

**SANDDORN E.V.**

Gesellschaft zur Förderung von Sanddorn und Wildrose



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**Therapeutical properties of sea buckthorn  
(*Hippophae rhamnoides* L.) and fungi  
threatening its cultivation**



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# *Hippophaë rhamnoides* L.

- The sea buckthorn is a thorny deciduous shrub belonging to the Elaeagnaceae family



# *Hippophaë rhamnoides* L.

- Fruits – berries are orange, 6 to 10 mm long, round, oval or ellipsoidal;
- The weight of the fruit ranges from 0.5 to 0.9 g
- Sea buckthorn seeds are surrounded by a parchment-like endocarp often strongly adhered to them.



# *Hippophaë rhamnoides* L.

- ▶ The genus name of the species comes from the Greek (híppos - horse, pháos - I shine) 'shiny horse'.
- ▶ According to legend, horses that fed on its shoots had a nice shiny coat.
- ▶ The species epithet rhamnoides means 'similar to the jackalberry'.
- ▶ *Rhamnus* - acrid
- ▶ It was already used in ancient Greece



# *Hippophaë rhamnoides* L.

- ▶ In Poland we use name „rokitnik zwyczajny”. This name was used since 1924, i.e. since the first edition of the Polish Plants. In this time the name has been established.
- ▶ In contrast, other names were used earlier:
  - ▶ „bodlak”
  - ▶ „bodzieniec”,
  - ▶ „rosemary tree”,
  - ▶ ‘sea thorn’,
  - ▶ ‘forest oil’,
  - ▶ ‘sea-buckthorn’

(Majewski 1894; Szafer i in. 1924)



# *Hippophaë rhamnoides* L.- origin

- ▶ The plant is native to cold and temperate regions of Europe and Asia, including the Caucasus and Tibet and Qinghai province in China - endemic species
- ▶ It also occurs in Siberia 'Gold of Siberia'



# *Hippophaë rhamnoides* L.

- ▶ In Poland, in its natural state, it can be found all along the sandy Baltic coast and in the Pieniny Mountains.



Plant of sea borthorn on the Baltic seaside, Jastrzębia Góra 2021



<https://www.larixogrody.pl/sadzonki/rokitnik-hippophae-rhamnoides>

# *Hippophaë rhamnoides* L.

- ▶ Sea buckthorn growing in the wild in Poland is under species protection.
- ▶ For this reason, berries should not be picked there.



([https://www.sadyogrody.pl/owoce/101/rokitnik\\_pospolity\\_odmiany\\_i\\_perspektywy\\_uprawy\\_w\\_polsce,8588.html](https://www.sadyogrody.pl/owoce/101/rokitnik_pospolity_odmiany_i_perspektywy_uprawy_w_polsce,8588.html))



# *Hippophaë rhamnoides* L.

- ▶ Sea buckthorn is cultivated in the northern temperate regions of Europe and in Asia and North America
- ▶ It is a wide-ranging plant with great economic potential
- ▶ It is used in the production of food, cosmetics, pharmacology, environmental protection and also in the manufacture of ornaments.



<https://drzewka-faworytka.pl/pl/p/ROKITNIK-ZENSKI-FRUGANA->



(<https://www.google.com/search?q=herbata+z+rokitnika&sc>)



# Genera - *Hippophae* L.

## European subspecies:

- **subsp. rhamnoides** – Baltic coast and north-west Europe.
- **subsp. fluviatilis (Soest) Rivas Mart** - looser shrubs - branches elongated, less branched and less thorny than subsp. Rhamnoides - Alps, Pyrenees, Apennines
- **subsp. carpatica Rousi** - the more or less spherical fruits - the Eastern and Southern Carpathians, the area between them and the north-western shores of the Black Sea and southern Germany between the Danube and its tributary the Izara
- **subsp. caucasica Rousi** large, straight upright shrubs or trees up to 10 m high with few thorns, elliptical fruit, Caucasus (above 1000 m), Asia Minor and south-eastern Balkans

## Asian subspecies:

- subsp. sinensis Rousi** – central and north part of China
- subsp. wolongensis Y. S.** - China (especially Syczuan province),
- subsp. yunnanensis Rousi** – spherical fruits - Chiny (Syczuan, Tybet, Junnan)
- subsp. mongolica Rousi**, thorns branching into second-order thorns, globular fruit - Mongolia, area from the Altai to the Lake Baikal region.
- subsp. turkestanica Rousi** - subspecies with the widest range including: western China, Pakistan, Afghanistan, northern India, Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan.

# *Hippophaë rhamnoides* L.

- ▶ It is one of the oldest medicinal plants,
- ▶ It has been used in traditional and folk medicine in Asia, especially in Mongolia and Tibet.
- ▶ As a medicinal plant, it was described in a textbook of Tibetan medicine in the 8th century.
- ▶ It has been used to 'improve stomach function', improve digestion, cardiovascular problems, liver damage, tendon and ligament injuries, skin diseases and even ulcers.



(Ahani i Attaran 2022)

# *Hippophaë rhamnoides* L. - properties

- ▶ antioxidant,
- ▶ cardioprotective,
- ▶ anti-atherosclerotic,
- ▶ antidiabetic,
- ▶ hepatoprotective,
- ▶ anticancer,
- ▶ immunomodulating,
- ▶ antiviral,
- ▶ antimicrobial,
- ▶ anti-inflammatory
- ▶ and vasodilator
- ▶ Reduces the incidence of stomach ulcers, promotes wound healing, accelerates the treatment of skin diseases and reduces pain



<https://www.serysokizpodhala.pl/produkt/konfitura-z-rokitnika-rokitnik-z-podhala-naturalna/>

(Suryakumar i Gupta 2011; Christaki 2012; Michel i in.al. 2012)

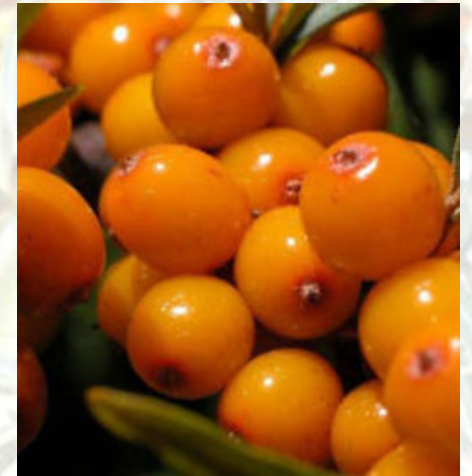
# *Hippophaë rhamnoides* L. - properties

- ▶ The biologically active substances found in sea buckthorn are used in the treatment of asthma and lung diseases
- ▶ Prevents excessive sebum secretion
- ▶ This plant has proven anti-stress and adaptogenic effects
- ▶ It also has a positive effect on metabolic diseases
- ▶ Has anti-ageing properties, protects against UV radiation,
- ▶ Decreases hair loss



*Hippophaë fructus* – *Hypophae fructus*  
*Hippophaë rhamnoides* L. – Sea buckthorn  
Elaeagnaceae – Oleaceae

- ▶ The herbal raw materials of sea-buckthorn constitutes of berries, leaves and sea-buckthorn oil (*Hippophae oleum*) obtained from the berries
- ▶ Fructus - juicy and aromatic, with a characteristic, bitterish flavour, pleasantly sourish and sweet after frosting
- ▶ Chemistry:
  - ▶ The fruit and leaves contain more than 190 biologically active substances:
    - ▶ Vitamin C - from 120 to 900 mg/100 g
    - ▶ even up to 2,500 mg/100 g of carotenoids or provitamin A ( $\beta$ -carotene - up to 60 mg%, lycopene, lutein and zeaxanthin),
    - ▶ Vitamin E up to 145 mg%,
    - ▶ Organic acids (malic, tartaric, citric)
    - ▶ Unsaturated fatty acids (oleic, linoleic, isolinoleic and linolenic),
    - ▶ Anthocyanins, flavonoids, steroids, tannins, sugars, pectins and mineral salts



*Hippophaë fructus* – *Hypaphae fructus*  
*Hippophaë rhamnoides* L. – Sea buckthorn  
Elaeagnaceae – Oleaceae

### **Sea-buckthorn oil**

- is pressed from the fruit and seeds or only from the seeds is a thick red-orange liquid with a characteristic taste and smell
- The fruit contains 4-13% oil in the flesh and the seeds 8-20%

### **Chemistry:**

- Glycerides of linoleic acid (30-40%)
- and  $\alpha$ -linolenic acid (20-35%)
- and others including oleic, palmitic and stearic acids,
- tocopherols (100-300 mg%),
- carotene and carotenoids (100-500 mg%),
- sterols,
- flavonoids macro- and microelements



# *Hippophaë fructus* – Sea buckthorn



## ▶ **Action and application**

- ▶ Source of vitamin C, (does not degrade quickly due to lack of ascorbase enzyme)
- ▶ Diseases with fever caused by bacteria and viruses
- ▶ Inflammations of various organs
- ▶ Diarrhea, gastric or duodenal ulcers
- ▶ Eexternally, the oil extract accelerates wound healing and soothes inflammation of the mucous membranes and skin.



# *Hippophaë oleum* – Sea-buckthorn oil cosmetology

- ▶ The substances contained in sea buckthorn oil give the skin a beautiful and healthy appearance.
- ▶ The presence of fatty acids and vitamins means that it is often used in cosmetic products for dry, flaky or rapidly ageing skin.
- ▶ The unsaturated fatty acids, such as oleic acid and gamma-linolenic acid, among others, give sea buckthorn oil its skin regenerating and repairing properties.
- ▶ Sea-buckthorn oil influences the circulatory system, facilitates oxygenation of the skin, removes excess toxins from the body and easily penetrates the epidermis.
- ▶ Anti-inflammatory properties - inside the skin, gamma-linolenic acid is converted into prostaglandins,
- ▶ Sea-buckthorn oil protects against infections



<https://www.i-apteka.pl/product-pol-45654-KREM-ROKITNIKOWY-50ml.html>

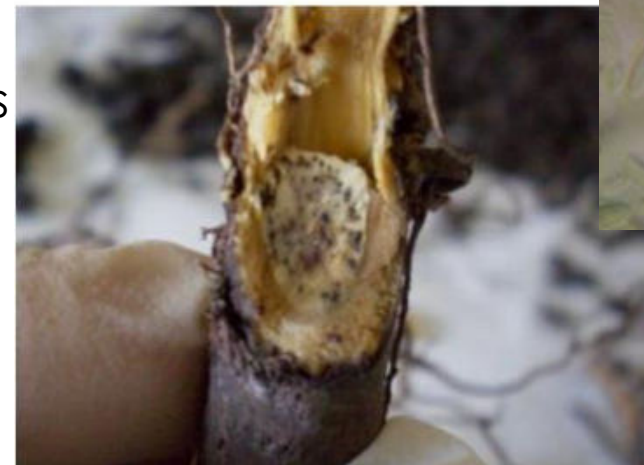
# Hippophaë rhamnoides L. - pathogens

## Wilting of plants

### *Verticillium dahliae* i *V. albo-atrum*

- These are fungi pathogenic to vascular plants
- Soil pathogens
- Verticillium conidial spores can enter the root system of the host directly or through wounds created naturally by root growth or induced by other soil organisms
- Once in the plant tissue, the pathogen produces toxins, attacks the xylem and causes systemic infection of the plant

(Cotuna et al., 2014, Drevinska i Moroèko-Bièevska 2022)



Wilting symptoms of *Hippophaë rhamnoides* and conidia of *Verticillium* sp.