

ECONOMICALLY AND ECOLOGICALLY IMPORTANT SPONTANEOUS SPECIES OF FABACEAE FAMILY FROM THE TERRITORY OF ROMANIA

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INTRODUCTION

Romanian botanical literature comprises a synthesis of all the plants that have proven economic value, written by I. Pop in 1982. In 2010, the work *Leguminoase din România* [Leguminous plants of Romania], was published by Tomescu A., Șesan T. E. The most extensive syntheses about the flora utility of the country are due to C. Pârnu, but this topic will remain permanently open because botany, regardless of its age as a science, will always be a beloved science. We can see this aspect from the current interest in phytomedicine, in finding plants for the future, solving environmental problems, etc. We have searched for information about plants in this family and found that many contributions have been made that complement the previously mentioned authors. When we present our current observations, the view is not definitive, as other works will appear in the future.

MATERIAL AND METHOD

Information about the uses of plants has continuously been recorded by various authors and, over time, the notions are becoming clearer; hence, a validation of plants with practical importance has been achieved. We started with one family at a time to make these aspects of a synthetic nature better known and to facilitate the searches of those interested in such subjects. For accuracy, for certain plants we have cited information from several authors.

RESULTS AND DISCUSSION

The economic value of the cultivated and wild species of the Fabaceae (Leguminosae) family has been highlighted over time. We classify spontaneous plants by categories of use in fodder, medicinal, good for ecological restoration, melliferous and other categories as follows:

Fodder plants

The most commonly spread Fabaceae on Romanian meadows are species such as *Trifolium*, *Medicago*, *Lotus*, *Vicia* și *Lathyrus*. However, their

biomass is small compared to the other categories of plants. Rare species for the country bring a reduced quantitative weight, but also *Astragalus monspessulanus*, *Onobrychis arenaria*, *Oxytropis halleri*, *Tetragonolobus siliquosus*, *Trifolium subteraneum*, etc. We grouped them according to classic terminology into the following categories:

Very good fodder plants are: *Medicago falcata* L.; *M. sativa* L.; *Onobrychis viciifolia* Scop.; *Trifolium hybridum* L.; *T. pratense* L.; *T. repens* L.; *T. resupinatum* L.

Good fodder: *Lotus corniculatus* L.; *Medicago lupulina* L.; *Robinia pseudacacia* L.; *Trifolium incarnatum* L.; *T. patens*; *T. retusum* L.; *Vicia angustifolia* L.; *V. dasycarpa* Ten.; *V. ervilia* (L.) Will.; *V. grandiflora*, Scop.; *V. hirsuta* (L.) Gray; *V. biennis* L.; *V. sativa* L.; *V. sepium* L.

Weak fodder: *Anthyllis vulneraria* L.; *Astragalus cicer*; *A. glycyphyllos* L.; *A. monspessulanus*; *A. onobrychis*; *Onobrychis arenaria* (Kit.) Ser. in DC.; *Onobrychis gracilis*; *Trifolium arvense* L.; *T. campestre* Schreb; *Vicia cracca* L., *V. pannonica* Cr., Măzărîche; *V. pisiformis* L.

Mediocre fodder: *Galega officinalis* L.; *Lathyrus hirsutus* L.; *L. palustris* L.; *L. pratensis* L.; *L. sativus* L.; *Trifolium alpestre* L.; *T. angulatum* W. et K.; *T. dubium* Sibth.; *T. montanum* L.; *T. ochroleucum* Huds.; *T. pannonicum* Jacq.; *T. spadiceum* L.; *T. subteraneum* L.; *Trigonella procumbens* (Besser) Rchb.; *Vicia cassubica* L.; *V. peregrina* L.; *V. sparsiflora* Ten.; *V. sylvatica* Benth.; *V. tetrasperma* (L.) Roth.; *V. truncatula* Fisch.

Under difficult conditions, herbivores can still consume some species with rare distribution from the genera *Lathyrus*, *Trifolium* and *Vicia*. More information about the value of forage plants was provided by Marușcă T. in 2019.

Edible Fabaceae

Plants in these families are known for the large amounts of protein that they contain in their seeds, and those that are cultivated provide a large amount of food for humans and fodder for animals. However, for the spontaneous species from our territory, although they are in large numbers, the seeds are rarely eaten because they also contain other

substances not accepted by the human digestive tract. In this sense, we mention acacia flowers (*Robinia pseudoacacia*), young leaves and seeds of galega (*Galega officinalis*), raw seeds from vetch (*Vicia*), sometimes from *Lathyrus*, roots of liquorice (*Glycyrrhiza glabra* L.) etc.

Medicinal Fabaceae

Fabaceae used in folk medicine

Anthyllis vulneraria L., used in contusions, rashes, wounds, bruises, cuts, skin diseases, constipation, neuropsychic conditions (fear), hernias (Crăciun Fl. et al. 1977; Tomescu A., Şesan T. E., 2010; Pârnu C. 2013),

Astragalus dasyanthus Pallas, ease of childbirth, hernia, burns, chest pains, internal pains, gastric pains (Tomescu A., Şesan T. E., 2010; Pârnu C., 2013)

Astragalus excapus L., in Romania, there is var *transsilvanicus* (Barth.) Ascherson et Graebner, blennorrhagia, poultices on sprains and dislocations, abdominal and heart pains, hernias Tomescu A., Şesan T. E., 2010; Pârnu C., 2013), syphilitic wounds, (<https://pfaf.org/user>), rare, present only in oak and sessile oak forests in Alba and Cluj counties.

Genistella sagitalis (L.) Gams, in liver disorders, joint rheumatism, constipation, elimination of toxic substances, kidney and bladder disorders, splenic disorders, hypothyroidism (Pârnu C., 2013; 2016), purgative, antirheumatic (Crăciun Fl., Bojor O., Alexan M., 1977; Scarlat M. A., 2019); herbal baths with anti-rheumatic effect, the flowers calm stomach pains, the decoction coagulates milk (Tomescu A., Şesan T. E., 2010)

Genista ovata W. et K. (*Genista tinctoria* L. ssp. *ovata* W. et K.), decoction of aerial parts has an antiseptic effect, heals destroyed tissues and fractures.

Genista tinctoria L., liver and spleen disorders, kidney and bladder disorders, joint rheumatism, hypothyroidism (Crăciun Fl. et al., 1977); dropsy, rheumatism, gout edible leaves and flower buds (<https://pfaf.org/user>); alleviates stomachaches, stimulates bile secretions, hormone regulator, anti-inflammatory. The flowers have a detoxifying effect, the aerial parts with the flower in hyperthyroidism, inflammation of the spleen, food poisoning, indigestion, anorexia, oedema, constipation, dyspepsia, bloating, abdominal colic, poisoning as an emetic, gout, rheumatism, neuralgia, hypothyroidism, fractures. The aerial part with flowers or seeds is used.

Lathyrus hirsutus L., used in smallpox (Tomescu Ana, Şesan Eugenia Tatiana, 2010)

Lathyrus niger (L.) Bernh it is not studied biochemically, but it has been used empirically frequently against fears accompanied by tachycardia, it is sedative, it regulates cardiac activity and pulse. Seeds and flowers are used (Tomescu Ana, Şesan Eugenia Tatiana, 2010; Pârnu C., 2016).

Lathyrus sylvestris L., Buckthorn, antirheumatic baths and against leg pain, contusions, sprains (Tomescu Ana, Şesan Eugenia Tatiana, 2010)

Lathyrus tuberosus L. medicinal-alimentary (Drăgulescu C., 1992), the leaves have antiseptic and cicatrizing properties, they were used in the past to heal wounds (Tomescu Ana, Şesan Eugenia Tatiana, 2010)

Medicago falcata L., Yellow alfalfa, in sweat and sore throat (Pârnu C., 2014)

Trifolium arvense L., in colds, flu, insomnia in children (Pârnu C., 2013); it is frequently spread in stubble, fields, meadows, in the forest-steppe area up to the beech floor.

Trifolium campestre Schreb, in intestinal pain, menstrual pain, diarrhoea (Crăciun Fl., Bojor O., Alexan M., 1977; Pârnu C., 2013).

Fabaceae used in both folk medicine and phytomedicine

Astragalus glycyphyllos L. is used empirically to eliminate intestinal worms and to treat internal pain (Pârnu, C., 2014), contains flavonoids (Buckingham, J.; V. Ranjit N. Munasinghe, 2015), has an action similar to *A. dasyanthus*, is used in kidney diseases, syphilis, gynaecology, rheumatism, dermatitis (Roman Lysiuk, Roman Darmohray, 2016).

Astragalus penduliflorus Lam. is rare in Romania, it grows only in meadows and steep slopes of Bucegi, Rodnei and Bârsei Mountains. It has the same flavonoid as *Astragalus glycyphyllos*.

Astragalus monspessulanus, *A. hamosus*, *A. onobrychis*, *A. corniculatus* and other species of this genus contain substances of therapeutic interest, the most important being flavonoids (Krasteva I. et al., 2015). *A. onobrychis* extracts have an antifungal effect (Pauliuc I., Botău D., 2013). *A. dasyanthus* is used by the Ukrainians for the treatment of 1st and 2nd degree hypertension, cardiovascular failure and chronic nephritis. *A. cicer* roots are used in Belarus for heart and gastrointestinal diseases (Roman Lysiuk, Roman Darmohray, 2016).

Coronilla varia, the seeds stimulate digestion (Crăciun Fl. et al. 1977); edible oil, emetic, cardiogenic, can be used externally on rheumatic joints and cramps (<https://pfaf.org/user>)

Cytisus scoparius (L.) Link. has edible flowers. Scarlat M. A. (2019) specifies the following uses: myocardial disorders (arrhythmias, extrasystole, cardiac neurosis, tachycardia, hypotension, cardiorenal oedema), acute respiratory disorders (pleurisy, bronchopneumonia, pneumonia), haemorrhages, uterine hypotony, rheumatic diseases, gout, oliguria, ascites, urinary lithiasis, convalescence, general weakness, albuminuria, eruptive fevers. It is prohibited in diabetes, hypertension, and pregnancy. The flowers are used in the pharmaceutical industry to extract sparteine,

useful in cardiology. For therapeutic purposes, only shoots without leaves and flowers are used.

Galega officinalis L. is a medicinal-food plant (Drăgulescu C., 1992); leaves are edible 2 in 5. It has been used since the Middle Ages against diabetes, it has a good effect on digestion, wounds, fever; infectious diseases are treated with the leaves; lactogenic insufficiency, diabetes, pancreatitis, constipation are treated with the flowers (Tomescu A., Şesan T.E., 2010); furunculosis, muscle pains, kidney ailments, urinary bladder ailments (Crăciun Fl., Bojor O., Alexan M., 1977; Pop I., 1982; Pârnu C., 2013, 2016),

Glycyrrhiza glabra L. is an aromatic food plant (Pop I., 1982; Tomescu A., Şesan T. E., 2010). In phytomedicine, it is used to cure the following diseases: arthritis, dysmenorrhea, gastro-duodenal ulcer, hyperacid gastritis, tracheitis, tracheo-bronchitis, laryngitis, convulsive cough, cough of various aetiologies, constipation, gallstones, urinary and gallstones, externally in conditions mouth (Crăciun Fl. et al., 1977; Pop I., 1982; Pârnu C., 2013, 2016 expectorant, sweetener (Roman Pharmacopoeia, ed. X); eye conditions, scalp conditions, oral and genital herpes, gastro-duodenal diseases, chronic viral hepatitis, lupus, scleroderma, rheumatoid arthritis, allergies caused by animal hair, cough, appendicitis, indigestion, inflammation, insect bites, sunstroke, haemorrhoids, flatulence, ulcers, gout, bowel sensitive, Crohn's disease, rheumatism, constipation, pectoral ailments, mouth and stomach ulcers, eliminates bronchial secretions, produces interferon, harmonizes the 12 meridians, (Tomescu A., Şesan T. E., 2010); arthritis, mouth ulcers, hormonal effects in women, affects the urinary system, ulcer, asthma, bronchitis, Addison's disease, ulcer, allergies, is contraindicated in pregnancy, cirrhosis and hypertension (<https://pfaf.org/user>);

Glycyrrhiza echinata L., is not medicinal (Crăciun Fl. et al., 1977)

Lathyrus nissolia L. contains flavones (Buckingham, J.; V. Ranjit N. Munasinghe, 2015)

Lotus corniculatus L.: anxiety, antispastic, calming in nervous excitement, nervous asthenia, insomnia, restlessness (Pârnu C., 2013; 2016; Crăciun Fl. et al., 1977; Grigorescu Em. Et al., 1993); aerial parts in conditions of colds, chills, stomach pains, effective in treating anxiety, depression, panic attacks, insomnia, good effect in thrombophlebitis and thrombosis (Tomescu A., Şesan T.E., 2010)

Lotus glaber Miller: anxiety, antispastic, excited nervous, insomnia (Pârnu C., 2013)

Medicago sativa L., medicinal-food in anaemia, remineralisation of the body and vitaminisation of the body, hypocalcaemia, digestive haemorrhages of low intensity, heart diseases, rheumatism, toning of the bone, digestive and immune systems, ulcers, bloating, stress and nervousness, menopausal disorders (Crăciun Fl. et

al., 1977; Drăgulescu C., 1992; Pârnu C., 2013; 2016; Tomescu Ana, Şesan Eugenia Tatiana, 2010)

Melilotus alba Medik, White melilot: anti-inflammatory, dysmenorrhea associated with neuralgic pain, including on the sciatic nerve (Romm Av., 2010). The dry plant is toxic, in the fresh state it is anticoagulant, it is used in ointments for external ulcers (<https://pfaf.org/user>); contains coumarins and flavonoids, treats leukorrhea (Tomescu Ana, Şesan Eugenia Tatiana, 2010)

Melilotus officinalis Lam., Yellow melilot, is used for gout, haematuria, insomnia, gingivitis, kidney and urinary tract diseases, urinary lithiasis, cystitis, gastrointestinal, liver cirrhosis, chronic hepatitis, gastric and intestinal colic, bronchitis, tracheitis, laryngitis, thrombophlebitis, varicose veins, urethritis, ulcers, wounds, pyelonephritis, hypertension, vascular diseases, baths for skin diseases, leucorrhoea, rheumatism (S. F. Marian, 1870-1907; Crăciun Fl. et al., 1977; Pop I., 1982; Drăgulescu C., 1992; Pârnu C., 2013), anti-inflammatory, dysmenorrhea associated with neuralgic pain, including on the sciatic nerve (Romm Av., 2010). Varicose veins, haemorrhoids, phlebitis, thrombosis, insomnia, nervous tension, neuralgia, palpitations, varicose veins, painful congestive menstruation, swollen joints, bruises, boils, erysipelas, conjunctivitis, strong anticoagulant (bleeding to death from small wounds); contains cumaines and flavonoids, treats leucorrhoea. The flowers are used in tea against neuropsychiatric conditions and insomnia (Tomescu Ana, Şesan Eugenia Tatiana, 2010).

Onobrychis viciifolia Scop. contains flavonoids with antidiabetic, antioxidant, antineoplastic, anti-inflammatory, antimutagenic, antifungal effects, one of which is similar to that of *Trifolium subterraneum* (Khare C.P., 2007; Buckingham, J., V. Ranjit N. Munasinghe, 2015)

Ononis spinosa L. ssp. *spinosa* (*O. campestris* W.D.J. Koch et Ziz), medicinal: metabolic disorders, kidneys, urinary bladder, ascites, bronchitis, cystitis, eczema, abdominal pain, gastric pain, oedema caused by cardiac and renal failure, gout, dropsy, poisoning, rheumatism, urinary retention, stimulation of diuresis, pyelocystitis, urinary lithiasis), is part of diuretic teas and those for cardiac arrhythmias. From ancient times it was used for stomach and kidney pains, general body tonic, skin diseases (Tomescu Ana; Şesan Eugenia Tatiana, 2010)

Robinia pseudoacacia L., acacia, hyperacid gastritis, heartburn, gastric and duodenal ulcer, asthma, cough, cold, neurasthenia, leucorrhoea, migraines, dental neuralgia, diarrhoea, constipation (Crăciun Fl. et al., 1977 ; Pârnu, C., 2013, 2016), edible seeds rich in protein and calcium, leaf juice and the inner part of the bark can be used as mild antiviral, cholagogue, emetic (<https://pfaf.org/user>) , the flowers are medicinal - alimentary, frequently used in gastritis and heartburn. In the pharmaceutical

industry, sparteine is extracted from flowers, used in cardiology. For therapeutic purposes, only shoots without leaves and flowers are used (Scarlat M. A., 2019)

Trifolium hybridum L. contains flavonoids (Buckingham, J.; V. Ranjit N. Munasinghe, 2015). Only flowers and leaves from young plants are used.

Trifolium pratense L., in kidney diseases, diarrhoea, rheumatic pains, gout (Crăciun Fl. et al., 1977; Pârnu C., 2013), flowers in cancer, hormone regulator (Romm Av., 2010), nerve sedative, frequently used for skin conditions in combination with purifying herbs such as *Arctium lappa* and *Rumex crispus*. In rural areas, it is used for breast cancer, eczema, psoriasis (https://pfaf.org/user). In folk medicine, the flowers are used against coughs, in antirheumatic baths. Plant extracts stimulate the activity of the gall bladder, liver, kidneys, regulate the level of cholesterol, carbohydrates, etc. (Tomescu Ana; Şesan Eugenia Tatiana, 2010). Scarlat M.A. (2019) attributes the following uses to red clover: cough, diarrhoea, kidney and abdominal diseases, inflammation of mucous membranes, leucorrhoea, rheumatic conditions, arthritis, arthrosis, ankylosing spondylitis, spondylosis, gout, generalized arteriosclerosis, coronary diseases and coronary arteriosclerosis, spasmophilia, tetany, cancer, hormonal disorders, menopausal disorders, etc., in various recipes

Trifolium repens L., creeping white clover, in gastrointestinal pain, leucorrhoea, cold, flu, cough, fever, ankylosing spondylitis (Crăciun Fl. et al., 1977; Pârnu C., 2014, 2016), potential anticoagulant effect (Romm Av., 2010). The flowers are rich in flavonoid components, used for stomach pain. The whole plant treats leucorrhoea, it is a general tonic (Tomescu Ana; Şesan Eugenia Tatiana, 2010)

Trigonella foenum-graecum L., Fenugreek is very good medicinally (5 in 5) it is used in ascariasis, ascites, anorexia, exophthalmic goitre, hyperglycaemia, inflammations, neuroses, wounds, (Crăciun Fl. et al., 1977; Pop I., 1982; Pârnu C., 2013); anorexia nervosa, ulcer, the most effective tonic for physical weakness caused by anaemia and infectious diseases, bad breath, contraindicated for pregnant women. The seeds contain substances (disogenins) from which oral contraceptives are obtained. It is cultivated, but sometimes it is spontaneous.

Vicia sativa L., medicinal, purgative (Crăciun Fl. et al., 1977).

From this family of plants, the following are also used in veterinary medicine: *Genista tinctoria*, for treating sheep with poisoning and digestive diseases (Tomescu A., Şesan T. E., 2010); *Ononis arvensis* L. for constipation and hematuria and *Robinia pseudacacia* leaves for animals with diarrhoea.

Melliferous plants

Very good melliferous plants: *Robinia pseudoacacia* L., acacia, 800-1200 kg per hectare, (Iordche P., Roşca L., Cismaru M., 2007)

Good melliferous plants: *Melilotus alba* Medik; *Onobrychis viciifolia* Scop.; *Trifolium resupinatum* L.; *T. repens* L.

Weak melliferous plants: *Galega officinalis* L.; *Trifolium retusum* L.; *T. subterraneum* L.; *Vicia cracca* L.; *V. hirsuta* (L) Gray; *V. sparsiflora* Ten.; *V. tetrasperma* (L.) Roth.

Mediocre melliferous plants: *Amorfa fruticosa* L.; *Anthyllis vulneraria* L.; *Cytisus albus*; *C. austriacus*; *C. hirsutus*; *Lotus corniculatus* L.; *Medicago falcata* L.; *M. lupulina* L.; *M. sativa* L., *Melilotus officinalis* Lam.; *Trifolium campestre* Schreb; *T. dubium* Sibth.; *T. fragiferum* L.; *T. hybridum* L.; *T. incarnatum* L.; *T. medium* Gruffb.; *T. montanum* L.; *T. ochroleucum* Huds.; *T. pannonicum* Jacq.; *T. pratense* L.; *T. rubens* L.; *T. spadicum* L.; *Trigonella foenum-graecum* L.; *T. procumbens* (Besser) Rchb.; *Vicia grandiflora*, Scop.; *V. pannonica* Cr.; *V. biennis* L.; *V. sativa* L.; *V. sepium* L.; *V. villosa* Roth.

Ecologically valuable Fabaceae

The roots of many species of this family reach deep into the soil layer, fight erosion and contain nodules full of bacteria that transform gaseous nitrogen from the atmosphere into liquid nitrogen. In recent decades, phenomena of soil detoxification by means of cultivated plants or even natural vegetation have been highlighted.

Frequent plantations of *Robinia pseudacacia* (acacia) have been cultivated on heavily degraded lands in our country since the end of the 18th century. In ecological restoration works, acacia has been used for a long time in agro-forestry crops to establish areas of protection, creating ecosystems where animals are attracted, leaves are good fodder, water is used more efficiently, eroded land is fixed by the trailing root system, leaf litter protects soils with a sandy texture, polluted soils are decontaminated because wood accumulates minerals, edges of railways are green, carbon is stored on depleted soils, nitrogen is fixed.

Hence, a judicious analysis of the places where plantations were established was necessary because it is an invasive species, which is more competitive through the root system and the dissemination of seeds. In areas with high biodiversity and which are objectives of natural protection, the acacia must be monitored and its expansion limited. In the Romanian silvicultural literature, we find studies from the end of the 18th century to the communist period. It was the most used species for the rehabilitation of ecosystems with erosions, sands, hydrographic basins with ravines, landslides, etc.

In our country, we observe frequent plantations of *Amorpha fruticosa* (Indigo Bush) intended to fight against strong winds in shelterbelts and on dams to stabilise them. Both acacia and indigo bush have spread invasively outside the areas where they were cultivated, causing other ecological problems.

Medicago sativa Lhas always been established on poorly productive and depleted arable land in village areas and on slopes, with the aim of restoring them properly. It is a valuable species for ecological restoration, enriches the soil with nitrogen, makes good use of nutrients from the depths, stabilises lands subject to erosion.

Vicia plants have a deep root system and were cultivated on the terraces of vine crops together with grasses with the dual purpose of stabilising the sides well but also to obtain very good quality fodder.

On steep slopes with scrub vegetation, we frequently see flowering *Cytisus* bushes, which are excellent plants that fight erosion. More widespread are *C. nigricans*, *C. hirsutus*, *Cytisus albus*, *C. austriacus*, *C. decumbens* (Durande) Spach. If there are also *Astragalus*, *Coronilla*, etc. we are sure that the respective ecosystems are stable over time.

Glycyrrhiza echinata specimens are sometimes planted on sandy lands in the Danube Delta. Similarly, *G. glabra* is useful for ecological restoration. On sunny hills, with loamy or loamy-sandy soils on the slopes, *Astragalus onobrychis* (sp. *spicata*), along with grass plants from the Poaceae family and some dicotyledonous plants contribute to the stabilisation and nitrogen enrichment of the respective soils.

In many submontane forests, there are *Cytisus scoparius* plantations that stabilise the slopes very well, as this species is a good stabilizer of soils and sandy lands. It was also cultivated in Romania both for anti-erosion purposes and as food for wild animals. It covers the soil and fixes nitrogen; it is a species of the future that can increase the amount of carbon in ecosystems and be part of new forests with economic value.

Lotus corniculatus also grows well on soils lacking in moisture and nutrient salts, often with poor vegetation and it enriches the soil. *Lotus uliginosus* Schkuhr recovers the soil, is a pioneer in restoring wet and acidic soils where clover cannot be grown, fixes atmospheric nitrogen (<https://pfaf.org/user>)

The following species can also be used for soil protection and erosion control: *Anthyllis vulneraria* L. fixes sandy lands (A. Nyarady, 1955); *Astragalus cicera* can be useful in ecological restoration; *A. dasycanthus*, *A. glycyphyllos* L.; *A. monspessulanus*; *A. onobrychis*; *Caragana frutex* (L.) C. Koch, stabilise the soil on the slopes; *Coronilla varia* protects degraded lands; *Genista germanica* L.; *G. pilosa* L. are very resistant for ground cover on rocks, as is *Genistella sagittalis* (L.) Gams; *Lathyrus sativus* L.; green manure, stabilises soil, fixes nitrogen

(<https://pfaf.org/user>); *Lathyrus vernus* (L.) Bernh; *Medicago lupulina* L.; *M. minima* (L.) Bartal, frequently spread in dry and sandy meadows from the plain area to the mountain area; *M. orbicularis* (L.) Bartal; *M. rigidula* (L.) All. are spread spontaneously on dry and sunny lands in plain and hill areas.

Melilot species, *Melilotus alba* Medik, *M. altissima* Thuill., *M. dentata* (W et K.) Pers and *M. officinalis* Lam. can help fight erosion and enrich the soil with nitrogen.

Onobrychis arenaria (Kit.) Ser. in DC, consolidates sands; *O. viciifolia* Scop., successfully combats soil erosion (C. Pärvi 2001), enriches soil in nitrogen, improves light soils, stabilises soils (<https://pfaf.org/user>)

Tetragonolobus maritimus (L.) Roth. fixes sandy soils in the Danube Delta. If plants of this family are present in the vegetation, the respective soils are safe..

Nitrogen-enriching plants

The most numerous nitrogen-fixing plants are found in family *Fabaceae*, of which we found the following cited: *Anthyllis vulneraria* L.; *Astragalus glycyphyllos* L.; *Caragana frutex* (L.) C. Koch; *Coronilla emerus*; *C. varia*; *Cytisus decumbens* (Durande) Spach; *C. scoparius* (L.) Link.; *Galega officinalis* L.; *Genista germanica* L.; *G. tinctoria*; *G. pilosa* L.; *Genistella sagittalis* (L.) Gams; *Glycyrrhiza glabra* L.; *G. echinata* L.; *Lathyrus cicera* L.; *Lathyrus latifolius* L.; *L. palustris* L.; *L. pratensis* L.; *L. sativus* L.; *L. sylvestris* L.; *L. tuberosus* L.; *Lotus corniculatus* L.; *L. uliginosus* Schkuhr; *Medicago lupulina* L.; *M. polymorpha* L.; *M. sativa* L.; *Melilotus alba* Medik.; *M. altissima* Thuill.; *M. officinalis* Lam.; *Onobrychis arenaria* (Kit.) Ser. in DC.; *O. viciifolia* Scop.; *Ononis spinosa* L. ssp. *spinosa*; *Trifolium dubium* Sibth.; *T. incarnatum* L.; *T. lupinaster* L. ssp. *angustifolium* (Litv.) Bobrov (Tomescu Ana; Şesan Eugenia Tatiana, 2010); *T. repens* L.; *T. subterraneum* L.; *Trigonella coerulea* (L.) Ser.; *Vicia cracca* L.; *V. hirsuta* (L.) Gray; *V. pisiformis* L.; *V. sativa* L.; *V. sepium* L.; *V. sylvatica* Benth.; *V. tenuifolia* Roth.; *V. tetrasperma* (L.) Roth.; *Vicia villosa* Roth., (<https://pfaf.org/user> ; Tomescu Ana; Şesan Eugenia Tatiana, 2010).

Dynamic accumulators

The plants accumulate minerals from the soil and make them more bioavailable. From this family we found the following: *Glycyrrhiza glabra* L.; *G. echinata* L.; *Medicago lupulina* L.; *Trifolium dubium* Sibth.; *T. hybridum* L.; *T. lupinaster* L. ssp. *angustifolium* (Litv.); *T. pratense* L.; *T. repens* L.; *Vicia cracca* L.; *V. hirsuta* (L.) Gray; *V. sativa* L.; *V. sepium* L.; *V. sylvatica* Benth.; *V. tenuifolia* Roth.; (<https://pfaf.org/user>; Tomescu Ana; Şesan Eugenia Tatiana, 2010).

Colouring plants are rarely used because, starting with the second half of the 20th century, chemically obtained pigments are used and natural ones are never found in the desired quantities. In literature, *Genista tinctoria* is frequently cited for dyeing textile threads in yellow and green (S. F. Marian, 1870-1907; Pop I., 1982; Pop Maria, Pop Oana, 2007; Tomescu A., Şesan T. E., 2010), *Genista germanica* L. and the flowers of *Lotus corniculatus* L. can also be used for yellow and orange colours. *Cytisus* plants are more widespread, their flowers can be used as dyes. The flowers of acacia, *Robinia pseudacacia* L., can be used to obtain yellow shades (Tomescu A., Şesan T. E., 2010) but also those of *Ononis spinosa* L. ssp. *spinosa*, also called Spiny Restharrow (Pop Maria, Pop Oana, 2007).

Ornamental vegetables

Milea Preda (1989) indicates the following species as ornamental plants for cultivation: *Amorfa fruticosa* L.; *Anthyllis vulneraria* L.; *Caragana frutex* (L.) C. Koch; *Cytisus albus*, *nigricans*; *Genistella sagitalis* (L.) Gams; *Genista tinctoria*; *Glycyrrhiza glabra* L.; *G. echinata* L.; *Lathyrus latifolius* L.; *L. vernus* (L.) Bernh.; *Lotus corniculatus* L.; *Ononis spinosa* L. ssp. *spinosa*; *Robinia pseudacacia* L.; *Cytisus scoparius* (L.) Link; *Trifolium hybridum* L.; *T. incarnatum* L.; *T. lupinaster* L. ssp. *angustifolium* (Litv.) Bobrov; *T. michelianum* Savi; *T. pratense* L.; *T. rubens* L. Accessible on <https://pfaf.org/userand> on *Lathyrus sylvestris* L.

The following plants have **cosmetic** use:

Robinia pseudacacia L., acacia, flower extract for dry skin, prevents photoaging, maintains hair (shampoos, conditioners) (Ionescu-Călineşti Larisa, 2009); volatile oils are extracted from flowers for perfumery (<https://pfaf.org/user>).

Medicago sativa L., hair and epidermis regeneration, combats the effects of photoaging, gentle exfoliation, skin cleansing in the form of lotions, oils, gels, etc. (Ionescu-Călineşti Larisa, 2009).

Galega officinalis L., extract from inflorescences for oily, acne-affected skin, prevents aging, hand and foot baths (Ionescu-Călineşti Larisa, 2009).

As **insecticides** to remove moths, we can use melilot plants *Melilotus officinalis* Lam., *M. alba* Medik, *M. altissima* Thuill. To the same purpose, we add *Lotus uliginosus* Schkuhr and *Cytisus scoparius* (L.) Link, *Coronilla varia* (Tomescu Ana; Şesan Eugenia Tatiana, 2010).

Toxic vegetables

Toxicity phenomena are rare and of low intensity in this family of plants. Different reactions are often observed depending on the category of consumers. Zanoschi V. et al., later Pop I. and other authors consider the following species to be toxic: *Amorfa fruticosa* L.; *Cytisus albus*; *C. austriacus*; *C.*

hirsutus; *C. nigricans*; *C. procumbens*; *Galega officinalis* L.; *Genistella sagitalis* (L.) Gams, Grozamă, *Genista tinctoria*, *Glycyrrhiza glabra* L.; *Glycyrrhiza echinata* L.; *Lathyrus cicera* L.; *L. niger* (L.) Bernh.; *L. sylvestris* L.; *Medicago sativa*; *Melilotus alba* Medik; *M. officinalis* Lam., *Trifolium repens* L.

The most toxic are:

Cytisus alpinus (Mill.) Bercht. et J. Presl. In Romania, it is rare, cited only in Sibiu and Mehedinti counties; according to <http://plants.usda.gov> and <https://pfaf.org/user>, the leaves are very toxic, have cholagogue and purgative effect, treat nicotism;

C. decumbens (Durande) Spach; poisonous plant, can cause paralysis or death;

Cytisus scoparius (L.) Link, overdose is fatal for humans (Scarlat M. A., 2019).

CONCLUSIONS

Since 1982, when I. Pop popularised the list of plants with economic value for Romania, to the present, uses have been known for the species that have ecological value, medicinal, decorative and others. No significant additions can be made to the colouring species, with significance in folk tradition, as food and wood. In summary, for the Fabaceae Family, the list of spontaneous plants of economic and ecological interest is as follows:

Amorfa fruticosa L., mediocre melliferous plant, ecological restoration in the past, invasive at present;

Anthyllis vulneraria L., low quality fodder, folk medicine, mediocre melliferous plant, decorative, ecological restoration;

Astragalus cicer, low quality fodder, ecological restoration;

A. dasyanthus, folk medicine, ecological role;

A. exscapus L. var. *transsilvanicus*, medicinal, dye and paper industry;

A. glycyphyllos L., low quality fodder, medicinal, ecological restoration;

A. hamosus, insufficiently studied;

A. monspessulanus, very weak fodder, ecological restoration;

A. onobrychis, low quality fodder, ecological restoration;

A. penduliflorus Lam. low medicinal value;

Caragana frutex (L.) C. Koch, decorative, ecological restoration;

Coronilla emerus weak medicinal plant, ecological restoration, cosmetic;

Coronilla scorpioides traditional usage (Paula De Vos, 2010);

C. varia, medicinal, ecological restoration, toxic, insecticide;

Cytisus albus, bobîţel, plant baths, mediocre melliferous plant, decorative, environmental protection;

C. alpinus (Mill.)Bercht. et J.Presl. toxic and medicinal;

C. austriacus, mediocre melliferous plant, environmental protection;

C. decumbens (Durande) Spach, environmental protection, toxic;

C. hirsutus, mediocre melliferous plant, environmental protection, toxic;

C. nigricans, decorative, soil protection, toxic;

C. procumbens, toxic;

C. scoparius (L.) Link., mediocre fodder, cosmetic, medicinal, toxic, soil protection, ecological restoration, paper industry, tanning and dyeing;

Dorycnium pentaphyllum Scop. Ssp *herbaceum* (Vill.) Rouy, medicinal, ecological importance;

Galega officinalis L., medicinal food plant with edible leaves 2 of 5, medicinal, cosmetic, weak melliferous, weak fodder and toxic, ecological restoration;

Genista germanica L., decorative, colouring, ecological importance;

G. ovata W. et K., medicinal, ecological importance;

G. pilosa L., ecological restoration;

G. tinctoria, dye industry, decorative, medicinal, ecological restoration, toxic;

Genistella sagitalis (L.) Gams, medicinal, decorative, ecological restoration;

Glycyrrhiza glabra L., aromatic food plant, medicinal, decorative, ecological restoration;

G. echinata L., decorative, ecological restoration;

Lathyrus aphaca L., ecological importance;

L. aureus (Stev.) Brandzã, ecological importance;

L. cicera L., toxic, ecological importance;

L. halersteinii Baumg., ecological importance;

L. latifolius L., toxic, ecological restoration;

L. laevigatus (W. et K.) Gren, ecological importance;

L. linifolius, insufficient data;

L. hirsutus L., mediocre fodder, medicinal, ecological importance;

L. niger (L.) Bernh, folk medicine, ecological importance;

L. nissolia L., phyto-therapeutic and ecological importance;

L. pallescens (Bieb.) C. Koch, ecological importance;

L. palustris L., weak toxicity, ecological value;

L. pratensis L., fodder, ecological value;

L. sativus L., edible 2 of 5, ecological restoration;

L. sylvestris L., medicinal, decorative, ecological importance, moderate toxicity, good fodder;

L. tuberosus L. medicinal-nutritive, mediocre melliferous plant, ecological restoration;

L. vernus (L.) Bernh., decorative, not studied biochemically, ecological role;

Lotus corniculatus L., good fodder, mediocre melliferous plant, toxic, decorative, medicinal, colouring, ecological restoration;

L. tenuis, mediocre fodder, medicinal, toxic;

L. uliginosus Schkuhr, insecticide, ecological restoration;

Medicago falcata L., very good fodder, mediocre melliferous plant, toxic, folk medicine;

M. lupulina L., good fodder, edible leaves 2 of 5, mediocre melliferous plant, toxic, ecological restoration;

M. marina L., ecological importance;

M. minima (L.) Bartal, mediocre fodder; ecological importance;

M. orbicularis (L.) Bartal, ecological importance;

M. polymorpha L. (*M. hispida* Gaertn.) rare, edible leaves 2 of 5, ecological importance

M. prostrata Jacq., rare, ecological importance;

M. rigidula (L.) All., low quality fodder; ecological importance;

M. sativa L., very good fodder, mediocre melliferous plant, toxic, medicinal-edible, cosmetic, ecological restoration;

Melilotus alba Medik, medicinal, aromatic and repellent, good melliferous, toxic, good ecological value

M. altissima Thuill., repellent, fodder, medicinal, ecological importance;

M. dentata (W. et K.) Pers, ecological importance;

M. officinalis Lam., folklore, aromatic food plant 2 of 5, mediocre melliferous plant, medicinal, Cosmetic, aromatherapeutic, moth repellent, nitrogen-fixing, toxic;

Onobrychis arenaria (Kit.) Ser. in DC., low quality fodder, mediocre melliferous plant, ecological importance;

O. gracilis, low quality fodder, mediocre melliferous plant;

O. viciifolia Scop., very good fodder, good melliferous, medicinal, ecological restoration;

Ononis arvensis L., medicine, veterinary medicine, dye and leather industry, decorative;

O. spinosa L. ssp. *spinosa*, edible 2 of 5, medicinal, decorative, colouring, ecological restoration;

Robinia pseudacacia L., very good melliferous, decorative, wood industry, folk medicine, cosmetic, ecological restoration, colouring, fodder;

Tetragonolobus maritimus (L.) Roth., mediocre fodder, toxic, medicinal, ecological importance;

Trifolium alpestre L., mediocre fodder, toxic, ecological importance, medicinal;

T. angulatum W. et K. mediocre fodder, mediocre melliferous plant, ecological importance;

T. arvense L., low quality fodder, toxic, folk medicine, ecological importance;
T. aureum Pollich; mediocre fodder, weak melliferous, ecological importance;
T. badium Schreb, ecological importance;
T. campestre Schreb; low quality fodder, mediocre melliferous plant, folk medicine, ecological importance;
T. diffusum Ehrh., ecological importance;
T. dubium Sibith., mediocre fodder, mediocre melliferous plant, ecological restoration;
T. echinatum M. Bieb., ecological importance;
T. fragiferum L., good fodder, mediocre melliferous plant, ecological importance;
T. hybridum L., very good fodder; mediocre melliferous plant, toxic, decorative, containing flavonoids, ecological restoration, cultivated;
T. incarnatum L., good fodder, mediocre melliferous plant, decorative, ecological restoration, cultivată și spontană ;
T. lupinaster L. ssp. *angustifolium* (Litv.) Bobrov, decorative, ecological restoration;
T. medium Grufb.; good fodder, mediocre melliferous plant, toxic, ecological importance;
T. michelianum Savi, ecological importance;
T. micranthum Viv., ecological importance;
T. montanum L., mediocre fodder, mediocre melliferous plant, empirical cure;
T. ochroleucum Huds., mediocre fodder, mediocre melliferous plant, ecological importance, medicinal;
T. ornithopoides L., ecological importance;
T. palidum W. et K., ecological importance;
T. pannonicum Jacq., mediocre fodder, mediocre melliferous plant, ecological importance;
T. patens, good fodder, weak melliferous, ecological importance;
T. pratense L., very good fodder, mediocre melliferous plant, decorative, medicinal, ecological restoration, cosmetic;
T. repens L., very good fodder; good melliferous, medicinal, ecological restoration;
T. resupinatum L., very good fodder, good melliferous, ecological importance;
T. retusum L., good fodder, weak melliferous, ecological importance;
T. rubens L.; mediocre fodder, mediocre melliferous plant, decorative
T. scabrum L., ecological importance;
T. spadiceum L., mediocre fodder, weak melliferous, ecological importance;
T. subterraneum L., mediocre fodder, weak melliferous, weak medicinal plant, ecological restoration;
T. striatum L., ecological importance;
Trigonella coerulea (L.)Ser., mediocre melliferous plant, medicinal, fodder, ecological importance;

T. foenum-graecum L., good quality aromatic edible plant (4 of 5), mediocre melliferous plant, medicinal (5 of 5), cultivated;
T. procumbens (Besser) Rchb., mediocre fodder, mediocre melliferous plant, ecological importance;
Vicia angustifolia L., good fodder, weak medicinal plant, ecological importance;
V. cassubica L., mediocre fodder, ecological importance;
V. cracca L., low quality fodder, weak melliferous, ecological restoration;
V. dasycarpa Ten., good fodder;
V. dumetorum L., ecological importance;
V. ervilia (L.)Will., good fodder;
V. grandiflora, Scop., good fodder, mediocre melliferous plant, ecological importance;
V. hirsuta (L.)Gray, edible leaves and seeds (2 of 5), good fodder, weak melliferous, ecological restoration;
V. lathyroides L., ecological importance;
V. lutea L., ecological importance;
V. narbonensis L., ecological importance;
V. pannonica Cr., low quality fodder, mediocre melliferous plant;
Vicia peregrina L., mediocre fodder, ecological importance;
V. biennis L., good fodder, weak melliferous;
V. pisiformis L., very weak edibility of leaves and seeds, ecological importance;
V. sativa L., good fodder, mediocre melliferous plant, medicinal, ecological restoration;
V. sepium L., Good fodder, mediocre melliferous plant, ecological restoration;
V. sparsiflora Ten., mediocre fodder, melliferous plant;
V. sylvatica Benth., mediocre fodder, edible seeds, ecological restoration;
V. tenuifolia Roth., ecological restoration;
V. tenuissima L., ecological importance;
V. tetrasperma (L.) Roth., mediocre fodder, weak melliferous, ecological importance;
V. truncatula Fisch., mediocre fodder;
V. villosa Roth., mediocre melliferous plant, ecological restoration.

Our study comprises approximately 120 species, most of which have both practical and ecological importance. Among them we have also included species with decorative value or mentioned in popular beliefs.

Many species can be used in ecological restoration because they can accumulate either nitrogen with the help of nitrogen-fixing bacteria from the nodules on the roots, or various heavy metals that they introduce in less harmful molecular forms.

This family includes very valuable fodder species but also numerous plants with medicinal properties. The list of toxic species warns about some

undesirable phenomena. We expect that, in the future, the diversity of uses can offer surprises.

ABSTRACT

The current study involves 120 spontaneous species with economic value, which were selected from the Fabaceae family from the territory of Romania and which cover the following categories: 59 fodder species, 48 melliferous species, 57 medicinal species, 3 industrial species, 7 species for vegetable dyes, 4 insecticide species, 8 cosmetic species and 17 decorative species. Some species have multiple uses, but most of them, i.e. 108 species are ecologically important, of which some are suitable for ecological restoration.

There are 23 toxic species of which 2 cause major problems. Useful species can be found in this family to solve future economy and ecological problems.

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