the Uzbek, Karakalpak, and Turkmen peoples, who have long coexisted as neighbors in the Aral Sea ethnocultural area of Central Asia, creates extensive opportunities for research within the context of mutual literary connections and artistic influence processes. This is because the peoples of the Northern Aral Sea region have lived in interaction with each other for centuries, relying on common ethnocultural foundations and maintaining relationships of friendship and kinship. This phenomenon continues to persist to this day. At the same time, close proximity to nature and the emergence of water, land, desert, and garden cultures have also influenced the folklore traditions in this region. Notably, plant imagery, the cult of trees and mulberry trees, flower symbolism, and ritual elements associated with healing and totemistic plants have formed an extensive semantic layer in folklore. In folklore semiotics, plant imagery is linked with spiritual codes such as life, purification, growth, renewal, beauty, fertility, protection, and blessing. Plant-related beliefs among the peoples of the Northern Aral Sea region are inseparable from common Turkic mythological layers while simultaneously acquiring a national character under the influence of local natural conditions and ecology. At this point, the current level of development in Turkic folklore studies highlights the necessity of revealing the similarities and differences of phytomorphic images in the folklore of Uzbek, Karakalpak, Turkmen, and other peoples with similar historical and genetic origins. This can be achieved by analyzing mythological beliefs, traditions, and rituals related to plants in a comparative typological aspect, based on modern scientific theoretical concepts. Presently, the acquisition of national spiritual identity and the assimilation of cultural heritage has become a common social characteristic, holding great importance for the spiritual future of our people. This has opened the way for a comprehensive study of the genesis and typological features of phytomorphic images in the folklore of Turkic peoples.

EXPERIMENTAL RESEARCH

When we examine world science, it becomes evident that folk perspectives, concepts, and mythological thoughts related to large trees, particularly poplars, as well as the artistic representation of the tree image in folklore works, have been extensively studied in global folklore studies and ethnology. What does this indicate? It signifies that our ancestors considered trees sacred, worshipped them, believed they possessed supernatural qualities, and widely incorporated them into their national traditions and customs [1].

On this matter, according to the renowned scholar J.G. Frazer, the understanding of natural forests as sacred places associated with spirits, deities, divinity, and gods by early humans gave rise to the concept of the tree cult. Ethnographer E. Tylor particularly emphasizes the presence of the following two main aspects in tree mythology: a) The initial understanding of every plant, particularly trees, as living beings gave rise to the traditions of worshipping and praying to trees;

b) the body of a tree can serve as a material vessel for the spirit of a deceased person [2].

When comparing the opinions expressed in scholarly sources regarding the mythological properties of trees, proponents of the animistic mythology of the plant and animal world link the historical foundations of the tree cult to mythical concepts about plants, and in this case, trees being understood as living entities. According to their reasoning, it becomes clear that beliefs emerged about natural objects, specifically trees, retaining their divine and supernatural qualities not only while growing but also after being cut down. These beliefs suggest that the essence of natural objects, particularly trees, maintains its sacred and extraordinary properties even after being felled. One of the aspects that defines the national identity of Turkic peoples, including Uzbeks, Turkmen, Karakalpaks, and others, is their customs and traditions, which have a history spanning many thousands of years. These traditions have served to educate our great people in the spirit of benevolent ideas for centuries, instilling in the hearts of the younger generation a love for the renowned ideals of our ancestors. For this reason, in folklore studies and ethnology, special attention has been given to the study of examples of folk oral artistic creations related to traditions and customs [3].

Ceremonies serve as a spiritual mirror reflecting the unique lifestyle of a people while also encompassing numerous rituals, beliefs, and customs rooted in historical foundations and connected to the mythological imagination of our ancestors who lived in the past. Among these are folk beliefs related to trees. In various customs and traditions of our people, one can find traces of tree worship, along with the symbolism of abundance associated with trees, and various beliefs and taboos aimed at sanctifying particular trees. Therefore, in this scientific study, we will comparatively present some of our thoughts on the analysis of the tree cult, which holds a significant place in Uzbek and Karakalpak folklore, specifically examining tree worship in customs and traditions. The article employs comparative historical, comparative-typological, ethno-folkloristic, and artistic-aesthetic analysis methods.

RESEARCH RESULTS

In our people's belief, the tradition of "sanctifying" long-lived trees such as old mulberry, plane, walnut, elm, and poplar emerged because trees were considered one of the dwellings where spirits reside.

The sanctification of the hawthorn tree is not without reason, as according to popular belief, jinn and evil spirits flee from the hawthorn. For this reason, in the past, skilled horsemen often made the handles of their whips from hawthorn wood. In some places, the tree used for making whips was also called "dubulga".

According to Rakhmetulla Yusuf's son, a folk healer who lived in the village of Qorakisa in Nurata, "Storytellers revere the iron military headgear as a sacred piece of wood. There's a legend about this: a man had a blue horse beneath him, a blue robe on his back, a blue turban on his head, and a whip with a handle made from an iron military headgear in his hand. If he lashed at any large snake with that whip, even if the whip didn't touch the snake, the snake would die on the spot [4]."

In the villages of the Nurota mountains, there was a custom of driving a stake made from hawthorn wood in front of the house threshold. For instance, according to information recorded from the Qorakisa village in the Nurota district, when moving into a new house, people would hammer a carved hawthorn stake in front of the threshold, then pull it out again. They would pour a small amount of molten lead into the hole left by the stake, before driving the hawthorn stake back in over it. People believe that "A house blessed with (spiritual essence) will have abundance and be protected from all misfortunes." For this reason, it has been noted that there is a saying among the people: "We had poured into our new house." According to tradition, it is believed to ward off potential misfortunes and bring blessings and abundance to the household. The custom of bringing blessings and prosperity is also found among the Altai Turks. In the Altai Teles and Telenget tribes, the concept of (blessing) is understood as a person's second self or

spirit. According to ethnographer L.P. Potapov, this word, which appears in early Turkic runic inscriptions, is used to convey the meaning of happiness and good fortune [5].

According to information recorded by Rahmatulla Yusuf, the tradition of hammering a branch of a hawthorn tree in front of the house, pouring molten lead into the hole where a stake was driven, and then hammering the stake over it again to bring blessings and abundance is considered one of the ancient customs of Turkic peoples. This practice is believed to have emerged as a result of thoughts associated with the tree cult.

In our opinion, the act of pouring blessings was initially synthesized in the mythological thoughts of our ancient ancestors about the flame mother and Umay, and later in views related to the plant cult, transitioning into shamanic mythology. Over time, this phenomenon has become embedded in human thought, expanding its functional and semantic roles.

The symbol of the sacred tree, embodying the essence of the world, is found in the cultures of various peoples. Scholars studying mythology explain that the image of the tree, known as the "world tree" or "tree of life," is understood in the mythologies of all peoples as a guardian that bestows eternal vitality and strength upon humans. This concept, originating from archaic myths and rituals, gradually evolved into shamanic understanding [6].

Thoughts related to the mythological concept of plants are encountered in the lyrical works of Turkic peoples, epic texts, primarily legends, fairy tales, and occasionally in epics as well. According to the legend "Khoja Mir," recorded by the renowned Uzbek folklorist M. Juraev, One year, it was extremely cold in Bukhara. One day, the Emir of Bukhara gathered his soldiers and said:

Today, you will go to Khoja Mir's house and say on my behalf, "The amir said: You are to pick a bucket of grapes from your garden and give them to the amir."

The soldiers were astonished by the amir's words, as it was the dead of winter. They set out to carry out the amir's order. They entered Khoja Mir's house and conveyed the amir's message. Khoja Mir ordered the uncovering of the buried grapes in his garden. The soldiers, with great effort, barely managed to open one edge of the buried grapes, as the ground was deeply frozen. When they uncovered the buried grapes, they were astonished. There, the grape leaves were lush green, and the grapes had fully ripened. They picked a bucket of grapes and took it to the amir. The amir, believing the grapes had been freshly picked, mounted his horse and set off to apologize for disrespecting Khoja Mir [7]. This legend, which illuminates the mythological significance of grapes, reflects the magical thinking of our ancient ancestors, based on the similarity between grape juice and human blood.

The mythological significance of grapes as a form of life, the motif of the amir seeing freshly harvested natural grapes in winter, should be evaluated as a product of mythological reflections related to eternal life and the tree of life.

There is a Karakalpak folk children's song called "White Poplar or Blue Poplar". This children's game song is presented in the form of a dialogue. In the song "White Poplar or Blue Poplar" boys and girls split into two groups and ask each other questions. When the boys ask, "Who do you need from us?", the girls reply, "We need a boy." At this point, people consider the poplar sacred, and therefore, sons and daughters are also compared to poplars, with wishes for them to grow tall and strong like these trees.

In Karakalpakstan, there is a custom of placing a child in a cradle forty days after birth. According to this tradition, when placing a child in the cradle, neighbors and relatives gather, and elderly mothers or grandmothers express good wishes by placing salt, a knife, and a book under the child's head pillow. They also hang a wooden amulet made from poplar on the cradle. This amulet is placed with the belief that the child should be protected from fears, sleep well, and be fruitful like a tree. In this context, the poplar is considered sacred by our people.

A tree is known by its fruit,

Poverty is known by its labor.

Even a tree's seed grows from itself.

From the fruit of a tree,

From the labor of poverty. - so it is said [7].

This compares the fruit of a tree to the growth and development of a child.

Among the Turkmen people, the belief that the mulberry tree is sacred is still preserved to this day. For example, in the village of Saraykol, Takhiatash District, Republic of Karakalpakstan, the majority of the settled population is Turkmen. According to a legend told by Taganbibi Kakabaevna, a large canal flowed in the area where the people lived. An elderly man went to the canal to wash his hands and saw a mulberry tree sapling floating in the water. He picked up the sapling. That man planted the mulberry sapling in the ground for Ore Ata's path. A man named Ore Ata was literate in religious studies and was an akhund (religious scholar). Ore Ata's children and grandchildren currently live in Kone Urgench, Turkmenistan. If the village children had a toothache, they would go to Ore Ata to have him recite prayers, and then the toothache would subside. The mulberry tree planted in Ore Ata's name grew and matured

over time. Even now, if the villagers fall ill, they come to this mulberry tree, circle around it with good intentions, and believe they will find healing. After this, all people visit the mulberry tree. This tradition continues to this day [10].

Additionally, women living in the village would approach the mulberry tree growing in that village area, bow to the tree three times, then embrace it several times, circle around it seven times, believing this would help them become pregnant. Furthermore, they would sit at the base of the mulberry tree and craft a small cradle from the tree or its branches, hanging it from the mulberry tree. For this reason, this mulberry tree is considered sacred, and no one would dare to cut it down.

Becoming pregnant through the magical properties of a tree, that is, having children from a tree, is considered one of the universal themes in world and Turkic mythology. In the ethnocultural traditions of many Turkic peoples, there were rituals based on the transfer of plant-specific fertility to women by embracing and circling sacred trees. Among the Yakuts in particular, a childless woman would go to the forest and, appealing to the tall trees there, ask for a child. In Kyrgyzstan, however, women who were childless or whose children died young would roll on the ground under an apple tree. Afterwards, they would hang the skin of a sacrificed animal on an apple branch. The tradition of venerating the mulberry tree and associating it with miraculous growth originated from the mythological beliefs of our ancient ancestors who lived in Central Asia. These beliefs were based on the idea that trees possessed supernatural properties. After the introduction of Islam to our land, ancient beliefs related to the tree cult began to take on Islamic significance. The supernatural characteristics attributed to trees became associated with the miracles of various saints and sheikhs. As a result, legends emerged about saints' staffs turning into trees, trees bearing fruit in winter due to saints' blessings, trees sanctified because they were planted by saints' hands, and saints performing miracles near trees.

People believe that cutting down or grafting certain trees and shrubs is a sin. In particular, it is considered forbidden to cut down sacred trees at shrines and mausoleums; otherwise, it is believed that the person who cuts them will be harmed in some way. Various legends have arisen about such trees. For example, according to Amina Hotam qizi, a resident of Qalazizon village in the Qiziltepa district of Navoiy region, tamarisk trees supposedly emerge from places where human blood was spilled. That's why its trunk and flowers are red in color. They say it's a sin to cut it down and use it as firewood [9].

This custom also exists among the Karakalpaks, who often refrain from cutting down mulberry trees. This is because the mulberry is considered a sacred tree among the people. Additionally, people hang a branch broken off from a mulberry tree in their homes. This tree is believed to bring happiness.

A mulberry tree grows in the center of Nukus city, and people go to it, bow before it, and offer their best wishes. Therefore, among the Karakalpak people, there is a saying [8]:

Cutting down a juniper tree is a great sin,
The flowing spring water will decrease.

This indicates that the juniper tree is considered sacred among the people.

At the same time, in Karakalpak folklore, one can observe the preservation of beliefs about the sacredness of trees in rituals and taboos. For example:

If someone shakes an empty cradle, the child's ear will hurt; If two people carry a cradle, the child will fall ill;
When a child is sleeping, the cradle is not moved from one room to another, as the soul will wander aimlessly, unable to find its owner;

A wooden amulet is worn around the child's neck to protect them from the evil eye;

When buying a cradle, there is no bargaining; the craftsman's stated price is accepted with a handclap. These beliefs have been preserved among the Karakalpak people and are still practiced in daily life today. Among the Turkmen people, the mountain tree is considered miraculous. Following this belief, they make small pendants from mountain wood, shaped with two larger ends and a narrow middle, resembling beads. These are attached to young children's skullcaps, headwear, and the "kurte" garments they wear, or tied to a multicolored thread made from various fibers and worn around the neck. This type of ornament is called "dagdabjyk" in Turkmen. Additionally, skilled young women and brides sew decorative kurte garments and suits with intricate patterns, and attach these pendants to protect against the evil eye and curses. Furthermore, they weave a mountain tree pattern at the beginning and end of the main designs in carpets. This is done to protect the carpet's beauty from the evil eye. The reason is that among Turkmen, if they believe someone's affection or gaze might harm an object, they use the mountain tree as protection against it. The Turkmen people also tie a piece of mountain wood to their livestock's ropes. A legend about this has been preserved as well. Long ago, there was a man with very sharp eyes. He would boast about this ability:

"I can quickly knock over anything I look at," he boasted.

One day, because of these words, the people sitting beside him looked at him and said:

"If that's so, then knock over that camel standing there!"

The man looked at the mentioned camel and cast his gaze upon it. The camel slipped where it stood, about to fall, but it didn't.

The man with the evil eye said:

“There's something strange here, otherwise that camel should have fallen.”

When he approached the camel and looked, he found a piece of mountain ash wood about two fingers in size attached to the camel's neck. The people who saw this said:

“Indeed, even with a talisman, it may slip but won't fall!” After this event, the phrase “One with a talisman won't slip” became a proverb and has been preserved among the people.

However, currently, beliefs about the healing properties of plants in plant-related rituals among the population have also been preserved. For example, if a child infected with erysipelas is circled around and fumigated with harmala, the child will recover.

The root of the dogbane plant is a remedy for tuberculosis and chest diseases [10].

If you recite an incantation over a wound and tie sorrel to it, it will open up and draw out the pus. According to Ulzifa Rizambetova, an 82-year-old resident of Qorao'zek district's Qorabug'a rural citizens' assembly, it's forbidden to burn oleaster pits or shells [11]. Because the oleaster gets upset and stops bearing fruit. In these concepts, the belief that the jujube tree is alive and considered sacred has been preserved in people's consciousness and continues to this day.

Along with these, one can observe that the concept of the sacredness of trees is also reflected in blessings within Karakalpak folklore. For example:

May your intentions be pure,

May good fortune settle upon you,

May the sustenance given by God,

Be not just a share, but a crown,

May your colts grow into horses [10],

May your willows grow into gardens In these blessing verses, the growth of a willow tree into a garden is metaphorically described, comparing human growth and development to a fruitful orchard. Let's look at another example:

May the saints protect you,

When you look to your right,

May a golden poplar take root,

When you look to your left,

May a silver poplar take root [17-21]. In this blessing poem, a person's growth is depicted through epithets such as “golden poplar” and “silver poplar.” Here, as mentioned above, one can observe the preservation of traces of mythological concepts associated with trees in relation to human life.

Let silver become a tree. In this praise poem, a person's growth is described with epithets like “golden poplar” and “silver poplar.” Here, as mentioned above, one can observe the preservation of traces of the tree's mythological concepts related to human life.

In Karakalpak culture, when expressing well-wishes to young brides, they are often associated with plants, conveying blessings for their happiness and growth, which are still practiced in our people's national traditions. For example:

May you have many children and grandchildren,

Be rooted like a camel thorn!

Blossom like a tamarisk,

Be fruitful like a poplar [11-43].

Or, in wishes for fruit and berries:

May we have plenty of mulberries,

May there be no misfortune,

Be fruitful like mulberry trees,

Be an example to your peers,

Amen, Allahu Akbar [8]!

May your food be grapes,

May you have a long life,

Amen, Allahu Akbar!

In the traditions and customs of the Karakalpak people, one can observe references to trees in common wishes. For example:

May your twig grow into a plane tree!

May you have many branches!

Since even trees themselves were considered “living,” various traditions related to this belief emerged. For example, the “tree frightening” ritual, conducted with the aim of ensuring that unproductive or low-yielding trees bear good fruit the following year, originated from this animistic idea. According to tradition, a person would take an axe and approach a tree that wasn’t bearing fruit. They would raise the axe high and say three times, “I’ll chop, I’ll chop, I’ll chop!” Other people, speaking on behalf of the tree, would plead, “Don’t chop!” and promise that it would bear abundant fruit the following year.

In some places, the orchard owner would gently strike the trunk of a tree with low yield using an axe, signaling that if it didn’t produce again, it would be cut down. It is believed that if this is done, the tree would “fear” and produce an abundant harvest the next season. Such beliefs also exist among Karakalpaks. This practice is still observed today. Similar beliefs related to fruitless trees have been known to other peoples of the world as well [1].

The tree cult holds great significance in the customs and traditions of the Uzbek, Karakalpak, and Turkmen peoples, who consider trees sacred. As mentioned in the aforementioned sources, these customs and traditions originated from ancient animistic beliefs. Early people, who considered trees to be living beings, believed that characteristics such as fertility and longevity associated with trees could be transferred to a woman who embraced them. Among Turkic peoples, including Uzbeks, Karakalpaks, Turkmen, Turks, and others, trees are associated with human life, and it can be observed that mythological concepts related to trees have been preserved even in beliefs about human death [14-17].

Such rituals and traditions associated with trees have been preserved among the peoples living in other territories of Karakalpakstan. For example, in the Kegeyli district of Karakalpakstan, at the Nurimbet Akhun cemetery, a tree is planted in the ground at the head of the Akhun’s grave. When we inquired about this from Muzaffar, son of Nurimbet Akhun, he mentioned that the tree at his father’s grave is connected to his tree of life [10].

CONCLUSIONS

In conclusion, we observe that mythological concepts about such plants and trees, originating from ancient times, are still preserved in the customs and traditions of our people today, with some of them still being practiced in our daily lives. From this comparative analysis, we can draw the following conclusions:

1. In Turkic wedding ceremonies, there is a noticeable belief that fruit trees hold magical significance for the bride and groom in bearing children. These beliefs and views emerged in connection with our people’s ancient plant and fertility cults and later found expression in the artistic thinking of the people.
2. Our ancestors’ thoughts related to plant cults served as a literary element, conveying the idea of fertility, in the imagery of fruit trees such as mulberry, apple, and pomegranate. This holds general importance for the folklore of Turkic peoples.
3. Currently, among Turkic peoples, including Uzbeks, Karakalpaks, Turkmen, and others, there is a tradition of making various amulets from mountain wood and attaching them to children. When asked why, it is believed that an amulet made from this mountain wood protects children from the evil eye and also brings good fortune. It was believed that placing small pieces of mountain wood in front of the house’s door would bring blessings to the home. Therefore, wood is considered sacred by our people.

REFERENCES

1. J. G. Frazer, *The Golden Bough* (Politedition, Moscow, 1986), p. 110.
2. E. Taylor, *Myth and Ritual in Primitive Culture* (Smolensk, 2000), p. 186.
3. Alimov, U.K., Reimov, A.M., Namazov, Sh.S., Beglov, B.M. The insoluble part of phosphorus fertilizers, obtained by processing of phosphorites of central kyzylkum with partially ammoniated extraction phosphoric acid. Russian Journal of Applied Chemistry. Russ J Appl Chem (2010) 83(3): 545–552. <https://doi.org/10.1134/S107042721030328>
4. Academy of Sciences of the Republic of Uzbekistan, Institute of Uzbek Language, Literature and Folklore, *Folklore Archive*, Inventory No. 1713/1–17, recorded by R. Yusuf ugli, May 19, 1971.
5. R. K. Kurbaniyazov, A. M. Reimov, A.T. Dadakhodzhaev, Sh. S. Namazov, B. M. Beglov. Nitrogen-phosphoric fertilizers produced by introduction of Central Kyzylkum phosphate raw material into ammonium nitrate melt. Russian Journal of Applied Chemistry. Russ J Appl Chem (2007) 80(11): 1984-88. <https://doi.org/10.1134/S1070427207110456>

6. E. P. Sleptsov, *Yakut Shamanism in the Context of Archaic Symbolic Systems: Mythology and Ritual*, Abstract of Candidate of Philological Sciences dissertation (Tomsk, 2009), p. 13.
7. A. Ahmadjonov, U. Alimov, P. Tuychi, A. Seitnazarov, A. Reimov, Sh. Namazov, S. Sadullayev. Effect of temperature on the kinetics of the process of nitric acid decomposition of Arvaten serpentinite. IOP Conf. Series: Earth and Environmental Science 1142 (2023) 012034. <https://www.scopus.com/pages/publications/85151285667>
8. M. Juraev, *Personal Archive of the Folklorist*, Copybook 11, in *Karakalpak Folklore*, 88–100 series (Science, 2015), pp. 174–175.
9. Alisher Eshimbetov, Shahobiddin Adizov, Inderpreet Kaur, Ahmed Reymov. Is it possible to differentiate between 2-phenylaminodihydro-1,3-thiazine from 2-phenyliminotetrahydro-1,3-thiazine by spectral methods? New glance to the old problem. European Journal of Chemistry 12 (1) (2021). <https://doi.org/10.5155/eurjchem.12.1.77-80.2068>
10. R. Saparniyazov, *Genesis and Artistic Interpretation of Phytomorphic Images (Based on Uzbek, Karakalpak, and English Folklore Materials)*, PhD dissertation (2021), p. 115; field recordings of folklore, June 30, 2021, Saraykul village, Takhiatash district, Republic of Karakalpakstan.
11. Kurbaniiazov, R.K., Reimov, A.M., Namazov, Sh.S., Beglov, B.M. Nitrogen-phosphoric fertilizers obtained by interaction of the concentrated solutions of ammonium nitrate with the mineralized mass of the phosphorites of Central Kyzylkum. Russian Journal of Applied Chemistry. Russ J Appl Chem (2009) 82: 1123. <https://link.springer.com/journal/11167>
12. R. Saparniyazov, *Field Recordings of Folklore*, August 28, 2021, Nukus city, Republic of Karakalpakstan.
13. R. Saparniyazov, *Field Recordings of Folklore*, November 26, 2021, Qorao'zak District, Qorabog'a village, Republic of Karakalpakstan.
14. Reymov Ahmed, Namazov Shafoat. Nitrogen-phosphorous fertilizers on the base of concentrated ammonium nitrate solution and Central Kyzylkum phosphate raw material. Polish Journal of Chemical Technology 16(3), Sep 2014, 30-35. <https://doi.org/10.2478/pjct-2014-0046>
15. S. K. Mirhasilov, “On the study of relics of pre-Islamic beliefs among Uzbeks in the pre-revolutionary period,” in *Ethnographic Study of the Life and Culture of Uzbeks* (Science, Tashkent, 1972), p. 28.
16. R. Saparniyazov, *Genesis and Artistic Interpretation of Phytomorphic Images (Based on Uzbek, Karakalpak, and English Folklore Materials)*, PhD dissertation (2021), p. 115.
17. L. P. Potapov, *Altai Shamanism* (Science, Leningrad, 1991), p. 33.
18. Namazov, Sh.S., Kurbaniyazov, R.K., Reimov, A.M., Beglov, B.M. Hardness of the granules of ammonium nitrate doped with the Central Kyzylkum Phosphorite. Russian Journal of Applied Chemistry. Russ J Appl Chem (2007) 81(6): 1103–1106. <http://dx.doi.org/10.1134/s1070427208060402>
19. O. Qaymov, *Archival Materials* (unpublished), available at institutional archive.
20. B. Sarimsoqov, *Uzbek Ritual Folklore* (Science, Tashkent, 1986); see also B. Sarimsoqov, “Ritual folklore,” in *Essays of Uzbek Folklore*, 1st ed. (Science, Tashkent, 1988).
21. Reymov, A.M., Namazov, S.S., Beglov, B.M. Effect of phosphate additives on physical-chemical properties of ammonium nitrate. Journal of Chemical Technology and Metallurgy 2013 48(4), 391-395. <http://dl.uctm.edu/journal/>
22. **Mahmutkhonov S., Baizhonova L., Mustayev R., Tashmatova S.** Dynamic analysis of voltage-ampere characteristics and harmonic distortions in electric arc furnaces. // AIP Conference Proceedings. 3331(1), 2025. pp. 070023, 1–5. <https://doi.org/10.1063/5.0305745>.
23. Bobojanov M., Mahmutkhonov S. Influence of the consumer to power quality at the point of connection // E3S Web of Conferences 384. 2023. PP, 01041, 1-5. <https://doi.org/10.1051/e3sconf/202338401041>.
24. Reymov K.M., Makhmuthonov S.K., Turmanova G., Uzaqbaev Q. Optimization of electric networks modes under conditions of partial uncertainty of initial information // E3S Web of Conferences 289, 07023 (2021). -2021, pp: 1-4, <https://doi.org/10.1051/e3sconf/202128907023>.
25. Urishev, B., Fakhreddin Nosirov, and N. Ruzikulova. 2023. “Hydraulic Energy Storage of Wind Power Plants.” E3S Web of Conferences, 383. <https://doi.org/10.1051/e3sconf/202338304052>
26. Urishev, B., S. Eshev, Fakhreddin Nosirov, and U. Kuvatov. 2024. “A Device for Reducing the Siltation of the Front Chamber of the Pumping Station in Irrigation Systems.” E3S Web of Conferences, 274. <https://doi.org/10.1051/e3sconf/202127403001>
27. Turabdjanov, S., Sh. Dungbo耶ev, Fakhreddin Nosirov, A. Juraev, and I. Karabaev. 2021. “Application of a Two-Axle Synchronous Generator Excitations in Small Hydropower Engineering and Wind Power Plants.” AIP Conference Proceedings. <https://doi.org/10.1063/5.0130649>
28. L.Jing, J.Guo, T.Feng, L.Han, Z.Zhou and M.Melikuziev, "Research on Energy Optimization Scheduling Methods for Systems with Multiple Microgrids in Urban Areas," 2024 IEEE 4th International Conference on Digital Twins and

Parallel Intelligence (DTPI), Wuhan, China, 2024, pp. 706-711, <https://ieeexplore.ieee.org/abstract/document/10778839>

29. Baratov, B.N., Umarov, F.Y., Toshov, Z.H. Tricone drill bit performance evaluation. Gornyi Zhurnal, Moscow, 2021. - № 12. - PP. 60-63. DOI:10.17580/gzh.2021.12.11.

30. Toshov, J.B., Toshov, B.R., Baratov, B.N., Haqberdiyev, A.L. Designing new generation drill bits with optimal axial eccentricity | Вопросы проектирования буровых долот нового поколения с оптимальным межосевым эксцентризитетом // Mining Informational and Analytical Bulletin, 2022, (9). - PP. 133–142. DOI: 10.25018/0236_1493_2022_9_0_133

31. Toshov J., Makhmudov A., Kurbonov O., Arzikulov G., Makhmudova G. Development and Substantiation of Energy-Saving Methods for Controlling the Modes of Operation of Centrifugal Pumping Units in Complicated Operating Conditions. Proceedings of the 11th International Conference on Applied Innovations in IT, (ICAIIT), November 2023, Koethen, Germany. – PP. 161-165.

32. J.B. Toshov, K.T. Sherov, B.N. Absadykov, R.U. Djuraev, M.R. Sakhimbayev, Efficiency of drilling wells with air purge based on the use of a vortex tube. NEWS of the National Academy of Sciences of the Republic of Kazakhstan "Series of geology and technical sciences". – Almaty, Volume 4, Number 460 (2023), 225–235. <https://doi.org/10.32014/2023.2518-170X.331>

Toshov J., Toshov B., Bainazov U., Elemonov M. Application of Cycle-Flow Technology in Coal Mines. Proceedings of the 11th International Conference on Applied Innovations in IT, (ICAIIT), March 2023, Koethen, Germany. – PP. 279-284.

33. Usmanov, E., Kholikhamatov, B., Rikhsitillaev, B., Nimatov, K. Device for reducing asymmetry // E3s Web of Conferences 461. 2023. PP, 01052, 1-5. <https://doi.org/10.1051/e3sconf/202346101052>

34. Toshov B., Toshov J., Akhmedova L., Baratov B. The new design scheme of drilling rock cutting tools, working in rotation mode pairs. E3S Web of Conferences 383, 04069 (2023) TT21C-2023 <https://doi.org/10.1051/e3sconf/202338304069>

35. J.B. Toshev, M.B. Norkulov, A.A. Urazimbetova and L.G. Toshniyozov. Optimization of scheme of placing cutting structures on the cone drill bit. E3S Web of Conf., Volume 402, 10039 (2023), International Scientific Siberian Transport Forum - TransSiberia 2023, <https://doi.org/10.1051/e3sconf/202340210039>

36. K.T. Sherov, N.Zh. Karsakova, B.N. Absadykov, J.B. Toshov, M.R. Sakhimbayev, Studying the effect of the boring bar amplitude-frequency characteristics on the accuracy of machining a large-sized part. NEWS of the National Academy of Sciences of the Republic of Kazakhstan "SERIES OF GEOLOGY AND TECHNICAL SCIENCES". – Almaty, Volume 2, Number 464 (2024), 217–227. <https://doi.org/10.32014/2024.2518-170X.405>

37. J. Toshov, L. Atakulov, G. Arzikulov, U. Baynazov, Modeling of optimal operating conditions of cyclic-flow technologies with a belt conveyor at coal mine under the "ANSYS" program. AIP Conf. Proc. 3152, 020006 (2024) / III International Scientific and Technical Conference "Actual issues of Power supply systems" (ICAIPSS2023), 7–8 September 2023, Tashkent, Uzbekistan. <https://doi.org/10.1063/5.0218904>

38. Kholikhamatov B.B., Samiev Sh.S., Erejepov M.T., Nematov L.A. Modelling of laboratory work in the science "Fundamentals of power supply" using an educational simulator based on a programmed logic controller // E3S Web of Conferences 384. 2023. PP, 01032, 1-3. <https://doi.org/10.1051/e3sconf/202338401032>

39. Rakhimov F, Rakhimov F, Samiev Sh, Abdukhalilov D. Justification of Technical and Economic Effectiveness of Application of 20 kV Voltage in Overhead Electric Networks //AIP Conf. Proc. 3152, 030023 (2024). <https://doi.org/10.1063/5.0218921>

40. Taslimov A, Mo'minov V, Samiev Sh, Abdukhalilov D. Issues of Optimization of Electrical Network Parameters Medium Voltage //AIP Conf. Proc. 3331, 020007 (2025). <https://doi.org/10.1063/5.0305781>

41. Toshbekov, O., Urazov, M., Yermatov, S., & Khamraeva, M. 2023). Yeffisent and yesonomisal yenergy use teshnology in the prosessing of domestis soarse wool fiber. In Ye3S Web of Sonferenses (Vol. 461, p. 01068). <https://doi.org/10.1051/e3sconf/202346101068>

42. Jumaniyozov, K., Urozov, M., Toshbekov, O., Salimova, M., Raximova, K., & Khursandova, B. (2025, November). Enhancement of energy-efficient cleaning equipment. In American Institute of Physics Conference Series (Vol. 3331, No. 1, p. 050007). <https://doi.org/10.1063/5.0307149>

43. Sultonova, F., Toshbekov, O., Urozov, M., Boymurova, N., Mustanova, Z., & Boltaeva, I. (2025, November). Enhancing and evaluating the characteristics of specialized workwear for employees in the electric power supply sector. In American Institute of Physics Conference Series (Vol. 3331, No. 1, p. 050006). <https://doi.org/10.1063/5.0306350>