Original Research Article

Plants in the national symbolism of European countries - a link among countries, cultures, and religions

ABSTRACT

The article analyzes the plant species included in the national symbols of European countries. National coats of arms, emblems and officially accepted symbolic elements have been analyzed. The study is based entirely on literary sources, thematically divided into four areas: botany and phytogeography, world and European heraldry; national symbols and emblems and the Web of Science and Research Gate information platforms. The study establishes the vectors of spread of plant species as a symbolic elements in the countries of Europe as a result of cultural, commercial, religious and scientific connections. Moreover, the continuity of the abiotic factors of the environment (terrestrial biomes) allows plant species to cross the borders of Europe and pass into Asia. The discovered similarities, continuity and duplication of a number of plant-based symbolic elements in countries of both continents are proof of a common past, a shared culture and are an ideal basis for achieving understanding between peoples speaking different languages and professing different religions.

Keywords: higher plants, national symbols, European countries

1. Introduction

Plants accompany man since his appearance. They contribute not only to his physiological evolution, but also to his shaping as a social being. Society also undergoes development, the main driving force of which is the procurement of food and the development of technologies for its processing [1]. In his "Theory of Cultural Evolution", the author distinguishes three stages in the development of society: the stage of hunting and gathering ("savagery"), the stage of sedentary agriculture ("barbarism") and urban society ("civilization").

About 40 mya in the early Oligocene, the climate began to change towards its present state. Animal food was abundant, as most modern mammal families originated from this time. The Quaternary Ice Age led to the extinction of many species and forced humans to retreat to areas with a milder climate, as did plants and animals [2]. For the flora and fauna of Europe, three regions play the role of refugia: the southern parts of the Iberian, Balkan and Apennine peninsulas [3] [4]. In the period around 16 000 - 13 000 BC the glaciers gradually retreated and the survivors returned to their habitats. Europe was slowly being populated with people.

Almost at the same time, along the equatorial regions, but in different places of the world, such as China, South Asia, Africa, Mesoamerica and South America, the first agricultural communities

Comment [u1]: Reference?

Comment [u2]: Define this at first mention

Comment [u3]: Write as "16000 - 13000".

Comment [u4]: Reference?

appeared. Through their activities, they transformed the environment to such an extent that modern scientists define it as the "Neolithic Revolution". The Neolithic Agricultural Revolution forced people to create permanent settlements and families with a division of labor. The specialized cultivation of food crops led to a number of negative consequences with which we still struggle today - soil impoverishment, reduction of plant diversity and deforestation of the landscape.

In the 3rd- 2nd millennium BC bronze was discovered, which was used not only in agriculture, but also for the manufacture of weapons. With the discovery of metals and their alloys, the world became not only more progressive, but also more aggressive. War became a part of human daily life and one of the easiest ways to get rich, which led to the gradual disintegration of the clan structure of society, the creation of class organization and the beginnings of statehood.

The use of various objects in the household stimulated the development of the brain and nervous system. Symbolic thinking originated about 30 000 years ago as a product of the second signaling system and the process of communication. The second signal system serves abstract - logical thinking, responsible for the perception of sound combinations in written and spoken form, signs, schemes, formulas, facial expressions, gestures, and of course symbols. From the walls of the caves, the symbolism "enters" the homes. The natural elements and the world of the dead are the first "altars" before which people offer their worship. In different parts of the world, signs of kinship appear - totems, tamgas and emblems. Images from animate and inanimate nature are used as symbols - mediators between man and nature. Worship of idols gradually transformed into religion (lat. "*religio*" - respect for the sacred, worship of the gods). With the development of feudal society, the medieval continuation of family symbolism - heraldry, appeared. Heraldry continued the tradition of using symbols - mainly images of animals and birds, household objects, parts of human bodies, geographical features, etc.

Vegetal elements are regularly undervalued in heraldry because they do not represent aggression. The great geographical discoveries and the progress of science allowed the systematization of biological diversity and rapidly increased the choice of plant species suitable for symbols. After the initial "boom" of exotic species in Europe in the 15th century, imported from various parts of the world, the passions of the elite were gradually tamed and the role of heraldic symbols was taken over by naturally distributed local and rare, endemic species.

The present article aims to analyze the plant species included in the national symbols of the countries of Europe. The research seeks an answer to the question to what extent national symbols can be used as evidence of historical ties between peoples.

2. MATERIALS AND METHODS

The development of communication between people forces them to use as symbols everything through which information can be transmitted. With the evolution of society, the presence of symbolism in material and spiritual life becomes more and more tangible. It is the basis of languages, writings, and sciences. The emergence of private property necessitates its designation, and its redistribution gives rise to frequent conflicts requiring the recognition of one's own among others. Thus, in the 11th - 12th centuries, heraldry appeared, which summarized all the knowledge accumulated until then about family symbols and turned it into a science. The coat of arms became the official distinguishing mark of groups of heterogeneous rank - states, cities, estates, families, and clans. The symbols on the national coat of arms are one way of expressing national identity. In the absence of a national coat of arms, the emblem fulfills this function. In the study, the term "national symbol" is used as a collective one, since each country has chosen its own way of presenting its national identity - through heraldic symbols, an emblem or via an officially declared national symbol, the result of a public poll or a proposal by state institutions.

Comment [u5]: Reference?

Comment [u6]: Reference?

Comment [u7]: Write as "30000".

Comment [u8]: Reference?

Comment [u9]: Reference?

Comment [u10]: Reference?

Comment [u11]: This should be part of the literature review. It is not relating how the work was carried out.

The study is based entirely on literary sources, thematically united in 4 points:

- specialized literature on biogeography and taxonomy of higher plants: printed sources: [5], [6], [7],[8] and on line sources: [9] [10];
- world and European heraldry (on line sources): [11], [12], [13]; [14]; [15]
- national symbols and emblems (on line sources): [16]; [17], [18]
- Web of Science and Research Gate databases

Review of the plant-themed symbolism of Asian countries is necessary for the following reasons: established centers of origin of the analyzed species in Asia, presence of common biomes and common taxonomic affiliation.

Comment [u12]: This sounds more like an aim of carrying out this study and not describing any method.

3. RESULTS

Today, the media space is saturated with paraphrased versions of a famous text from the Holy Scriptures, warning about the danger of false prophets (Gospel from Matthew 7:16): "By their fruits you will know them". Applied to our subject, the paraphrase would be: "By their symbols you shall know them".

3.1.Symbols of the Balkans and Europe - tulip, rose, lily, oak

Comment [u13]: 3.1. Symbols .....

3.1.1. Tulip (*Tulipa sp.*)

Among the symbolism of the European and Balkan countries, several species that have accompanied man since ancient times dominate. These are the tulip, the rose, the cream and the oak. The role of the oak tree as a national symbol will be discussed in a separate article.

The genus *Tulipa* includes about 150 species, naturally distributed in Eurasia and North Africa. *Tulipa sylvestris* L. (Wild tulip) was the first species naturalized in Britain in the 17th century [19]. Tulips entered European and Mediterranean gardens much earlier, but they are not native to these regions. The Tien Shan and the Pamir-Altai mountain ranges in Central Asia were found to be primary centers for the genus, and the Caucasus - a secondary center [20], [21] . The tulip is a bulbous plant belonging to the group of spring geophytes. They are a characteristic element of deciduous forests in temperate latitudes, alpine and arid biomes, where harsh natural conditions are compensated by a short life cycle of the whole plant or at least of its aerial parts. In ancient times, the species attracted people's attention not only for its beauty, but also for its transience, determined by its biological type. The natural range of the tulip includes the countries of Central Asia: Kazakhstan, Turkmenistan, Tajikistan, Uzbekistan and those from the Middle East: Iran, as well as Armenia, Turkey and Crete Island [22].

Comment [u14]: Delete the spacing

The species is a common theme in Turkish culture, where it symbolizes abundance and contentment. The roots of its Latin name come from the Turkic word “turban” (turban) - a special headband that protects from the strong sun rays in the desert. In the Christian religion, the tulip symbolizes the coming of spring and the Resurrection of Christ, and in the Netherlands it symbolizes the shortness of life [23].

In the 10th - 11th centuries, cultivation of natural species began in Constantinople, which did not go unnoticed by Western diplomats. In the middle of the 16th century, the Dutch scientist, writer and keen gardener Busbecq was sent as a Habsburg ambassador to the court of Suleiman the Magnificent. He arranged for exotic tulip bulbs to be transported to Vienna [24]. Thus the tulip began its journey

north to the Netherlands. Thanks to the efforts of another botanist - Clusious [25] the thawing of tulips in the Netherlands became a fashion trend, and subsequently an industry. According to some scholars, the tulip was not introduced to Europe through Anatolia, but through the Iberian Peninsula and Andalusia due to the Ottoman invasions in the 8th century [26]. Its value as a garden plant is expressed not only in its beautiful appearance, but also in its ability to mutate easily, creating spectacular hybrids [27], [28].

The tulip is an important symbolic element in Iran and Turkey and a national plant in Hungary and the Netherlands (Fig.1).

Fig.1. Tulip fields in the Netherlands (Aerial photo)

3.2.2. Rose (*Rosa sp.*)

The genus *Rosa* includes 140 - 180 species divided into 4 subgenera. North Africa, West Asia and China are considered the homeland of the rose [29]. Fossil remains of the genus indicate an age of 35 mya. Cultivation of roses is thought to have begun 5,000 years ago, probably in China [30]. Artifacts of the domestic use of the rose dating back to 2000 BC have been found in the Middle East [31].

The Mediterranean played an important role in the spread of the rose - Romans, Greeks and Phoenicians not only cultivated the species, but also traded it. In the 3rd century BC the Greek scientist Theophrastus described a number of plants, including several types of roses. This "advertisement", combined with the conquests and commercial activity of Alexander the Great, became the reason for the spread of the cult of the rose in the ancient world.

The species was widely cultivated in the gardens of Persia, the Romans used the roses as confetti and for medicinal purposes [32]. An analogue and natural continuation of the ancient Greco-Roman Rosals are Rusalii - a pagan Slavic holiday celebrated in Serbia, Bulgaria, Macedonia and Vardavar - an Armenian holiday connecting paganism and Christianity. With the fall of the Roman Empire, the luxuries of life disappeared and the monasteries took over the maintenance of the few surviving rose gardens, along with other medicinally oriented plant species. Early Christians considered the rose a pagan symbol, but it later became Christian as well [33]. It is argued about the time - the 8th century or the 11th century - when the papal institution adopted the custom of awarding a Golden rose in recognition of merits to nobles, which has been preserved to this day. In Gothic cathedrals, there is necessarily a rose window, located in a central place and personifying the purity of the Mother of God [34].

Introduction of roses to Western Europe during the 12th - 13th century is associated with the Crusader Knights. For the first time, a stylized image of a rose appeared on the coat of arms of the York family (XIII - XV centuries) - a white rose (*Rosa* × *alba*) - today the emblem of Yorkshire, and a red rose (*Rosa galica* L.) - on the coat of arms of the Lancaster family. The civil wars between the two houses - York and Lancaster - are known in English history under the name "War of the Roses". After 30 years of enmity, the two families united around the Tudor family, and their union acquired a heraldic expression with the so-called "Tudor" rose - with two rows of petals, with which a connection with the cultivated varieties was made (Fig.2).

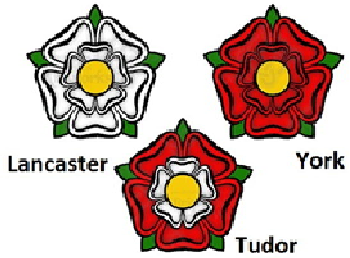

Fig.2. Formation of "Tudor rose" as a heraldic symbol

The coats of arms in the English armories testify to the use of both natural representatives of the genus and cultivated forms. Syrians and Persians discovered that soaked or stewed flowers release essential oils with a pleasant aroma and medicinal effect. Rose water became highly valued as a perfume and culinary flavor in the sweets of the East.

Roses easily hybridize with each other, and even for experienced gardeners it is difficult to determine the parent forms. Hybrids are usually used - one of the hybrids of the white rose - "Maxima", became the emblem of the Jacobites in the 18th century. Through DNA analysis, it is established that white roses are the result of a cross between local species - *Rosa gallica* L. and *Rosa canina* L. Unlike the white rose, *Rosa gallica* L. (Red rose) is a widespread European species, also called the French rose or "Rose de Provins" - after the town of Provins (a small town in northeastern France, known for its extensive rose farms, and today for its perfume factory).

At present, only 4 species are grown as oil plants - *Rosa damascena* Mill., *Rosa centifolia* L. (Centifolia rose) (= *R. gallica var. centifolia* (L.) Regel, *Rosa gallica* L. and *Rosa alba* L. [35]. *Rosa x damascena* is a hybrid between *Rosa gallica* L. (Gallic rose) and *Rosa moschata* Herm. (Musk rose).

The rose from Iraq and nearby Georgia (*Rosa laevigata* Michx. - Cherokee rose) was chosen as the national plant. From Asia Minor, the "Rose Road" passes through Bulgaria (*Rosa damascena* Mill. - Damask rose), Romania (*Rosa canina* L. - Dog rose) and continues its "journey" to the Czech Republic and Slovakia, where it is also adopted as a national symbol. The rose (specified to the genus level - *Rosa sp*.) is also present as the national symbol of the USA.

3.2.3. Lily (*Lilium sp.)*

The representatives of the genus *Lilium* carry the centuries-old fame of decorative, medicinal and food species. The group of true lilies numbers over 100 species, but species from another 97

genera are defined and translated as lilies - in the families *Liliaceae, Asparagaceae, Amaryllidaceae*, all Monocots. Both natural forms and many hybrids are cultivated.

Among the many species, *Lilium candidum* L. (White lily, Madonna lily) occupies a central place. The species is naturally distributed in the Balkans and the Middle East - the Caucasus, Afghanistan, and naturalized in the rest of Europe and everywhere in the world. Its cultivation began before 2000 BC in Asia Minor and over time acquired great symbolic value for many cultures around the world. The white lily was spread throughout the eastern Mediterranean by the Phoenicians. In the Assyrian and Egyptian empires, the species became an emblem of the sovereignty of the kings and a decorative element in the palaces of King Solomon - The Book of Kings (Hebrew Bible). Frescoes from the period between 1600 BC - 1500 BC have been found on the island of Crete showing plants of the species.

During the Middle Ages, the spread of the lily in Europe was associated with France and the "Fleur de Lis" (a stylized version of the lily). Lilies for centuries decorated the coat of arms and the flag of France and a number of family coats of arms (Fig. 3).

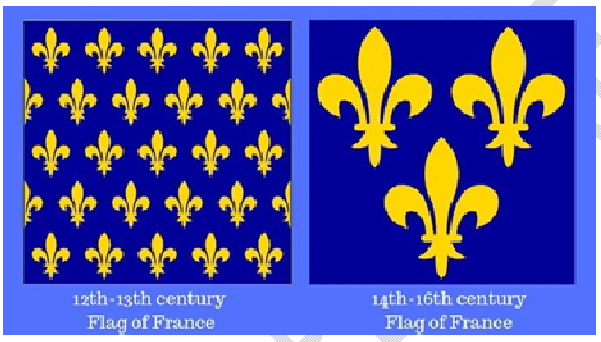

Fig.3. "Fleur de Lis" on the national flag of France until the 16th century

From France, lilies spread to other European countries as national symbols - Spain, Italy, and Germany. From the 12th century, when Louis VII adopted the lily as a symbol of his country, until the 20th century, the species became an invariable element of French history, French monarchs and Catholicism, and the embodiment of Christian ideas of purity and chastity. In biblical texts, paradise is characterized by lilies, roses, carnations and pomegranates.

With the development of science, the systematization of species progresses rapidly. The European Renaissance changed man's attitude to the environment, which forced many countries to replace exotic species on their coats of arms with local ones. In this case, the lily was replaced by representatives of local species, resembling it externally, belonging to the same subclass - *Liliopsida* (Monocots), but from a different family - *Iridaceae* (Fig. 4).

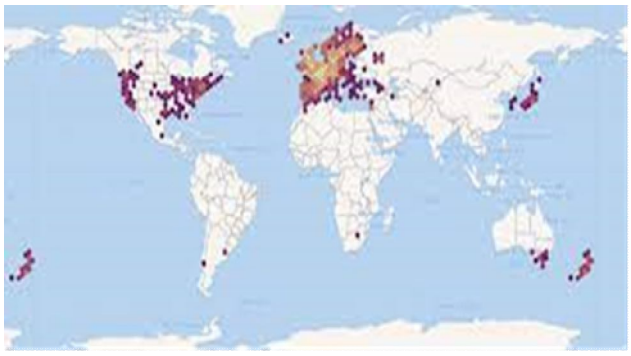

Fig. 4. Global distribution of *Iris pseudacorus* L. (by GBIF Secr., 2018)

From this family, in the role of "Fleur-de-lis" are the species of the genus *Iris* (Iris): the widespread *Iris pseudacorus* L. (Yellow Iris), *Iris germanica* L. (German Iris) or the endemic *I. nigricans* Dinsm. (Black iris) - national flower of Jordan and *Iris croatica* L. (Croatia iris) - national symbol of Croatia. In the Balkans, the lily was part of the national coat of arms of Bosnia and Herzegovina until 1998; in Italy, the image of "Fleur-de-lis" refers to the species *Iris florentina* L. (Florentine Iris) - a naturalized species in Central and Southern Europe. Today, the medieval division of states into "roses" and "lilies" is largely preserved.

3.2. Symbols of the Baltic Republics and Russia - species from *Asteraceae* Family (Asters)

The *Asteraceae* family is one of the leading families among the *Angiosperms* - it has about 30,000 species, divided into 12 subfamilies and 1,900 genera. The representatives are mainly herbaceous plants with a specific structure of the inflorescence. Cluster analysis proves that the ancient primary range of Asterids is South America, with a secondary migration direction Africa. Biogeographic studies focus attention on the evolution of major tribes [36], [37], [38], [39], [40]. According to them, the ancestors of the family should be sought in South Africa, Western Asia or the Old World. The oldest macrofossil was found in South America and dates to approximately 47, 5 mya [41], but fossils have been found even in Antarctica, complicating the historical biogeography of *Asteraceae* [42].

The group of Baltic republics includes Lithuania, Latvia and Estonia. All three countries experience the influence of diverse cultures - Swedish, Russian, and German. In the 3rd century, these places were inhabited by the pagan tribes of the Baltics. A leading Visigothic family from the 5th century bears the name Balti. Its most famous representatives were Alaric I and Alaric II. Alaric I was the first definitely established king of the Visigoths from the late 4th to the early 5th century, and the first German to take Rome. During the early Iron Age, the Proto-Balts reached southern Russia and present-day Ukraine. The resettlement of the Slavs began in the 7th century, and the Scandinavian influence intensified in the 8th century. In the 9th - 11th centuries, the Vikings appeared on the historical scene, and in the 13th century, the early Russian principalities were destroyed or severely affected by the Mongol invasion.

The plant symbols declared national by these countries belong to the *Asteraceae* family (Aster = star, sun). Latvia chose wild chamomile (*Leucanthemum vulgare* L.), Estonia - cornflower (*Centaurea cyanus* L.); Ukraine - sunflower (*Helianthus annus* L.), Russia - wild chamomile (*Leucanthemum*

vulgare L.). The blue cornflower is a respected symbol not only in modern Estonia, but also in the German kingdom of Prussia (XVIII - XX centuries) - the predecessor of modern Germany.

Symbolism with the theme of Asters, characteristic of the Baltic republics and Russia, finds its expression in the wood carving and embroidery of the South Slavs, where floral motifs with representatives from this family predominate. The images include species characteristic of the given areas at different stages of growth and development. In the southern part of Eastern Europe, rose and periwinkle dominate the embroidery, in the middle part - cornflower and ferns, and in the northern parts - elements of conifers, plantains and caluna.

Basis for the Aster species selection as symbols can also be found "closer" - in the history of ancient Egypt with the veneration of the sun and the god Ra (XXV - XXIV centuries BC), in the Zoroastrianism of the ancient Persians and the winged sun, in the worship of the ancient Greeks to the god Helios and of the ancient Romans to the all-seeing god Sol [43] (Fig. 5).

A B

Fig 5. The Egyptian sun god Ra (A) and Faravahar - The winged sun symbol of Zoroastrianism (B)

3.3. Symbols of Asia - species of *Poaceae* Family (Cereals)

In systematic terms, the Cereals fall into the group of the first 10 most numerous families on the planet - they include about 700 genera with over 10,000 species, distributed in 12 subfamilies. More important in this case is their crucial importance as a grain - fodder crops, which have fed the human race and accompanying domesticated animal species from their appearance to the present day. The typical structure of the inflorescence allows easy pollination and self-pollination by the wind - as a result of which the first hybrid forms of wheat - tetra and hexaploids: spelt, emmer, eikorn - appeared already in the Mesolithic [44].

3.3.1. Wheat (*Triticum sp.*)

Agricultural Neolithic societies arose around the same time everywhere in the world - Mesopotamia, China, South Asia, Africa, Mesoamerica and South America. The Levant - a fertile area between the Tigris and Euphrates rivers in the territories of today's Iran and Iraq - is considered the original source of the cult of the Cereals.

The Cereals theme is widely represented in the ancient biblical texts - the Old Testament, the Bible, the Talmud, etc. The ancient Persian traditions from before 3000 BC were deeply rooted in the rituals and customs of modern Iranians through Zoroastrianism, the religion of Ancient Persia before

the advent of Islam. On the Persian New Year (Norowz), starting in the week of the vernal equinox, the festive table necessarily contains seven main elements symbolizing well-being, happiness, wealth, good health and other fortunes. Among them, there must be a vessel with sprouted grains of wheat or lentils, symbolizing the awakening of life (Fig. 6). Cereals are an inalienable part of the pagan beliefs of the southern and eastern Slavs in pre-Christian Russia and the Balkans. Their life cycle, from sowing to harvesting and the onset of winter, is bound up with folk customs and traditions reflecting the main stages of human development.

Included in the territory of the ancient Levant, modern Syria and Jordan and nearby Armenia still keep the ears of wheat on their national coat of arms. Pakistan, Afghanistan, Turkmenistan, Uzbekistan, Tajikistan, and Azerbaijan take over the "Relay" of wheat in the countries of South and Central Asia, and in the Black Sea region - Ukraine. In the recent past, wheat sheaves contained the emblems of some Eastern European countries - Romania (1948 - 1989), the Republic of Macedonia (1947 - 2009), the former GDR (German Democratic Republic) (until 1990). The coats of arms of a number of European cities in Spain, France, Italy, Portugal, the Baltic republics and Russia speak for those who have appreciated the power of bread and cereals throughout the centuries to the present day.

Fig.6. Symbol elements of the Iranian New Year (Nowruz)

3.3.2. Rice (*Orysa sativa* L.)

Neolithic farmers from the Near East established contact with those from India, around 8,500 BC [45]. A detailed cartographic study of several archaeological sites in regions now belonging to modern Pakistan show similarities in the early agricultural phases with sites in South Asia. Wheat cultivation spread beyond the Fertile Crescent around 8000 BC. From the lands of the Fertile Crescent, the species reached Greece, Cyprus around 6500 BC, Egypt soon after 6000 BC, Germany and Spain in 5000 BC. By about 3000 BC wheat reached England and Scandinavia, and a millennium later to China.

In the period from 10,000 BC - 8200 BC in the Yangtze River basin in southern China, another cereal species appeared, which today is the main food crop of 60% of the world's population, mainly in the developing countries of Asia, Latin America, the Caribbean and Africa - rice [46], [47], [48]. About 3500 - 3000 BC ago in Africa, the less common species *Oryza glaberrima* Steud. independently occurred [49].

In the production of agricultural products, rice occupies the third place in the world after sugar cane and corn [50]. The main producers of rice are also its main consumers, which is reflected in their national symbolism. Rice and sometimes wheat ears contain the emblems of the countries of East,

South and South East Asia - China, Laos, Indonesia, Bangladesh, and North Korea. In Eastern cultures, rice fulfills a ritualistic, wheat-like role in wedding rituals. In the island groups of Indonesia, Thailand, Cambodia and Laos, the species takes the form of a female deity, and in some Asian countries - Cambodia, Thailand, and Nepal - the beginning of each of its growing seasons is celebrated with royal honors. In South America, many cities in Brazil, Peru, and Colombia feature rice ears on their coats of arms.

4. DISCUSSION

The search for a connection between the abiotic factors of the environment and people's lifestyle, religion and language, physical and mental characteristics, is not a new trend. Ancient Greek philosophers, led by Theophrastus, noted that the type of soil determined the livelihood, cultural and religious values of a people [51]. This idea has been continued in more recent times by a number of scientists, who further develop it and even find in it the reasons for the progress or collapse of civilizations [52], [53], [54]. The thesis finds its conclusion in the climatic [55] and biome zoning of the world [56], [57], through which the similarity between climate and biota is proven even in remote regions located on different continents.

Comment [u15]: This statement looked unclear. Which thesis?

All terrestrial biomes are represented on the continent of Asia. Phytogeographical the territories of the countries of South West, Central and East Asia fall into the biome of the steppes, semi-steppes and deserts. An extensive belt starts from Romanian Dobruja through southern Ukraine and Kazakhstan to the foothills of the Altai and the Tien Shan in the Far East, dividing Eurasia into 2 parts - Western and Eastern steppes. The main types of soil in these areas are black soil and brown soil, mainly formed by glacial and post-glacial loess. The fertile soils of the steppes favor the development of agricultural activity. In such places, the cropping period can last up to nine months of the year, and unsuitable land can be used as pasture. For these reasons, even in antiquity, the steppe landscape was strongly influenced by the way of life of nomadic tribes - Scythians and Sarmatians in the 6th century, followed by Turkic tribes.

The main plant species in the steppe communities are Cereals [58], [59], which is the reason why people direct their attention and selective efforts to them. Driven by his primal needs for survival, man further develops what nature gives him in abundance - fertile soil and plant species capable of nourishing him. Wheat and its wild predecessors - spelt, einkorn, emmer, were the basic source of carbohydrates not only for humans, but also for their major companions - horses and domesticated dairy animals - cows, goats, and sheep. Today, despite the drive to create new, high-yielding varieties with lodging-resistant stems and full ears, scientists are powerless over the biology of wheat and specifically its susceptibility to sudden climatic changes, fungal and bacterial diseases and the presence of weeds [60].

The establishment of rice - the "grain of life" as a major agricultural crop in East, South and Southeast Asia was based on the wealth of water resources in these parts of the continent - several large rivers and high mountains with melting glaciers. Tropical and subtropical climates with extreme rainfalls, causing floods and landslides, further complicated human existence in these places.

Archaeological excavations carried out in China indicate a whole range of cerals grown with it: foxtail millet, corn millet, wheat, barley, soybean, adzuki bean, oats, and buckwheat, found in Neolithic human settlements. A correlation has been established between loess deposits in river mouths, on the slopes of valleys and mountains and the cultivation of millet. In ancient China, millet was grown in the north and rice in the south. Main routes for rivers become a means of communication, which is always accompanied by human migration and cultural exchange [61].

Comment [u16]: Check the spelling

Perceived as symbolic elements from ancient times, the Cereals embody the natural connection between people professing different religions - Christianity, Islam, and Buddhism, but equally aware of the price of survival, of which they become a symbol. For different geographical latitudes, these may be different types - wheat, rice, rye, and oat, but they all carry the same message - about the power of human will, which won back a piece of land with much efforts from nature and provided the primary source of food.

In turn, the steppe biome is the reason for the entry of the Asters into the national symbolism of the Baltic countries. The widespread distribution of the Asters in all geographic latitudes is taken as evidence of the high adaptive abilities of the family and its dominance in the steppes is associated with loess deposits during the Quaternary in these areas [62]. Phytogeographical, the Baltic republics fall into the zone of temperate forests, which pass from broad-leaved in the south to mixed and coniferous forests in the north. In the forests, the distribution of the Asters is limited in the ecotone between forest and grass vegetation, and agricultural activity further narrows the area of distribution of some species, such as the cornflower - an annual weed native to Europe, today with the status of an endangered species due to the excessive use of pesticides.

Comment [u17]: Change this to "Phytogeographically"

The western steppes reach Manchuria and China, passing through deserts and crossing the "Silk Road".The national symbol of Japan - the chrysanthemum (*Chrysanthemum morifolium* Ramat.) is also from the *Asteraceae* family, originally used in China around the 5th century BC. Early on, the species was often compared to chamomile and referred to as 'Big Flowered Chamomile, *Anthemis grandiflora* Host. [63].

Comment [u18]: Spacing

The adoption of the tulip, rose and lily in the national symbolism went in different directions. Their spread in ancient civilizations is associated with their centers of origin - the Near and Middle East. The biologically active ingredients of the three species do not allow their wide application as food plants, therefore they become rather an element of luxury and extravagance for the leading elites. Ancient people learned how to use them for medicinal purposes and as decorative species. From everyday life, species passed into religion - the tulip becomes a symbolic element in Christianity and Islam; the rose connected paganism, Christianity and Islam; and perhaps only the lily preserved the spirit of Catholicism.

The methods of transfer of plant species are as follows:

• trade routes - "Silk Road" (Fig. 7), connecting Europe with the Far East from the II century BC – to the XIII century AD; "Road of salt and gold" - 5th century, connecting the trans-Saharan trade in Africa with the Mediterranean economies; Viking trade routes in the 10th century - through the great Russian rivers, Scandinavia is connected to the Mediterranean and transatlantic - to Greenland and Canada. In the 15th century, through the Columbus exchange, the network of trade routes connecting Eurasia and Africa included North and South America.

• religious paths - pilgrimage, crusades

During the 5th - 10th century, Christianity began to cover a significant part of Europe, and one of the ways to spread the new religion was pilgrimage. The Crusades became a major route for the exchange of cultural and religious values between East and West. In this period, many exotic plant species were brought to the West, which today can easily be classified as introduced species. Subsequently, some of them were naturalized, while others remained subject to selection and genetics.

Comment [u19]: Write in prose format

Fig .7. The "Silk Road"

• scientific paths - In the 14th century Europe was covered by a cultural revival - the Renaissance, which lasted until the 17th century. Science gradually came out of the shadow of religion, and scientific centers moved from monasteries to secular universities. Before Linnaeus systematized plant diversity in the 18th century, in the so-called Pre-Linnean period, a number of European scientists contributed with their research to the development of plant taxonomy and systematics: [64], [65], [66], [67], [68].

5. CONCLUSION

Most of the plant species accepted as national symbols of European countries are not native to Europe, but have centers of origin in Asia. From a botanical view point, these are examples of the ancient introduction of alien species outside their natural ranges. Their establishment as national symbols is the result of a long historical path as a means of sustenance and survival, bearers of religious meaning, medicinal properties or aesthetic delight. The choice of each country is unique, specific only to it and reflects its national identity. If we look carefully, however, we will notice a duplication of symbolism in a number of countries in Europe and Asia - a consequence of the continuum of abiotic factors and historical connections between peoples. Moreover, the vectors of introduction obtained by connecting the center of origin of the species with the countries for which it has a symbolic meaning indicate not only the direction of its spread, but also the contacts made between peoples over the centuries - commercial, cultural, religious. Today, when the idea of a global world that does not require national borders is increasingly asserted, language and religion redistribute peoples into larger families. Plant symbols can also act as an indicator of the historical past and contain possibilities for building a more peaceful world.

ETHICAL APPROVAL: The topic is examined from a scientific view point, respecting the principle of neutrality.

REFERENCES:

1. + Morgan LH. Ancient Society: Or Researches in the Lines of Human Progress From Savagery, Through Barbarism to Civilization (Classic Reprint). *Forgotten Books*. 2017.

2. +Bhgagwat SA, Willis KJ. Species Persistence in Northerly Glacial Refugia of Europe: A Matter of Chance or Biogeographical Traits? *Journal Biogeography.* 2008; 35 (3): 464 - 482.

3. +Rémy JP, Brewer S, Bordács S, Burge K, Cheddadi R, Coart , Cottrell J, Csaikl UM, van Dam B, Deans JD, Espinel S, Fineschi S, Finkeldeyl R, Glaza I, Goicoechea PG, Jensen JS, OKönig A, Lowe AJ, Madsen SF, Mátyás G, Munro RC, Popescua F, Sladea D, Tabbener HS, de Vries GM, Ziegenhagen B, Beaulieu JL, Kremer A. Identification of refugia and post-glacial colonisation routes of European white oaks based on chloroplast DNA and fossil pollen evidence. *Forest Ecology Manage*ment . 2002; 156, 1-3 (1): 49 - 74.

4. +Svenning JC, Skop F. Ice age legacies in the geographical distribution of tree species richness in Europe. *Global Ecology and Biogeography* .2007; 16: 234 - 245.

5. +Tutin TG, Burges NA, Chater AO, Edmonson JR, Heywood VH, Moore DM, Valentine DH, Walters SM, Webb DA (eds). *Flora Europaea*. 1993; 1-2. Cambridge Univ. Press, Cambridge.

6. + Tutin TG, Heywood VH, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA (eds). Flora Europaea. 1968 - 1980; 2-5. Cambridge Univ. Press, Cambridge.

7. +Gruev B . General biogeography. Science and Art, 1988. (in Bulgarian)

8. +Cox CB, Moore PD, Ladle RJ. Biogeography. An Ecological and Evolutionary Approach. 9th Edition. Wiley Blackwell. 2016.

9. +GBIF Secretariat. 2018. GBIF backbone taxonomy: *Iris pseudacorus* L. Global Biodiversity Information Facility, Copenhagen. Available from: https://www.gbif.org/species/5298231.

10. GBIF - The World Checklist of Vascular Plants (WCVP); Royal Botanic Gardens, Kew. Available from: https://www.gbif.org/dataset/

11. Fox-Davies, A Ch. A complete guide to heraldry [ca. 1909]. Cornell Univ. Library,1909.

12. Heraldry - Medieval Genealogy. Available from http://www.medievalgenealogy.org.uk

13. Encyclopedia Britannica: Coat of arms /Definition, History, Symbols, & Facts. Available from: https://www.britannica.com.

14. The History of Coats of Arms and Heraldry - Historic UK. Available from https://www.historic-uk.com

15. Fleur-de-lis Designs: Parts of a Coat of Arms. Available from: https://www.fleurdelis.com.

16. Symbolhunt: National Emblems: Coat of Arms of the World. Available from: https://symbolhunt.com

17. List of National Flowers of all Countries - Fresherslive. Available from: https://www.fresherslive.com

18. Gardenerdy - Complete List of National Flowers By Country. Available from: https://gardenerdy.com.

19. Spencer-Jones R, Cuttle S. Wild Flowers of Britain and Ireland. London. Kyle Books. 2005.

20. Botschantzeva ZP. Tulips: taxonomy, morphology, cytology, phytogeography and physiology. Balkema, Rotterdam. 1962.

21. Beshko N, Tojibaev KSh, Batoshov AR. Tulips of the Nuratau Mountains and South-Eastern Kyzylkum (Uzbekistan). *Stapfia*. 2013; 99:198-204.

22. Eker İ, Babaç MT, Koyuncu M. Revision of the genus *Tulipa* L. (*Liliaceae*) in Turkey. *Phytotaxa.* 2014; 157 (1): 001. Available from: doi:10.11646/phytotaxa.157.1.1.

23. Christenhusz MJM, Govaerts R, David JC, Hall T, Borland K, Roberts PS, Tuomisto A, Buerki S, Chase MW, Fay MF. Tiptoe through the tulips - cultural history, molecular phylogenetics and classification of *Tulipa (Liliaceae*), *Botanical Journal of the Linnean Soc*iety. 2013; 172 (3): 280 - 328. Available from https://doi.org/10.1111/boj.12061.

24. Busbecq OG. The Life and Letters of Ogier Ghiselin de Busbecq. Seigneur of Bousbecque, Knight, Imperial Ambassador. 2012.

25. Clusius C. A Treatise on Tulips. (Transl. by van Dijk, W.). Haarlem: Associated Bulb Growers of Holland. 1951. (Transl. of a section from the Rariorum plantarum historia, 1601).

26. Bermejo JEH, Sánchez EG. Tulips: An Ornamental Crop in the Andalusian Middle Ages. *Economic Botany* .2009; 63 (1), 60 - 66. doi.org/10.1007/s12231-008-9070-3.

27. Hall AD. The genus *Tulipa*. London: Royal Horticultural Society. 1940.

28. King M. Gardening with Tulips. Portland, OR; Timber Press. 2005.

29. Raymond O. Domestication et sélection dirigée chez le rosier: analyse historique via les phénotypes morphologique, chimique et biochimique. PhD Thesis, Université Claude Bernard-Lyon1, Lyon, France. 1999.

30. Goody J.The Culture of Flowers. Cambridge University Press. 1993.

31. Becker HF. The Fossil Record of the Genus *Rosa*. *Bulletin of the Torrey Botanical Club.* 1963; 90 (2): 99 -110. Available from: https://doi.org/10.2307/2483008.

32. Nikbakht A, Kafi M. A study on the relationships between Iranian people and Damask rose *(Rosa damascena*) and its therapeutic and healing properties". *Acta Horticulturae* 2004; 790: 251-254. doi: 10.17660/ActaHortic.2008.790.36

33. Cucciniello L. Rose to Rosary: The Flower of Venus in Catholicism in Rose Lore: Essays in Semiotics and Cultural History. Hutton F. (ed.), Lexington Books. 2008.

34. Clark N. Aphrodite and Venus in Myth and Mimesis. Cambridge, England: Cambridge Scholars Publishing. 2015.

35. Kovatcheva N, Jeliazkov VD, Astatkie T. Productivity, Oil Content, Composition, and Bioactivity of Oil-bearing Rose. *HortScience: a publication of the American Society for Horticultural Science*. 2011; 46 (5):710-714. DOI: 10.21273/HORTSCI.46.5.710

36. Keeley SC, Forsman ZH, Chan R. A phylogeny of the “evil tribe” (*Vernonieae: Compositae*) reveals Old/New World long distance dispersal: Support from separate and combined congruent datasets (trnL-F, ndhF, ITS). *Molecular Phylogenetics and Evolution*. 2007; (44): 89 -103. doi.org/10.1016/j.ympev.2006.12.024

37. Bergh NG, Linder PH. Cape diversification and repeated out-of-southern-Africa dispersal in paper daisies (*Asteraceae - Gnaphalieae*). *Molecular Phylogenetics and Evolution*. 2009; 51: 5 - 18. Available from: https://doi. org/10.1016/j.ympev.2008.09.001.

38. Katinas L, Crisci JV, Hoch P, Tellería MC, Apodaca MJ. Trans-oceanic dispersal and evolution of early composites (*Asteraceae*). *Perspectives in Plant Ecology, Evolution and Systematics*. 2013; (15) 269 - 280. Available from: https://doi.org/10.1016/j.ppees.2013.07.003

39. Barres L, Sanmartín I, Anderson CL, Susanna A, Buerki S, Galbany CM, Vilatersana R. Reconstructing the evolution and biogeographic history of tribe *Cardueae (Compositae*). *American Journal of Botany*. 2013; 100: 867-882. Available from: https://doi.org/10.3732/ajb.1200058.

40. Nie ZL, Funk VA, Meng Y, Deng T, Sun H, Wen J. Recent assembly of the global herbaceous flora: Evidence from the paper daisies (*Asteraceae: Gnaphalieae*). *New Phytologist*. 2016; 209: 1795 - 1806. doi.org/10.1111/nph.13740

41. Barreda, VD, Palazzesi L, Katinas L, Crisci JV, Tellería MC, Bremer K. … *et al.* An extinct Eocene taxon of the daisy family (*Asteraceae*): Evolutionary, ecological and biogeographical implications. *Annals of Botany*. 2012; 109: 127-134. Available from: https://doi.org/10.1093/aob/mcr240.

42. Barreda VD., Palazzesi L, Tellería MC, Olivero EB, Raine JI, Forest F. Early evolution of the angiosperm clade *Asteraceae* in the Cretaceous of Antarctica. *Procc Nat Acad Sci.* 2015; 112: 10989 - 10994. Available from: https://doi.org/10.1073/pnas. 1423653112.

43. Antonie I. The importance of the Melliferous flora for the beekeeping in Gura Râului countryside area (Sibiu county), Romania. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development* . 2020; 20 (4): 57-64.

44. Fuller DQ. Contrasting Patterns in Crop Domestication and Domestication Rates: Recent Archaeobotanical Insights from the Old World. *Annals Botany*. 2007; 100 (5): 903 - 924. doi:10.1093/aob/mcm048. PMC 2759199. PMID 17495986.

45. Shukurov A., Sarson GrR, Gangal K. The Near-Eastern Roots of the Neolithic in South Asia. PLOS ONE. 2014; 9 (5): e95714. doi:10.1371/journal.pone.0095714.

46. Normile D. Yangtze seen as earliest rice site. *Science.* 1997; 275 (5298): 309 - 310. doi:10.1126/science.275.5298.309. S2CID 140691699.

47. Zhang J, Lu H, Gu W; Wu Na, Zhou K, Hu Y, Xin Y, Wang C, Kashkush K. Early Mixed Farming of Millet and Rice 7800 Years Ago in the Middle Yellow River Region,China. *PLOS ONE.* 2012. 7(12):e52146 .Bibcode: 2012PLoSO...752146Z. doi:10.1371/journal.pone.0052146

48. He K, Lu H, Zhang J, Wang C, Huan X. Prehistoric evolution of the dualistic structure mixed rice and millet farming in China. The Holocene. 2017; 27 (12): 1885-1898. doi:10.1177/0959683617708455.

49. Choi JY. The complex geography of domestication of the African rice *Oryza glaberrima*... *PLOS Genetics* . 2019; 15 (3): e1007414. doi:10.1371/journal.pgen.1007414. PMC 6424484. PMID 30845217.

50. USDA . 2023 . Rice Outlook. Economic. January 17, 2023; Research Service, 1-19.

51. Theophrastus. Enquiry into Plants. Loeb Classical Library. (Transl. by Hort A). London and New York: William Heinemann and G.P. Putnam's Sons. Available at Internet Archive as Vol. I (Books I-V) and Vol. II (Books VI-IX). 1916.

52. Hyams E. Soil and civilization. London, Thames and Hudson. 1976.

53. Huntington SP. The Clash of Civilizations? *Foreign Affairs.* 1993. 72 (3) 22 - 49. doi.org/10.2307/20045621.

54. Brevik EC, Homburg JA, Sandor JA. Soils, Climate, and Ancient Civilizations - In: Horwath, W. R., Kuzyakov Y. (Eds). Climate Change Impacts on Soil Processes and Ecosystem Properties. *Developments in Soil Science.* 2018. Elsevier 35: 1-28. Available from: https://doi.org/10.1016/B978-0-444-63865-6.00001-6.

55. Köppen. Climate Classifications General Books. 2013.

56. Whittaker RH. Communities and Ecosystems. 2nd Ed., MacMillan Publishing Co., New York. 1975.

57. Olson DM, Dinerstein E. The Global 200: A representation approach to conserving the Earth's most biologically valuable ecoregions. *Conservation Biology* .1998; 12:502–515. [1]

58. Smelansky IE, Tishkov,AA. The Steppe Biome in Russia: EcosystemServices, Conservation Status,and Actual Challenges. Ch.2. - In: Werger MJA, van Staalduinen MA (eds.). Eurasian Steppes. Ecological Problems and Livelihoods in a Changing World, Plant and Vegetation 6, 2012. DOI 10.1007/978-94-007-3886-7_2, © Springer Science+Business Media B.V. 2012

59. Chytrý K, Willner W, Chytrý M, Divišek J, Dullinger S. Central European forest - steppe: An ecosystem shaped by climate, topography and disturbances. Journal of Biogeography. 2022; Wiley Online Library. Available from: https://doi.org/10.1111/jbi.14364

60. Battisti DS, Naylor R L. Historical Warnings of Future Food Insecurity with Unprecedented Seasonal Heat. SCIENCE. 2009; 323 (5911): 240-244 DOI: 10.1126/science.1164363

61. Liu X, Jones MK, Zhao Z, Liu G, O'Connel TC. The earliest evidence of millet as a staple crop: New light on neolithic foodways in North China. Am. Journ. Biol Anthropology. 2009; 149, (2): 283 - 290. Available from: https://doi.org/10.1002/ajpa.22127

62. Chibilyov A. Steppe and forest-steppe. In M. Shahgedanova (Ed.): The physical geography of northern Eurasia. Oxford, UK: Oxford University Press. 248-266, 2002.

63. Bernard D. The Golden Flower: Chrysanthemum, Its history - culture. The main varieties. Gunten. 2008.

64. Bock H. New Kreuterbuch von Underscheidt, Würckung und Namen der Kreuter, so in teutschen Landen wachsen, Strasburg. 1546. Available from: https://doi.org/10.5962/bhl.title.8043.

65. Brunfels O. Herbarium vivae eicones. Vols.1-2. 1530 -1540.

66. Dodoens R. Historia frumentorum, leguminum, palustrium et aquatilium herbarum acceorum, quae eo pertinent. Missouri Botanical Garden. 1566.

67. Gessner C. Catalogus plantarum Latinè, Graecè, Germanicè, & Gallicè. Zurich: Apud Christoph. Froschoverum. 1542.

68. Fuchs L. De Historia Stirpium comentarii insignes (or Notable Commentaries on the History of Plants). 1542.