

PLANTS FROM ROMANIAN SPONTANEOUS FLORA USED IN TRAUMATISMS AND RHEUMATISMS

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INTRODUCTION

Botanical literature of the past 100 years has known syntheses with utilitarian plants written by S.F. Marian., V. Butură, Att. Kovacs, I. Pop, C. Părvu, etc. The period 1990-2020 witnessed an increasing interest in medicinal plants, which led to precious information being revived and studied again on scientific bases while numerous remedies were found to respond to people's needs. These lists of medicinal plants provide an opportunity to use an even larger number of species that are growing in our country.

MATERIAL AND METHOD

By comparing the lists of medicinal plants, we have highlighted their important uses. In this paper, we will only list the species without indicating their biochemistry, therapeutic actions, methods of administration, etc.

We used only their scientific names, although they also have popular names that are used throughout the country and are frequently cited in literature. We did not make a rating of them because all the species in the lists had to be analysed and we lack a lot of information for these categories of diseases.

RESULTS AND DISCUSSIONS

Regarding the categories of uses considered, there are many valuable species that have several uses. Moreover, some also act on other body systems, but they are not listed here.

In ancient medicine, phytotherapy was combined with psychotherapy. Hence, for mental shocks, we find useful *Hypericum perforatum*, a plant which is also useful in burns, wounds, skin ulcers, rheumatism, insomnia, gout, tumours, epilepsy, bronchitis (Crăciun Fl., Bojor O., Alexan M., 1977; Pop I., 1982; Părvu C., 2016). Cosmetic preparations are used externally for wounds, ulcers, varicose ulcers (Ionescu-Călinești Larisa, 2009).

Contusions can have *Agrimonia eupatoria*, *Cornus sanguinea*, *Equisetum arvense*, *Monesses uniflora*, *Polygonatum multiflorum*, *P. odoratum*,

Tamarix ramosissima, *Tamus communis* applied on them. There are creams on the market that contain some Romanian plants. For example, *Tamus communis* has a rhizome rich in alkaloids, glycosides, saponins, tannins and is used in the preparation of ointments or extracts used against rheumatism, contusions, bruises and gout.

It is known as a remedy used externally but it can also be used internally in small quantities, with diuretic, purgative and anti-inflammatory effects. It is more widespread in the south of the country (Crăciun Fl., Bojor O., Alexan M., 1977; Părvu C., 2014). *Equisetum arvense* (horsetail) has long been used to heal wounds, varicose ulcers, contusions, relieve rheumatoid arthritis and in uterine bleeding, small internal bleeding, gout, etc. *Tamarix ramosissima* it is also mentioned for bleeding wounds, rheumatoid arthritis (S. F. Marian, 1870-1906; Crăciun Fl., Bojor O., Alexan M., 1977; Părvu C., 2016). *Monesses uniflora*, known in Romanian, Indian and Chinese literature, cannot be harvested for industrial purposes because it is sporadic in mountainous and small areas, but we believe it can be cultivated.

For bruises, *Arnica montana*, *Oenothera biennis*, *Polygonatum multiflorum*, *P. odoratum*, *Primula veris*, *Sambucus nigra*, *Tamus communis*, *Viburnum lantana* can be used. Of these, *Arnica montana* and *Tamus comunis* are frequently found in ointments used for several ailments. The oil of *Oenothera biennis* has anti-inflammatory effect (Romm Av., 2010). The root extract is used in facial masks to combat bruises, irritated skin, sunburn (Ionescu-Călinești Larisa, 2009), rheumatoid arthritis (<https://pfaf.org/user>)

Dislocations have been treated with plants in folk environments. For example, *Potentilla argentea* popularly called hoary cinquefoil, silver cinquefoil or silver-leaf cinquefoil, has been used for dislocations, bleeding wounds, cuts, sweet spots, stab wounds (Părvu C., 2016). *Symphytum officinale* was used even more often. *Potentilla cinerea*, *Artemisia absinthium*, *Stellaria media*, *Agrimonia eupatoria* are also used to these purposes.

After stings, both cultivated and spontaneous plants can be used; from the latter category we find *Artemisia vulgaris* (used even for snake bites), *Ledum palustre*, *Plantago lanceolata*, *P. media*, *P.*

major, *Sanguisorba officinalis*, *Saponaria officinalis*, *Sempervivum tectorum*, *Senecio jacobaea*. Next, we can highlight *Plantago* and *Sanguisorba*, which we believe have always been used by Romanians. The roots of *Sanguisorba officinalis*, are useful for kidney disease, wound healing, stings, burnt tissues, wounds, colitis, acute enterocolitis, diarrhoea, bloody diarrhoea, stomach pain, epistaxis, haematuria, haemoptysis, haemorrhage, haemorrhoids, melena, menorrhagia, menopause, flatulence, scalds, wounds, ulcerative colitis, haemorrhagic syndrome (S. F. Marian, 1870-1907; Crăciun Fl., Bojor O., Alexan M., 1977; Pop I., 1982; Pitera F., 2001, Soescu Sorina et al., 2008; Pârvu C. et al., 2018) It is spread through wet meadows and swamps, from the plain to the spruce floor.

The most common *Plantago* species have similar uses. *Plantago lanceolata* L. has been used in ulcers (S. F. Marian, 1870-1907; Crăciun Fl., Bojor O., Alexan M., 1977; Pop I., 1982), bronchitis, cough, tracheitis, laryngitis, stomatitis, purulent wounds, blepharitis, atherosclerosis, asthma insect bites, small intestinal bleeding, conjunctivitis, skin conditions, hyperacid gastritis, diarrhoea (Pârvu, C., 2014). In cosmetics, the leaf extract is an antimicrobial agent, used to fight acne, oily skin, sensitive skin, wounds, skin and mucous ulcers, eczema, anti-wrinkle creams, hair care (Ionescu-Călinești Larisa, 2009). *Plantago major* L., has been used in skin ulcers, gastrointestinal ulcers, bronchitis, cough in children, whooping cough, tracheitis, laryngitis, stomatitis, purulent wounds, blepharitis, atherosclerosis, asthma, hypercholesterolemia, small bowel haemorrhage, skin disorders, gastritis, diarrhoea (S. F. Marian, 1870-1907; Crăciun Fl., Bojor O., Alexan M., 1977; Pop I., 1982; Pârvu, C., 2016).

It also acts as a skin anti-inflammatory, antimicrobial, astringent on the respiratory system and skin (<https://pfaf.org/user>). *Plantago media* has been used in tracheitis, laryngitis, acute stomatitis laryngitis, purulent wounds, atherosclerosis, asthma, skin irritations, hypercholesterolemia, insect bites, small intestinal bleeding, conjunctivitis, skin conditions, bronchitis, hyperacid gastritis, diarrhoea (Crăciun Fl., Bojor O., Alexan M., 1977). 20-30 grams of *Plantago ovata* leaves consumed per day are laxatives.

Burns have been treated with tea made of *Achillea millefolium*, *Alchemilla vulgaris*, *Arctium lappa*, *Artemisia scoparia*, *Chamaenerion angustifolium*, *Grindelia squarrosa*, *Hypericum perforatum*, *Leonurus cardiaca*, *Lilium martagon*, *Malva sylvestris*, *Mycelis muralis*, *Nasturtium officinalis*, *Origanum vulgare*, *Parietaria officinalis*, *Polygonum bistorta*, *P. lapathifolium*, *Populus nigra*, *Rumex acetosella*, *R. maritima*, *Sedum maximum*, *S. vulgare*, *Sempervivum tectorum*, *Senecio jacobaea*, *Descurainia sophia*, *Stachys officinalis*, *Thymus* sp., *Tilia* sp., *Verbena officinalis*,

Veronica officinalis. From *Pinus cembra*, turpentine is obtained with which the burned or scalded areas can be anointed. Sunburns can be soothed with tea from *Chenopodium album*, *Matricaria chamomilla*, *Trifolium* sp. *Matricaria chamomilla* is commonly used as a disinfectant. *Hippophaë rhamnoides* oil is a valuable elixir that is also very helpful in burns. It is widespread in the Subcarpathian area of Moldavia, Wallachia (between the rivers Bistrita and Olt) and on the sands of the Danube Delta. The properties of the fruit are those of a general tonic and strong antiscorbutic, which activates the wound healing process (epithelialization), eliminates toxins from the body through the gastrointestinal and renal routes, stabilizes a normal digestion and fights diseases caused by fungi.

Skin ulcers can be cured with *Ajuga reptans*, *Aristolochia clematitis*, *Galium aparine*, *Hedera helix*, *Humulus lupulus*, *Inula helenium*, *Ligustrum vulgare*, *Lycopodium clavatum*, *Matricaria chamomilla*, *Mentha* sp., *Plantago* sp., *Quercus* sp., *Rubus* sp. Of these, *Plantago* and *Lycopodium* spores have been more popular.

Varicose ulcer can be successfully treated by general detoxification and return to a very balanced lifestyle but its healing can be accelerated if *Agrimonia eupatoria*, *Alnus glutinosa*, *A. incana*, *Anagalis arvensis*, *Arctium* sp., *Atropa belladonna*, *Equisetum* are still used. To these are added *Potentilla erecta*, *Stachys officinalis*, *Symphytum officinalis* *Taraxacum officinalis*, *Urtica dioica*.

Mouth ulcers can be combatted with plants used for skin ulcers, rich in tannins, but also with *Amaranthus hypocondriacus*. The list may be longer in the future.

To the purpose of healing wounds, a long list of plants is available, of which we present the following: *Achillea millefolium* ssp. *millefolium*, ssp. *sudetica*, *Agrimonia eupatoria*, *Ajuga reptans*, *Alchemilla xanthochlora*, *Alnus glutinosa*, *A. viridis*, *Amaranthus hypocondriacus*, *A. retroflexus*, *Anchusa officinalis*, *Arctium lappa*, *Arnica montana*, *Artemisia campestris*, *Bidens tripartita*, *Calluna vulgaris*, *Capsella bursa-pastoris*, *Centaureum erythraea*, *Clematis vitalba*, *Colchicum autumnale*, *Consolida regalis*, *Convolvulus arvensis*, *Cornus sanguinea*, *Equisetum arvense*, *Erigeron canadensis*, *Euonymus europaeus*, *Eupatorium cannabinum*, *Euphrasia rostkoviana*, *Fraxinus excelsior*, *Galium aparine*, *G. verum*, *Gentiana asclepiadea*, *G. utriculosa*, *Geranium dissectum*, *G. macrorrhizum*, *Glechoma hederacea*, *G. hirsuta*, *Gratiola officinalis*, *Grindelia squarrosa*, *Gypsophylla paniculata*, *Hedera helix*, *Hypericum perforatum*, *Lapsana communis*, *Laserpitium latifolium*, *Leonurus cardiaca*, *Limonium gmelinii*, *Lysimachia nummularia*, *L. punctata*, *Lythrum salicaria*, *Malva sylvestris*, *Marrubium vulgare*, *Matricaria recutita*, *Mentha piperita*, *M. spicata*, *Menyanthes trifoliata*, *Mercurialis perennis*, *Monarda uniflora*, *Mycelis*

muralis, *Myosotis alpestris*, *Myricaria germanica*, *Onopordon acanthium*, *Origanum vulgare*, *Parietaria officinalis*, *Paris quadrifolia*, *Pedicularis sylvatica*, *Petasites albus*, *P. hybridus*, *Pinus cembra*, *P. mugo*, *P. sylvestris*, *Plantago lanceolata*, *P. major*, *P. media*, *Plumbago europaea*, *Polygonum aviculare*, *P. bistorta*, *Populus nigra*, *Portulaca oleracea*, *Potentilla erecta*, *Primula elatior*, *P. veris*, *Prunella vulgaris*, *Pulmonaria mollis*, *P. rubra*, *Pulsatilla montana*, *Quercus cerris*, *Q. frainetto*, *Q. petraea*, *Q. pubescens*, *Q. robur*, *Rhinanthus serotinus*, *Rumex acetosa*, *R. conglomerates*, *R. crispus*, *Salix alba*, *S. caprea*, *S. cinerea*, *S. daphnoides*, *S. pentandra*, *S. purpurea*, *S. viminalis*, *Salvia sclaraea*, *Sanguisorba officinalis*, *Sanicula europaea*, *Scrophularia nodosa*, *S. umbrosa*, *Sedum maximum*, *Senecio jacobaea*, *Senecio vulgaris*, *Staphylea pinnata*, *Symphytum officinale*, *Tamarix ramosissima*, *Tamus communis*, *Telekia speciosa*, *Teucrium chamaedrys*, *Teucrium scordium*, *Thymus serpyllum*, *Trapa natans*, *Trifolium pratense*, *Trigonella foenum-graecum*, *Ulmus glabra*, *U. minor*, *Urtica dioica*, *Utricularia vulgaris*, *Verbena officinalis*, *Veronica beccabunga*, *V. spicata*, *Viburnum lantana*, *Vinca minor*, etc.

Arnica montana is used for bleeding wounds, purulent wounds, rheumatoid arthritis, bruised wounds (Pârnu C., 2001), skin irritations, oedema, bruising, seborrheic dermatitis, skin fungal infections, acne, hair care, plastic surgery to reduce oedema and of postoperative bruises (Ionescu-Călinești Larisa, 2009).

Capsella bursa-pastoris is effective in treating internal and external bleeding, nasal bleeding, diarrhoea, etc. (<https://pfaf.org/user>), haemostatic, hypotensive (Christmas Fl., Bojor O., Alexan M., 1977; Kovacs Att., 1979; Pop I., 1982), haemophilia, small internal haemorrhages, metrorrhagia, etc. (Pârnu, C., 2016), cosmetic varicose veins, venectasias, bleeding wounds, telangiectasias (Ionescu-Călinești Larisa, 2009).

Cuts can have latex applied on them from *Mycelis muralis*, as well as plant juice with disinfectant and healing effect from *Achillea millefolium*, *Equisetum arvense*, *Actaea spicata*, *Alchemilla vulgaris*, *Anchusa officinalis*, *Aristolochia clematidis*, *Galium verum*, *Hedera helix* (suppurative cuts), *Inula britanica*, *Lapsana communis*, *Leucanthemum vulgare*, *Paris quadrifolia*, *Plantago sp.*, *Potentilla arenaria*, *P. erecta*, *Scrophularia umbrosa*, *Symphytum officinalis*, *Telekia speciosa*, *Thymus sp.*, *Veronica beccabunga*, etc.

Bleeding can be stopped with astringent plants with a high content of tannin and other substances such as those from *Achillea millefolium* ssp. *millefolium*, ssp. *sudetica*, *Achillea setacea*, *Ajuga reptans*, *Alnus glutinosa*, *Alnus viridis*, *Calluna vulgaris*, *Capsella bursa-pastoris*, *Cerastium fontanum* ssp. *fontanum*, *Cornus sanguinea*, *Equisetum arvense*, *Fraxinus excelsior*, *Geranium*

dissectum, *Lamium purpureum*, *Lysimachia nummularia*, *Lysimachia punctata*, *Lythrum salicaria*, *Matricaria recutita*, *Monesses uniflora*, *Myosotis alpestris*, *Petasites hybridus*, *Plantago major*, *Potentilla anserina*, *P. erecta*, *Primula vulgaris*, *P. elatior*, *P. veris*, *Quercus cerris*, *Q. frainetto*, *Q. petraea*, *Q. pubescens*, *Q. robur*, *Rumex patienia*, *Salix viminalis*, *Sanguisorba minor*, *S. officinalis*, *Sanicula europaea*, *Scrophularia nodosa*, *Urtica dioica*, *U. urens*, *Viburnum lantana*, *Vinca minor*, etc. Oak leaves and bark have been frequently used for this purpose. Low-intensity gastric and intestinal bleeding can be stopped with plants of spontaneous flora such as *Corylus avellana*, *Erigeron annuus*, *Sanguisorba minor*, *Quercus cerris*, *Q. petraea*, *Geum aleppicum*, *Equisetum arvense*, *Lysimachia punctata*, *Malva sylvestris*, *Plantago sp.* Nasal haemorrhages can be stopped using the juice from some species of *Quercus cerris*, *Q. petraea*, *Q. robur*, etc.

Rheumatic diseases have always saddened the elderly and, sometimes, even people past their prime were interested in getting treated with various remedies from the plant kingdom. Romanians have tested a wide variety of species, among which about 100 species are known in specialised literature as liable to alleviate the pain. These include: *Abies alba*, *Aconitum firmum*, *A. tauricum*, *Actaea spicata*, *Aegopodium podagraria*, *Agrimonia eupatoria*, *Alnus glutinosa*, *Anemone ranunculoides*, *Arctostaphylos uva-ursi*, *Artemisia vulgaris*, *Aruncus dioicus*, *Ballota nigra*, *Bellis perennis*, *Berberis vulgaris*, *Betula pendula*, *B. pubescens*, *Brassica juncea*, *Calluna vulgaris*, *Cardamine pratensis*, *Cichorium inthybus*, *Clematis recta*, *Clematis vitalba*, *Colchicum autumnale*, *Conium maculatum*, *Daphne mezereum*, *Ecballium elaterium*, *Equisetum arvense*, *Eupatorium cannabinum*, *Fraxinus excelsior*, *Genista sagittalis*, *G. tinctoria*, *Geranium palustre*, *Hedera helix*, *Helleborus odoratus*, *H. purpurascens*, *Helichrysum arenarium*, *Heracleum sphondylium*, *Hippophaë rhamnoides*, *Ilex aquifolium*, *Juniperus communis* ssp. *communis*, *Lamium album*, *Ligustrum vulgare*, *Lolium perenne*, *Lysimachia punctata*, *Matricaria recutita*, *Mentha longifolia*, *M. piperita*, *Menyanthes trifoliata*, *Mercurialis perennis*, *Ononis spinosa*, *Parietaria officinalis*, *Peucedanum oreoselinum*, *Physalis alkekengi*, *Picea abies*, *Pinus cembra*, *P. mugo*, *Polygala major*, *P. vulgaris*, *Polygonatum multiflorum*, *P. odoratum*, *Populus nigra*, *Potentilla reptans*, *Prunus padus*, *Pteridium aquilinum*, *Pulsatilla montana*, *Ranunculus acris*, *R. bulbosus*, *R. trichophyllus*, *Ribes uva-crispa*, (Pârnu, C., 2016) *Ribes nigrum*, *Rubus fruticosus*, *Salix alba*, *S. caprea*, *S. cinerea*, *S. purpurea*, *S. viminalis*, *Salvia nemorosa*, *S. sclaraea*, *Sambucus ebulus*, *S. nigra*, *Scopolia carniolica*, *Scrophularia nodosa*, *Serratula tinctoria*, *Solanum nigrum*, *Sorghum halepense*, *Syringa vulgaris*, *Tamarix ramosissima*,

Tamus communis, *Taraxacum officinale*, *Taxus baccata*, *Telekia speciosa*, *Teucrium chamaedrys*, *T. scordium*, *Thymus serpyllum*, *Tragopogon dubius*, *Trapa natans*, *Ulmus glabra*, *Urtica dioica*, *Vaccinium vitis-idaea*, *Verbena officinalis*, *Veronica beccabunga*, *Xanthium italicum*, *X. strumarium*, etc.

More species of *Ranunculaceae* family have been externally used by various peoples in alleviating rheumatic pains. In Romania, the most popular is *Helleborus purpurascens*, whose extract is used in hospitals. For the past decades, ointments containing extracts of *Tamus communis* and *Helleborus purpurascens* were commercialised.

Among the folk remedies whose effect is proven scientifically, there are some that are more frequently used such as the bark from the shoots of *Salix* sp. and *Salix alba* L., which is useful in ankylosing spondylosis, peripheral circulation stimulation, ulcers, etc. (S. F. Marian, 1870-1907; Crăciun FL., Bojor O., Alexan M., 1977; Pop I., 1982; Pârvu C., 2016). Bark has been used for thousands of years to relieve joint pain and to control fever (Chevallier. A., 1996 in <https://pfaf.org/user>), in dyspepsia, rheumatism, arthritis, gout, fever, inflammation of autoimmune diseases, headache neuralgia (Bown. D., 1995 in <https://pfaf.org/user>), whereas leaves are used in insomnia, rheumatism, headaches (<https://pfaf.org/user>); gemmotherapy recommends it in arthritis, osteoarthritis, gout and acute polyarthritis.

Urtica dioica registers good scores for multiple uses, including gout, haemorrhoids, haemorrhages, metrorrhagias, rheumatism, wounds, varicose ulcer (S. F. Marian, 1870-1907; Crăciun FL., Bojor O., Alexan M., 1977; Pop I., 1982; Pârvu C., 2016).

The following species were identified for gout: *Aconitum tauricum*, *Agrimonia eupatoria*, *Arctostaphylos uva-ursi*, *Betula pendula*, *Betula pubescens*, *Cichorium inthybus*, *Colchicum autumnale*, *Dryopteris filix-mas*, *Equisetum arvense*, *Fraxinus excelsior*, *Gratiola officinalis*, *Hedera helix*, *Helichrysum arenarium*, *Juniperus communis* ssp. *communis*, *Lamium album*, *Lonicera nigra*, *Physalis alkekengi*, *Populus nigra*, *Potentilla anserina*, *Ranunculus bulbosus*, *Salix alba*, *S. cinerea*, *S. purpurea*, *S. viminalis*, *Solanum dulcamara*, *Tamus communis*, *Taraxacum officinale*, *Trifolium pratense*, *Urtica dioica*, *Vaccinium vitis-idaea*. Of these, the most accessible are *Betula pendula*, *Salix alba*, *Taraxacum officinale*, *Urtica dioica*, *Vaccinium vitis-idaea*, etc.

CONCLUSIONS

As a result of the analysis of these lists, the degree of spread of these plants must be considered. It is important to take into account the fact that this diversity offers larger possibilities for valorising

plants economically and that any of these plants can be cultivated when it has restrained spread.

ABSTRACT

Approximately 150 flora species of spontaneous cormophytes in Romania can be used in the most unpredictable and unpleasant life situations such as severe blows, haemorrhages, rheumatism, etc. We have identified 104 species used in phytotherapy to reduce rheumatic pain, 128 species used to accelerate wound healing, 5 in dislocations, 31 for gout, 9 in contusions, 8 in bruises, 41 in haemorrhages, 7 in stings, 22 in cuts, 36 in burns, 13 in skin ulcers, 10 in varicose ulcers, etc. Plant lists are not definitive because some plants are used less or some will be used more frequently in therapies. In the absence of some plants that are needed, there can be found some with less efficiency or others with better effectiveness but not present in the flora of Romania.

REFERENCES

1. BURZO I., 2015 - Compoziția plantelor medicinale și alimentare din flora spontană și cultivată [The composition of medicinal and edible plants from spontaneous and cultivated flora], ELISAVAROS, Bucharest;
2. BUCKINGHAM, J.; V. RANJIT N. MUNASINGHE, 2015 - Dictionary of Flavonoids, CRC Press;
3. CIULEI S., GRIGORESCU EM., URSULA STĂNESCU, 1993 - Plante medicinale. Fitochimie și Fitoterapie [Medicinal plants. Phytochemistry and phototherapy], I-II, Editura Medicală, Bucharest;
4. CRĂCIUN FL., BOJOR O., ALEXAN M., 1976 1977 - Farmacia naturii [Nature's pharmacy], I-II, Ceres Publishing House, Bucharest;
5. MENCINICOPSCHI GH., BOJOR OV., IONESCU-CĂLINEȘTI LARISA, 2009 - Compendiu de terapie naturistă [Compendium of natural therapy], Editura Medicală, Bucharest;
6. MARIAN, S.F.L., 2008-2010 - Botanică Poporană Română [Romanian Popular Botany], vol I Ed. Mușatinii, Suceava, vols. II-III Ed. Acad Rom., Bucharest, edited by Aura Brădățan;
7. PITERÀ FERNANDO, 2001- Compendiu de gemoterapie clinică [Compendium of clinical gemmotherapy], Ed. a-III-a, Genoa (transl.), Simile Publishing House, Constanta;
8. KHARE C.P., 2007 - Indian Medicinal Plants, Springer;
9. PÂRVU C., PÂRVU ALEXANDRA ȘTEFANIA, 2016 - Enciclopedia plantelor medicinale din Flora României [Encyclopedia of medicinal plants from Romanian flora], vols. I-II, ASAB Publishing House, Bucharest;

10. SĂVULESCU Tr. (editor), 1952-1976 - Flora R.P.R.-R.S.România [Flora of R.P.R.-R.S.Romania], I-XIII, Edit. Acad. Rom., Bucharest;
11. SOESCU SORINA, NIȚU SIMONA, PONORAN CARMEN, OLAH, NELI, 2008 - Gemoterapia de la A la Z [Gemmotherapy from A to Z], Eikon, Cluj Napoca;
12. *** <https://pfaf.org/user> - Plants for a Future.

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