

SOME BIOLOGICAL PROPERTIES OF FERULA ASSA FOETIDAL. TYPESAliboev Sh.A¹, Rabbimov A. R.², Xamdamova E.I.³¹ Research Institute of Karakul and Desert Ecology, Samarkand² Research Institute of Oriental Medicine, Samarkand³TSUE Samarkand branch, Samarkand

Abstract: The article presents data from experiments to determine the seeding characteristics, optimal sowing depth and timing of seeds of *Ferula assa-foetida* L., that is a valuable medicinal plant type, for cultivation in arid regions of Uzbekistan.

Keywords: medicinal plant, seeds, fertility, planting depth, optimal planting time, grass, phenology, growing season.

INTRODUCTION

Ferula assa foetida L. family includes about 170 species, and these plant species are of great practical importance: they are widely used by mankind due to their nutritional, medicinal, aromatic, essential oil, spice and honey-giving properties, and their natural resources are declining (Plunkett, 2018). According to some sources, there are 180-185 species of *ferula assa foetida* L. on earth, 106 species in the former Soviet Union, 105 species in Central Asia, 48 species in Uzbekistan, more than 50 species in the Western Tien Shan Mountains, about 60 species in the Pamir-Alay ridge, the Western Pamirs. There are 33 species in the Aloy ridge (Rahmonkulov, Avalboev, 2016). Due to the valuable medicinal properties of the Kuhiston or Tajik *ferula assafoetida* L. species (*Ferula tadshikorum* Pimenov), its natural resources are being exploited by entrepreneurs, and a kilogram of glue resin from its roots is sold at the retail market for \$ 200. That is why the natural resources of the Tajik *ferula assafoetida* L. are declining day by day, and according to some data, it is included in the next edition of the Red Book of the Republic of Uzbekistan with the 3rd status (Mahmudov, 2019). According to their biological characteristics, most brittle species are perennial herbaceous, large, monocarpous, i.e., plants that bloom once in their lifetime and produce seeds, with an ephemeroïd life cycle. A large amount of nutrients are needed for the buds to flower and produce seeds. Therefore, the plant accumulates nutrient reserves in the root during its short-term spring vegetation (average 90 days) over the years (7-9 years) and finally produces flowering seeds and reaches the end of its life. X.S. According to Rakhmonov (2017), Tajik *ferula assafoetida* L. is a monocarpous plant with a large life cycle lasting 23-27 years. As the buds age, the roots become thicker and the diameter of the roots of an adult plant reaches 8-10 and even 15 cm, depending on its species. Glue resin collectors usually select plants that are 4-5 years old, and the plant from which the resin is obtained will not regrow, produce seeds, and disappear. In recent years, it has also become more difficult to find *ferula assafoetida* L. seeds. Because the number of adult plants

in their natural populations has declined sharply. The use of low-yielding desert and hilly lands as a source of ferula assafoetida L. valuable medicinal raw materials can dramatically increase efficiency. Therefore, on March 20, 2018, the President signed a special resolution No. PQ-3617 "Respublikada kovrak plantasiyalarini tashkil etish va ularning xom ashyosini qayta ishlash hajmlarini ko'paytirish hamda eksport qilish chora-tadbirlari to'g'risida" ("On measures to establish ferula assafoetida L. plantations in the country, increase the production and export of its raw materials") and set a number of important tasks in this regard. The establishment of artificial turf plantations is inextricably linked with the development of scientifically effective agro-technical measures for its care in the field, based on an in-depth study of the biological properties of the plant. Therefore, taking into account the urgency of the problem, a number of scientific institutions in the country have launched research aimed at studying the biological properties of fragile species and the development of agro-technical measures for the cultivation of some species.

The purpose of the study is to develop agro-technical measures for the cultivation of ferula assafoetida L. species in arid regions of Uzbekistan.

The source of the research is the naturally distributed seeds of L. Bad smelly Ferula assafoetida and Tajik ferula assafoetida L. tadshikorum Pimenov. Bad smelly ferula assafoetida L. seeds were collected from the wild population of Nurabad district of Samarkand region, and Tajik ferula assafoetida L. seeds were collected from the wild population of Dehkanabad district of Kashkadarya region. In our research, laboratory and field experiments were conducted to study the characteristics of plants in natural populations, such as seed yield, seed germination characteristics, seed germination in laboratory and field conditions, optimal depth and timing of seed sowing, grass survival, growth and development in early years. The research is used generally accepted methods in botany, seed science (Metodicheskiye ukazaniya po izucheniyu posevnykh kachestv i uroжайnykh svoystv semyan selskoxozyaystvennykh kultur, Moskva, 1981; Dospexov, 1979; Grisenko, Kaloshina, 1976). Field experiments were conducted in experimental fields located in the Adir (Tepakul) and desert (Qarnab) regions of Samarkand region.

Research results and its analysis. Phenological studies in the wild population of Ferula assafoetida L. in Karnabchol have shown that spring regrowth of adult plants is observed in late February, early March. It grows rapidly in April and begins to bloom in the first ten days of the month. The flowers are yellow, bisexual, ball flowers form a complex umbrella. The side leaves of the root are elongated, divided into three parts, the leaf plates are elongated lanceolate. The inflorescence is located at the tip of a long stem, and there are also small petals located in tiny

follicles along the stem. The seeds begin to ripen in mid-May and they ripen in early June. The ripe seeds are seed-banded, consisting of two single-seeded mericarps, yellow in color, flat elliptical, with wide lateral ribs. In the center of the seed is an elongated ovule, which is brown in color and can be seen with the naked eye. It was found that 75-85% of *ferulaassafoetida* L. seeds have a developed ovary and 15-25% of the seeds do not have an ovary, i.e. there are empty seeds. The absolute mass of 1000 pieces of flaky seeds is 67.4 g. and in the mountainous region, the figure is 43.0 g. formed. The purity of seeds harvested by hand is 54-55%. Experiments on the germination of seeds have shown that the seeds begin to germinate at relatively low temperatures (+1- + 50C) and the germination process takes a relatively long time (70-80 days). Similar data have been reported by other researchers (Khudoyberdiyeva, Avalboyev, Haydarov, 2020). However, 72-83% of the seeds germinated under laboratory conditions. The slowness of the germination process indicates the presence of a dormant period of seeds. Fertility of *ferula assafoetida* L. seeds in field conditions is 45-51% in our experiments. In the arid region, this is a much higher figure. Observations have shown that in the field, *ferula assafoetida* L. seeds begin to germinate from the second decade of February. It was found that it is possible to dramatically increase the germination of seeds by cold stratification for 50-60 days. The germination rate of stratified seeds under laboratory conditions reached 87% in a short period of time (7 days). It was found that *ferula assafoetida* L. seeds retain their fertility even in the second year. The germination rate of seeds in the second year under laboratory conditions was 33-36% in our experiments. In the hills of Samarkand region, the optimal period for sowing *Ferula assafoetida* L. seeds is December-January (Table 1).

Table 1

Fertility of *ferulaassafoetida* L. seeds depending on sowing dates,%

Sowing dates	Fertility,%
December	59,6 ± 1,7
January	47,3±5,2
February	0

Table 2

Germination of seeds from different depths,%

Planting depth, sm	Fertility,%
0-0,5	47,0 ± 2,9

1,0	47,0 ± 4,6
2,0	33,5 ± 4,9
3,0	11,0 ± 3,4
4,0	0

While the germination rate of seeds sown in December under field conditions was almost 60%, the germination rate of seeds sown in January was slightly lower, i.e. around 45-50%. It was found that seed germination was also related to the depth to which they were planted in the soil (Table 2). The highest germination was observed in the variant buried to a depth of 0–0.5 cm, while the germination was only 11% when the seeds were buried to a depth of 3.0 cm. At a depth of 4.0 cm, the grass did not sprout at all. Hence, the optimal depth of planting the seeds in the soil can be obtained as 0.5-1.0 cm.

The development of sprouted grasses is relatively slow in the first year of life, and by the end of the growing season in the upper part of the ground in each bush develops a pair of lanceolate leaves, reaching a length of 10-15 cm. However, the roots of the plants develop rapidly and penetrate to a depth of 25-30 cm, at a depth of 10-12 cm the thickness of the main root reaches 1-1.5 cm, forms an elongated nodule 5-6 cm long, and again thins and continues to penetrate to a depth. In the first year of its life, the vegetation period of the plants lasted until May 30 and amounted to 101 days, i.e., the plants completed the vegetation period in the juvenile phase. Re-growth of grasses in the second year began in the second decade of February. Plant viability was relatively high, ranging from 68.7 to 85.6% in experimental variants. In mid-March, the plants developed rapidly and the presence of juvenile and immature plants in the population was detected. By this time, it was noted that immature plants developed 2-3 leaf complexes.

Based on the data obtained from the experiments, it can be said that it is possible to cultivate *Ferula assafoetida* L. species and protect its natural resources by building artificial plants, increasing the production of export-oriented medicinal products.

CONCLUSION:

- *Ferula assafoetida* L. species are plants with valuable medicinal properties, the natural resources of which are widely exploited, and this activity threatens the complete extinction of some species from nature;
- Breast species can be propagated from seeds and the natural resources of valuable species can be protected by creating their production plantations;

-In the conditions of the hills of Samarkand region, the optimal time for sowing fragile seeds is December-January, the optimal depth of burial of seeds in the soil is 0.5-1.0 cm;

-Break seeds have the ability to germinate in the second year, and in years when the seed yield is abundant, seed stocks can be collected and used in the future.

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