

## SPECIES WITH IMMUNOSTIMULANT ACTIVITY CULTIVATED IN THE “USEFUL PLANTS” DEPARTMENT OF THE BOTANICAL GARDENS FROM IAȘI

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**Abstract:** The present paper presents a new group of plants, from the “Useful Plants” sub-section, less known for its immunostimulant proprieties, but which are used in the composition of some modern drugs (neutraceuticals).

Out of the total number of twenty-three species, belonging to fourteen families, two are trees, two are shrubs, seven are annual plants and twelve are perennial.

The medicinal and toxic plants are listed in the alphabetical order of their Latin names, along with the family, vegetal material, the harvesting time, the geographic distribution and the therapeutic activity.

The immunostimulant plants represent a valuable material for scientific researcher or the studying process because of its known origins.

**Key words:** medicinal plants, immunostimulants, the “Useful plants” sub-section, the Botanical Gardens from Iași.

### Introduction

Today it is known that many urinary tract infections, pulmonary diseases, heart deficiencies, endocrine and digestive diseases are connected with immunodeficiency which lead to a weak resistance of the body to infections. [9]

Due to this aspect, the research activity was centered on the isolation and the identification of different substances, which would have an influence upon the immune response by stimulating the immune reaction – immunostimulant agents.

Lately the interest of researchers has grown toward the plant-kingdom as a possible source for new immunostimulants. This is why starting with 1980 the majority of substances that have been tested as immunostimulants are extracted from plants. [2,4,9]

Starting with the role of “Useful Plants” sub-section into proving the importance of the plants and its utility in our daily life, since 2003 we thought necessary to improve this department with new plants which through their pharmacological activity would be appropriate for modern research.

The reason of the inauguration of the immunostimulants group is double: on one hand the visitors interest for medicinal plants that are used due to its components in modern medicine; on the other hand it was our wish to group the medicinal species in the same group with the toxic ones, according to the therapeutic activity.

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We wanted to show that the term “medicinal plant” is influenced by history (it depends on the therapy evolution), some of the herbs used in the past are no longer used today and vice-versa, and the term of “toxic/toxicity” is dependant on the administration dosage.

### Results and discussion

The “Medicinal Plants” sub-section is placed within the “Useful Plants” department (1.5 ha), on the central platform of the Botanical gardens. Today includes twenty-three groups of plants which are divided according to its therapeutical effect on the human body unlike the classical Botanical Gardens where the plants are grouped according to the used part of the plant.

By adding a new group of plants - the immunostimulants (less known under this aspect – Plate I), we intend to bring information for those that are interested: students, Ph.D. students, professors, doctors, pharmacists, professionals in this field or even to the public.

The immunostimulant plants group includes twenty-three species, belonging to fourteen families: *Aristolochiaceae* – one taxon, *Asteraceae* – seven taxons, *Araliaceae* – one taxon, *Lorantaceae* – one taxon, *Malvaceae* – two taxons, *Droseraceae* – one taxon, *Plantaginaceae* – one taxon, *Cupressaceae* – one taxon, *Fabaceae* – three taxons, *Poaceae* – one taxon, *Phytolaccaceae* – one taxon, *Urticaceae* – one taxon, *Tiliaceae* – one taxon, *Myrtaceae* – one taxon.

Out of all species two are trees, two are shrubs, seven are annual plants and twelve are perennial. All species are grown outside, except three species grown in cold green-house conditions: *Drosera rotundifolia* L., *Myrtus communis* L., *Panax ginseng* C.A. Meyer.

In the Table I are listed, in the alphabetical order of their Latin names, the medicinal and toxic plants which through the active compounds contributes to the growth of the defence capacity of the body. The information is completed by dates concerning the family, vegetal material, the harvesting time, the geographic distribution and the therapeutic activity.

The propagation of all taxons has been done through seeds that were obtained from internal and international (*Drosera rotundifolia*, *Echinacea purpurea*, *Myrtus communis*, *Panax ginseng*) exchange. In March and April all the seeds have been sown directly on the ground layer, except the followings: *Drosera rotundifolia*, *Echinacea purpurea*, *Myrtus communis*, *Panax ginseng*, *Thuja occidentalis*, that were first sown in flower pots and only after that its were taken outside, at the ground layer (*Thuja occidentalis*), or transferred to cold green-house conditions (the other three species already mentioned above).

Beside the species used a long time for its different medicinal proprieties (Table I), we introduced new plants in the group (*Aristolochia clematitis*, *Arnica montana*, *Echinacea purpurea*, *Gossypium hirsutum*, *Carthamus tinctorius*, *Eupatorium cannabinum*, *Phytolacca americana*, *Myrtus communis*, *Drosera rotundifolia*) of which the immunostimulant proprieties have been proven lately. This is exactly why some of its have not ben listed as medicinal in the books of systematic – botany.

We accomplished also a classification of the species (Table I) in medicinal (Med.) and toxic (Tox.).

Even though the allocated area for each group is very small, the plants (the outdoors ones) are distributed on small dimensions layers, and they are permanently kept under observation in order to establish the necessary growth conditions depending on the annual variation of environment factors.

The labels for the toxic taxons are written in red and the labels for the typical medicinal plants in black.

As we already stated, the collected information from this new group of the “Medicinal Plants” sub-section are used by specialists as well as the public. The present taxons represent a valuable material for research (Ph.D. students from faculties like Biology, Pharmacy, Veterinary Medicine) because its known origins.

This new group tries to respond, at least in part, to the request of the public regarding the new medicines/drugs found on the market and which contain plant extracts; in the nature this plants are wild, spontaneous or cultivated (Table I).

### Conclusions

1. The “Medicinal Plants” sub-section includes twenty-four groups of plants, divided by the therapeutical activity; the last group contains species with immunostimulant proprieties.
2. The group of immunostimulant plants is formed of twenty-three taxons which belong to fourteen families, out of which two are trees, two are shrubs, seven are annual plants and twelve are perennial.
3. In the Table I are listed the toxic and medicinal plants in alphabetical order, the family, the vegetable material/the harvested part of the plant, the therapeutical activity and the growth area.
4. The plants have been obtained from seeds that were received from internal and international exchange; some are grown indoors and some outdoors. In the nature this plants are wild, spontaneous or cultivated.
5. Our aim is the cognition, at least in part, of those plants with immunostimulant proprieties which lie at the basis of the modern phytopreparates.

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<b>Nr. crt.</b>	<b>Taxons</b>	<b>Family</b>	<b>Vegetal material/harvest time</b>	<b>The Activity</b>	<b>Geographic distribution</b>
1.	Althaea officinalis L. Perennial Med. wild / cultivated	Malvaceae	Althaeae radix (III-IV) (IX-XI)	Stimulent of phagocytosis, stimulent of immunoglobulins synthesis	Europe, North Africa; adv. în Amer. de N.
2.	Aristolochia clematitis L. Perennial Tox. wild	Aristolochiaceae	Aristolochiae rhizoma (IV) herba (V-VI) semen	Stimulent of phagocytosis	Medit.
3.	Arnica montana L. Perennial Tox. wild / cultivated	Asteraceae	Arnicae flos (VI-VIII)	Stimulent of phagocytosis	Eur.
4.	Calendula officinalis L. Annual Med. cultivated/ subsponaneous	Asteraceae	Calendulae flos (VI-VIII)	Stimulent of phagocytosis	Medit.
5.	Carthamus tinctorius L. annual Med. cultivated/ subsponaneous	Asteraceae	Carthami flos (VII-IX) semen	Stimulent of phagocytosis	Asia - West
6.	Drosera rotundifolia L. perennial Med. wild	Droseraceae	Droserae herba (V-VIII)	Stimulent of phagocytosis, stimulent of the proliferation of the T cells, stimulent of nonspecific immune mechanism	Euras., Am. de N.
7.	Echinacea purpurea (L.) Mnch. perennial Med. cultivated	Asteraceae	Echinaceae radix (III), (IX-X) herba (VII-VIII)	Stimulent of phagocytosis	Am. de N.

8.	Eupatorium cannabinum L. perennial wild Tox.	Asteraceae	Eupatorii herba (VII-IX)	Immunostimulant (Pharmaceutical industry)	Euras., Afr. de N.
9.	Glicine max (L.) Merr. (G. hispida (Moench) Maxim, Soja hispida Moench) annual cultivated Med.	Fabaceae	semen (IX-X)	Immunostimulant through lectins	As. de E.
10.	Glycyrrhiza glabra L. perennial wild, subsponaneous and cultivated Med.	Fabaceae	Glycyrrhizae radix sau Liquiritae radix (IX-XI) (II-VI)	Immunostimulant through lectins	Euras.-medit.
11.	Gossypium hirsutum L. annual cultivated Tox.	Malvaceae	Gossypii radix cortex (IX-XI)	Stimulent of interferon secretion	Peru
12.	Matricaria recutita L. (M. chamomilla) annual wild/ cultivated Med.	Asteraceae	Chamomillae flos (V-VIII)	Stimulent of phagocytosis	Euras.
13.	Myrtus communis L. shrub cultivated Med.	Myrtaceae	Myrti semen Folium (VI-IX)	Seed extract is cytostatic	Medit.
14.	Panax ginseng C. A. Meyer shrub cultivated Med.	Araliaceae	Ginseng radix (following seven years in cultivation)	Stimulent of protein synthesis, at the bone marrow level	Far East
15.	Phaseolus vulgaris L. annual cultivated Med.	Fabaceae	Phaseoli fructus sine seminibus (IX-X)	Immunostimulant through lectins	Venez., NV Argentinei

16.	Phytolacca americana L. perennial cultivated/ subsponaneous Tox.	Phytolaccaceae	Phytolacca radix herba semen (IX-XI)	Immunostimulant through lectins	Am. de N
17.	Plantago major L. Pătlagină mare perennial wild Med.	Plantaginaceae	Plantaginis majoris semen folium (V-X)	Stimulent of serumal complement, activarea macrofagelor	Euras.
18.	Solidago virgaurea L. perennial wild Med.	Asteraceae	Solidaginis herba et summitates (VII-IX)	Imuno-induced antitumoral efect	Euras., Am. de N
19.	Thuja occidentalis L. tree cultivated Tox.	Cupressaceae	Thujae summitates (all year long)	Stimulent of phagocytosis and of the proliferation of the T cells	Am. de N
20.	Tilia cordata Mill. tree wild Med.	Tiliaceae	Tiliae flores (VI-VII)	Immunostimulant through lectins	Eur.
21.	Triticum aestivum L. (T. sativum Lam., T. vulgare Vill.) annual cultivated Med.	Poaceae	Triticii semen (VII-VIII)	Immunostimulant through lectins	Large area
22.	Urtica dioica L. perennial wild Med.	Urticaceae	Urticae majoris herba radix (V-IX)	Immunostimulant through lectins	Cosm.
23.	Viscum album L. shrub wild Tox.	Loranthaceae	Visci albi stipes (I-III) (X-XII)	Unknown immunostimulant mecanism	Eur.

- Med. = medicinal; - Tox.= toxic.



Imunostimulant medicinal plants



*Calendula officinalis* L.



*Plantago major* L.



*Phytolacca americana* L.



*Eupatorium cannabinum* L.



*Aristolochia clematitis* L.