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SYSTEMATIC DIVERSITY OF DYE PLANTS OF THE FLORA OF THE AKTOBE REGION

Research article

Abstract

The article presents the results of the study of dye plants of the Aktobe region based on the analysis of their own long-term studies of the flora of the region. As a result of the analysis of the flora, 108 dye plants belonging to 71 genera and 36 families were identified. The study of the systematic diversity of dye plant species showed the predominance in the number of species of the subclasses *Rosidae*, *Dilleniidae*, *Lamiidae*, and among the families *Rosaceae*, *Rubiaceae* and *Polygonaceae*. The predominance in the number of species of such genera as *Galium* (13 species), *Polygonum*, *Tamarix*, *Geranium* by 4 species has been established.

The clear dominance of polycarpic grasses in the spectrum of life forms of dye plants according to I.G. Serebryakov has been established. Polycarpics accounted for 47,2% of the dye plant species in the region. The analysis of the distribution of species by ecological groups showed the prevalence of the mesophilic group, which made up 61,1% of the total number of species.

Keywords: flora, dye plants, useful plants, life forms, ecological groups.

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СИСТЕМАТИЧЕСКОЕ РАЗНООБРАЗИЕ КРАСИЛЬНЫХ РАСТЕНИЙ ФЛОРЫ АКТЮБИНСКОЙ ОБЛАСТИ

Научная статья

Аннотация

В статье представлены результаты изучения красильных растений Актюбинской области на основе анализа собственных многолетних исследований флоры региона. В результате проведенного анализа флоры выявлено 108 красильных растений, относящихся к 71 роду к 36 семействам.

Изучение систематического разнообразия красильных видов растений показало преобладание по числу видов подклассов *Rosidae*, *Dilleniidae*, *Lamiidae*, а среди семейств *Rosaceae*, *Rubiaceae* и *Polygonaceae*.

Установлено преобладание по количеству видов таких родов как *Galium* (13 видов), *Polygonum*, *Tamarix*, *Geranium* по 4 вида.

Выявлено явное доминирование поликарпических трав в спектре жизненных форм красильных растений по И. Г. Серебрякову. Поликарпики составили 47,2% красильных видов растений региона. Анализ распределения видов по экологическим группам показал превалирование мезофильной группы, составившей 61,1 % от общего числа видов.

Ключевые слова: флора, красильные растения, полезные растения, жизненные формы, экологические группы.

1. Introduction

Biological resources are the type of natural resources. Useful plants are the most important component of the planet's phytoreources. In the composition of any flora there are valuable species that have economic applications, which are promising for their use both in natural conditions and when introduced into culture. Therefore, the flora of Kazakhstan and especially Aktobe region has great potential. Historically plants have used for coloring wool, fabric, and leather. Currently the

problem of finding and expanding the range of natural products used in various spheres of human activity is becoming more and more urgent, and in this regard, interest in dye plants is increasing. The use of natural dyes for coloring food products is already regulated by technical instructions. Additionally natural and organic cosmetics are in increasing demand among consumers. Despite the sufficient knowledge of the flora of the region, there is still no floristic summary of dye plants.

The main purpose of this article is to identify and analyze the systematic diversity of dye plants of the Aktobe region.

2. Methods

Material for isolating dye plants in the flora of the region after the results were obtained by more than 40-year-old individual flowers isolated in the monographs “synopsis of flowers of the current floral district” [1], “dictaphones of field plants are relevant for this area” [2].

In the analysis of the systemic structure of flora, the expression of its specialness, the generally accepted symbols and principles developed by A.I. Tolmachev [3,4], R.V. Kamelin [5] and implemented in the article.

As new for the analysis of life forms, wet principles processed by I.G. Serebrikov [6]. When identifying ecological types of species, Florence used the classification and principles of A.T. Shenikov, N.G. Poplavskaya, R.V. Kamelin [7-8].

The determination of the belonging of the flora species of the region to the group of dyeing plants was carried out according to the works (A.H. Rollov [9], L.A. Utkin [10], N.I. Rubtsov [11], N.V. Pavlov [12], [13], Enden O.A. [14], An.A. Fedorov., by. Rosen [15], Flora of Kazakhstan [16], I.A. Gubanov, I.A. Krylov, V.L. Tikhonov [17], V.I. Chopik, L.G. Dudchenko, A.N. Krasnova [18], N. M. Grisyuk, I.L. Grinchak, Or. Ya. Yolin [19], Or.A. Korolyuk [20]).

3. Results

In the flora of the Aktobe region, we have registered 876 useful plants (59.4% of flora species) belonging to 395 genera and 94 families [2].

Our analysis of the flora of the region revealed 108 species of dye plants, which made up 12.3% of the number of groups of useful plants in the region.

Dye plants of the Aktobe region are represented by 108 species belonging to 71 genera to 36 families. The number of species is dominated by the subclasses *Rosidae* – 33 species, *Dilleniidae* – 23 species, *Lamiidae* – 22 species, 2 classes are single-species: *Pinopsida*, *Equisetopsida*. The most multi-species families are *Rosaceae* and *Rubiaceae* (1st place – 13 species each) and *Polygonaceae* (2nd place – 10 species), and the 3rd place in the number of species is occupied by the *Asteraceae* family - 6 species, 22 families are 1-2 species (Table 1).

Table 1 – Systematic diversity of dye plants of Aktobe region

Taxa	Genus	Species
<i>Magnoliophyta</i> Department		
<i>Magnoliopsida</i> class		
<i>Ranunculidae</i>		
<i>Ranunculaceae</i>	3	3
<i>Papaveraceae</i>	1	1
	4	4
<i>Caryophyllidae</i>		
<i>Chenopodiaceae</i>	2	4
<i>Polygonaceae</i>	4	10
<i>Plumbaginaceae</i>	1	1
	7	15
<i>Hamamelididae</i>		
<i>Betulaceae</i>	2	3
	2	3
<i>Dilleniidae</i>		
<i>Clusiaceae</i>	1	2
<i>Primulaceae</i>	1	1
<i>Tamaricaceae</i>	1	4
<i>Salicaceae</i>	2	5
<i>Capparaceae</i>	1	1
<i>Brassicaceae</i>	3	3
<i>Malvaceae</i>	3	3
<i>Cannabaceae</i>	1	1
<i>Urticaceae</i>	1	1
<i>Euphorbiaceae</i>	1	2
	15	23
<i>Rosidae</i>		
<i>Rosaceae</i>	9	13
<i>Lythraceae</i>	1	1
<i>Fabaceae</i>	4	5
<i>Nitrariaceae</i>	1	1
<i>Peganaceae</i>	1	1
<i>Geraniaceae</i>	1	4
<i>Balsaminaceae</i>	1	1
<i>Rhamnaceae</i>	2	2
<i>Elaeagnaceae</i>	2	2
<i>Apiaceae</i>	2	2
<i>Viburnaceae</i>	1	1
	25	33
<i>Lamiidae</i>		
<i>Rubiaceae</i>	1	13
<i>Menyanthaceae</i>	1	1
<i>Solanaceae</i>	1	1
<i>Boraginaceae</i>	4	4
<i>Scrophulariaceae</i>	1	1
<i>Lamiaceae</i>	2	2
	10	22
<i>Asteridae</i>		
<i>Asteraceae</i>	6	6
	6	6
<i>Pinophyta</i> Department		
<i>Pinopsida</i> class		
<i>Cupressaceae</i>	1	1
	1	1
<i>Equisetophyta</i> Department		
<i>Equisetopsida</i> class		
<i>Equisetaceae</i>	1	1
	1	1
in total	71	108

According to the number of species, the following genera prevail: *Galium* (13 species - *Galium pseudorivale*, *Galium ruprechtii*, *Galium ruthenicum*, *Galium saurense*, *Galium spurium*, etc.), *Polygonum* (4 species - *Polygonum aviculare*, *Polygonum bistorta*, etc.), *Tamarix* (4 species - *Tamarix gracilis*, *Tamarix ramosissima*, etc.), *Geranium* (4 species - *Geranium pratense*, *Geranium sylvaticum*). Three species are represented, such genera as, *Calligonum*, *Populus*, *Geum*, *Rosa*.

There are 9 genera, such as *Chenopodium*, *Salsola*, *Rumex*, *Betula*, *Hypericum*, *Salix*, *Euphorbia*, *Trifolium*, etc.

By the first type 51 genera have been, 71.8% of the total number of genera of dye species of flora (*Consolida*, *Chelidonium*, *Limonium*, *Isatis*, *Lavatera*, *Peganum*, *Equisetum*, *Juniperus*, *Xanthium*, *Inula*, *Helichrysum*, *Bidens*, etc.) (Figure. 1).

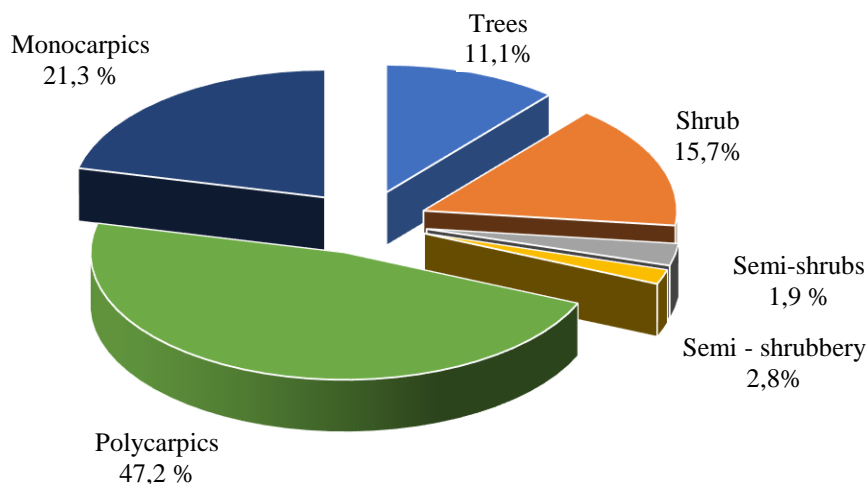


Fig. 1 – Spectrum of life forms of dye plants according to I.G. Serebryakov

The analysis of life forms according to I.G. Serebryakov showed a clear predominance of polycarpic herbs - 47.2%. Polycarpics are represented by such species as *Polygonum amphibium*, *Rumex confertus*, *Hypericum scabrum*, *Althaea officinalis*, *Urtica dioica*, etc. Monocarpics include *Impatiens noli-tangere*, *Sisymbrium officinale*, *Solanum nigrum*, *Xanthium strumarium*, etc. Types of woody and semi-woody forms is 31.5% of the total number of dye plants. Shrubs dominate among them – 13 species, 12.0% (*Tamarix gracilis*, *Rosa majalis*, *Genista tinctoria*, etc.) and trees – 12 species, 11.1% (*Alnus glutinosa*, *Populus nigra*, *Padus avium*, *Elaeagnus angustifolia*, etc.). The smallest number of species are represented by semi-shrubs - 2 species (*Comarum palustre*, *Onosma simplicissima*).

The study of the species of dye plants in relation to the moisture factor showed that the spectrum of ecological types is represented by three ecological groups: xerophilic, mesophilic and hygrophilic with a clear predominance of mesophilic (Figure. 2).

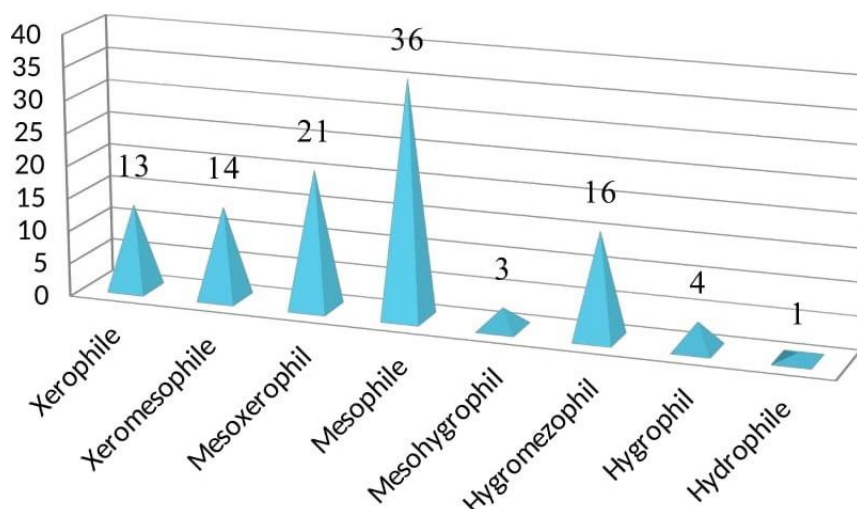


Fig. 2 – Distribution of the species of dye plants of the flora according to the types of habitats with a certain moisture regime

The mesophilic group unites 66 species of dye plants of the Aktobe region (61.1%). At the same time, mesophiles total amount is 33.3%. This group is represented by such species as *Rumex acetosa*, *Geum aleppicum*, *Potentilla anserina*, *Rubus caesius*, *Origanum vulgare*, *Viburnum opulus*, *Anthriscus sylvestris*, *Geranium sylvaticum* etc. Hygromesophiles are on the second place in this group - 14.8%. These include *Lythrum salicaria*, *Padus avium*, *Filipendula ulmaria*, *Salix caprea*, *Populus nigra*, *Lysimachia vulgaris*, *Polygonum bistorta*.

Xeromesophiles in this group make 13% of the total number of dye plants in the region. There are *Consolida regalis*, *Polygonum aviculare*, *Hypericum perforatum*, *Genista tinctoria*.

The xerophilic group has 34 species and are represented by xerophiles and mesoxerophiles. The hydrophilic group unites 8 species, 7.4% of the total number of species of dye plants of the region flora.

4. Conclusion

As a result of the analysis of the Aktobe region flora 108 species of dye plants were identified. This amount was 12.3% of the number of groups of useful plants or 7.3% of the total number of species of flora of the region. The systematic diversity of dye plants is represented by 7 subclasses of the *Magnoliopsida* class, as well as the *Pinopsida* and *Equisetopsida* classes.

The area of the Aktobe region has particular interest for conducting resource studies of a number of dye plants.

Conflict of Interest

None declared.

Конфликт интересов

Не указан.

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