

# Some Comments on the Types of Series *Cistanche* Hoffmanns. & Link, Distributed in Bukhara Region (Uzbekistan)

Husniddin K. Esanov<sup>1</sup>, Sirojiddin A. Murodov<sup>1</sup>, Kimyo A. Aslonova<sup>1</sup>, Nigina H. Qurbonova<sup>2</sup>

<sup>1</sup>Bukhara State University, Bukhara, Uzbekistan

<sup>2</sup>Bukhara State Medical Institute, Bukhara, Uzbekistan

Email: azizqobilov-87@mail.ru

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## Abstract

The article provides information on the distribution and importance of the *Cistanche* family in the Bukhara region. Four species of the genus *Cistanche* *mongolica* Beck., *Cistanche flava* (C. A. Mey.) Korsh., *Cistanche ambigua* (Bunge) Beck., *Cistanche salsa* (C. A. Mey.) Beck. have been identified in this region. The species has been identified as host plants in different ecological environments and parasitic. Among the *Cistanche* species, *C. salsa* and *C. flava* are common in the study area. It has been noted in laboratory experiments that their medicinal properties are higher than those of other species.

## Keywords

Bukhara, *Cistanche*, Research, Medicine, Species, Genus, Parasite

## 1. Introduction

The study of natural resources, their inventory, and identification of species with beneficial properties in their composition is one of the most pressing issues today. Over the past 10 years, a lot of scientific research has been conducted on the study of plants in the Bukhara region [1]-[9]. In this study, rare, endemic, native species, and invasive plants from abroad in the study area were studied and their beneficial properties along with their role in biodiversity were presented. Medicinal properties are also noted. In recent years, the population's demand for medicinal products has been growing. In this regard, special attention is paid to the development of the pharmaceutical industry in the country, and the provision of the population with quality medicines. On the basis of measures taken in this direction, significant results are being achieved in the establishment of farms

specializing in the cultivation of medicinal plants and the creation of a raw material base of medicinal plants. At present, the identification of medicinal plants and their raw material base in each region is one of the most pressing issues. For the preparation of medicinal products, it is important to first determine the composition of medicinal plant species [10] [11]. In particular, in recent years, decisions have been made to identify the natural resources of a number of medicinal plants, raw material reserves, their rational use, and the organization of plantations by multiplying them on arable land. One such medicinal plant is the species of the *Cistanche* family. Demand for this plant is growing worldwide, especially in Asia (China, India, etc.). The *Cistanche* family belongs to the Orobanchaceae family and includes 22 species worldwide. There are 6 species in Central Asia [12] and 4 species in the Bukhara region [13]. *Cistanche* family species are perennial parasitic plants. They are firmly rooted in the soil and are adapted to parasitize the roots of various plants. Including *Cistanche mongolica* Beck. occurs in saline soils and along rivers. Mainly parasitizes on *Tamarix* species. Kyzylkum, Mirzachul, Karshi steppes, Karakum, Syrdarya and Amudarya rivers. *Cistanche flava* (C. A. Mey.) Korsh. parasitizes species of the *Calligonum* family in sand dunes. This species is found in the Kyzylkum, along the Amu Darya, in the southwestern part of the Karakum, and in the Pamir Alay [12].

*Cistanche ambigua* (Bunge) Beck. Barkhan is found in sands, gravelly and small rocky hills, in bald places. It is parasitic on *Haloxylon* species and other members of the Chenopodiaceae family. Distributed in Betpakdala, Ustyurt, Kyzylkum, Syrdarya and Amudarya, Karakum.

*Cistanche salsa* (C. A. May.) Beck. is found in soft sands, clayey soils, sandy and gravelly saline desert soils, along streams, and in abandoned lands, and parasitizes in species of the genus *Haloxylon*, *Salsola*, *Anabasis*, *Kalidium*, *Atriplex*, and *Calligonum*. It is found in the Kyzylkum, Muyunkum, Betpakdala, Ustyurt, and Karshi steppes, along the Amudarya and Syrdarya rivers.

*C. ridgewayana* Aitch. & Hemsl. occurs on the banks of the Amudarya, Surkhan-Sherabad valley, and Pamir-Alay. Parasitizes in *Tamarix* species. *C. fissa* (C. A. May.) Beck. is found in saline and saline sands. Parasitizes on shrubs of the family Chenopodiaceae. This species is not found in Uzbekistan.

## 2. Methods

Field research to study the representatives of the *Cistanche* series was conducted in 2019-2022 by the route method. During the research, their distribution areas were identified and herbarium samples were prepared from the plant. In determining the species of *Cistanche* Flora Uzbekistana [14], Key to plants of Central Asia [12], systematic analysis of the series using the classification APG IV [15]. A number of scientific works have been used to determine the importance of species [10] [16] [17].

## 3. Results

As a result of field research conducted in Bukhara region in 2019-2022, the sta-

tus and distribution areas of *Cistanche* populations were studied. It is mainly found in sandy areas, saline soils, stream banks and ruderal lands where the Chenopodiaceae, Tamaricaceae and Polygonaceae families are distributed. In Bukhara, the Karakul oasis and the surrounding sandy areas, its population was sparse. It should also be noted that the Kyzylkum Nature Reserve is found in the forests of the Amudarya River, around the Amu-Bukhara channel, Karakul, Kogan, Peshku, Jondor, Shafirkan, Romitan and Gijduvan districts in the sands, streams, sandy soils, waste lands and roadsides. In these areas, the number of tufts was small, with isolated populations. The distance between the tubes is 10 - 20 meters. However, it can be said that in the forests of the Kyzylkum State Reserve, along the rivers, there are many populations of *Tamarix* species (**Figure 1**).

After passing through the Gazli settlement of the study area, representatives of the *Cistanche* family began to meet alone and in groups of 5 - 6 in the sands along the roadsides and in the surrounding areas (**Figure 2**). Their frequent occurrence on the roadsides is related to the amount of moisture. Because when it rains, water accumulates more in such areas.



**Figure 1.** *Cistanche mongolica* Beck. and Amu Darya tugai, along with *Tamarix* species.



**Figure 2.** Around Bukhara-Khorezm A-380 road.



*Cistanche ambigua*, *C. mongolica*, *C. salsa* and *C. flava* species are found in the study area of the *Cistanche* family [13]. Among these species, the most common and highly medicinal are *C. salsa* and *C. flava*. These species are currently widely used in the pharmaceutical industry. *Cistanche salsa* was found in several sandy areas of the desert environment of Romitan district of the study area.

Representatives of the *Cistanche* family are all parasitic plants. They naturally live together with their own masters. All species of this category have medicinal properties, and they are widely used in various folk medicine or folk medicine. In particular, the medicinal properties of *Cistanche salsa* are higher than other types. Eastern species of *Cistanche* species are used in the treatment of many diseases.

*Cistanche salsa* (C. A. Mey.) Beck. is a perennial, medicinal, and parasitic plant. Stems 15 - 40 cm long, 10 - 12 mm wide, much thicker at the base, covered with sawdust. The sawdust is ovoid or oblong-ovoid. Inflorescence cylindrical, 8 - 25 cm long, the flower is densely sessile. The covering fragments are elongated lanceolate, blunt, the back is covered with coarse hairs, the edges are curly, with small teeth. The petals are slender, elliptical, blunt, hairy on the back, the edges are thinly veiled, equal to or slightly shorter than the length of the corolla. The petals are tubular, 10 - 14 mm long. The petals are 25 - 35 mm long, bent outwards, sometimes almost straight, the lower part is tubular, oozing, on the inside there are feathers where the pollinators are attached, from the middle to the top gradually expands the purple curved area. The pollen grains are attached to the underside of the tubular crown, the pollen grains are yellow, thickly hairy, the nests are short, sharp. The node is oblong-ovate, the beak is 2-lobed. The calyx is ovoid or oval ovoid, the seeds are numerous, small oval [14]. This species is found in sandy, sandy-loamy and loamy saline soils, as well as in saline deserts (Figure 3).

Parasitizes perennial plant species of the *Anabasis*, *Calligonum*, *Haloxylon* and *Salsola* families. In Uzbekistan, it grows in the Bukhara, Navoi regions and Karakalpakstan [18].



**Figure 3.** *C. salsa* (C. A. Mey.), the growth of Beck. in sandy soils with *Calligonum* species.

*Cistanche* is a non-pharmacopoeial plant and its use is unknown in official domestic medicine. Nevertheless, having a number of valuable useful properties, *Cistanche* is widely used in medicine in Eastern countries. Traditionally, the Chinese use *Cistanche* for potency, treatment of certain diseases of the prostate gland. In China and Japan, the stem of the plant has been used for a long time as a tonic. It is used for inflammatory processes of the genitourinary tract (cystitis, nephritis, pyelonephritis), with edema as a diuretic. *Cistanche* is an active component of many dietary supplements and vitamin complexes. Thanks to its antioxidant properties, the plant has a beneficial effect on brain cells, protecting them from damage and preventing them from premature aging, and activates memory processes (<https://lektrava.ru/encyclopedia/tsistankhe>). Despite the high importance of the representatives of the *Cistanche* family, we do not have extensive use of these plants in medicine or folk medicine. In recent years, research on these plants has focused on solving this problem.

Herbal tinctures have been used to treat ulcers in Central Asia. Aqueous extracts have a bactericidal effect. This plant has been used in traditional Chinese medicine for 2000 years. It is recognized as the best potent medicine in traditional Chinese medicine and is called “Desert Ginseng”. It was first proposed in ancient written sources for use in diseases of the genitals, musculoskeletal system, urinary system and circulatory disorders of men and women. The use of the medicinal properties of the *Cistanche* plant dates back to the Ming Dynasty. In particular, this plant was included in the composition of magnetite drugs that restore youth and nourish the kidneys in Fu Renyu’s work “Precious Book of Ophthalmology” published in 1644. It is still used in Chinese, Japanese and Taiwanese medicine in the preparation of energy-boosting juices and in the treatment of urinary tract, in chronic renal failure. The *Cistanche* plant is mainly used to increase infertility and strength. It really is a “desert ginseng”. *Cistanche* is also very effective in the treatment of inflammatory diseases of the kidneys, nephrogenic arterial hypertension, improves mental activity and has an overall



**Figure 4.** Distribution of *Cistanche flava* in the sands of Peshku District.

potency-boosting effect. However, *Cistanche* has a very mild effect, has no side effects and is suitable for long-term use. Numerous pre-clinical studies in China and Japan have confirmed the antioxidant, anti-inflammatory, neuroprotective and immunostimulatory properties of *Cistanche* extract [18].

As a result of field research, the distribution areas of *Cistanche flava* in the Bukhara region were also studied (Figure 4), and herbarium samples were prepared from it to determine the chemical composition of the subsurface [19]. Based on the results of the analysis, the *Cistanche flava* collected in the Bukhara region showed that the sum of flavanoids in the subsoil was  $5.36\% \pm 0.71\%$  when recalculated to quercetin, which is more than other species. This species lives as a parasite in the sandy massifs of the Bukhara region in the species *Calligonum*.

#### 4. Conclusion

As a result of research in the Bukhara region, the distribution areas, populations, and encounters of host plants of the *Cistanche* family species were identified. Populations were studied to consist of a small number of tufts. Based on inquiries from local residents, the elderly, and some shepherds, it can be noted that the local population has partially used the underground part of *Cistanche* and does not have a sufficient understanding of the positive (medicinal) properties of the plant. Although this plant is widespread in Central Asia, it is rarely used by humans. *Cistanche* has been used in folk medicine since 2000 in China, India, Japan, and Arab countries. Due to the high medicinal properties of this plant, it is called “desert ginseng”, “golden root”, “root of life in the desert” and so on. Therefore, collecting information about this plant, promoting a broader understanding of them, and conducting science-based research is one of the most important and urgent tasks today. Research is currently underway, and research is underway to identify and increase their reserves.

#### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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