

Veratrum nigrum

Veratrum nigrum, the black false hellebore,[2][3] is a widespread Eurasian species of perennial flowering plant in the family Melanthiaceae.[1][4] Despite its common name, *V. nigrum* is not closely related to the true hellebores, nor does it resemble them.

The plant was widely known even in ancient times. For example, Lucretius (ca. 99 BCE – ca. 55 BCE) and Pliny the Elder (23 AD – August 25, 79) both knew of its medicinal emetic as well as deadly toxic properties.[5]

Veratrum nigrum is native to Eurasia from France to Korea including Germany, Poland, Russia, China, and Mongolia.[1][6][3][7] The plant can exist in hardiness zones 4 through 7.[7] It grows best in shade or partial shade, with wet or moist grounds conditions.[2][7][8][9] Any nutrient-rich soil supports its growth,[9][10][11][12] although one source observes that it prefers calcium-rich soil.[13] Another source observes that the bed must be fairly deep.[12]

The plant has a robust black rhizome.[7][10] Simple angiosperm leaves arranged in a whorled pattern emerge from the base of the plant.[7] Each whorl is decussate (rotated by half the angle between the leaves in the whorl below), with only two or three whorls around the base.[4][10] Each leaf is sessile (attaching directly to the plant), and about 12 inches (300 mm) in length.[3][14] The leaves are broad, glabrous (smooth), lanceolate in shape, with entire (smooth) edges.[10] The veins in the leaves branch immediately from the base and run parallel through the leaf, leaving a pleated look.[8][9][12] Long, green, coarse, woody spike racemes branch off in decussate patterns from the main trunk, with short pedicels supporting a single flower.[4][10] The flowers are purple-black, giving the plant its name.[7][8]

Veratrum nigrum blooms in early summer for several weeks,[2][8] but goes dormant in intense summer heat.[7] It tends to grow in colonies,[2] and attains a height of about 4 feet (1.2 m).[3][4][7] Its racemes branch out to about 24 inches (610 mm) in width.[9] The seed heads are crimson in color.[8] Plants grown from seeds will generally push through the earth and sprout leaves in early spring.[9]

Veratrum nigrum was used as an ornamental plant in European gardens at least as far back as 1773.[15] It was in common use in 1828,[16] and Charles Darwin grew it in his garden in the 1840s.[17] The plant is still widely used in gardens in Europe and Asia because of its striking black flowers.[2][8] It is also used to add height to a garden,[8][18] and as a means of providing a darker backdrop to more brightly colored plants and flowers.[19] The large seed pods weather winter well (tending not to drop in high wind), and it can be a striking winter ornamental seedpod plant as well.[18] However, it is difficult to find and very expensive in the United States.[7][12]

This plant has gained the Royal Horticultural Society's Award of Garden Merit.[20][21]

Propagation is by seed or by division.[10][11] However, a plant generally takes seven years to reach maturity and flower.[12] Snails and slugs feed on the plant's rhizomes and leaves, so gardeners must take care to keep these pests away.[2][9][12]

All parts of the plant are highly toxic.[22] However, the highest concentrations of toxins tend to be in the rhizome.[22] Toxicity varies widely depending on the method of preparation

(extract, water extract, etc.), and the method of application.[22] Just 1.8 grams (0.063 oz) per 1 kilogram (2.2 lb) can cause death due to cardiac arrhythmia.[23] Death has even occurred at a dosage as low as 0.6 grams (0.021 oz).[24]

Veratrum nigrum contains more than 200 steroid-derived alkaloids, including isorubijervine, jervine, pseudojervine, rubijervine, tienmuliumine, tienmuliluminine, and verazine.[22][25] The herb causes irritation of mucous membranes.[25] When ingested, the irritation of the mucosal membranes of the stomach and intestines will cause nausea and vomiting.[22][25] If the herb is introduced to the nose, this mucosal irritation will cause sneezing and coughing.[22][25] Ingestion can also cause bradycardia (slow heart rate), hyperactivity, and hypotension (low blood pressure).[22] In high concentrations, topical contact can cause skin irritation, excessive tears from the eyes, and redness.[26]

Classic symptoms of *Veratrum nigrum* toxicity include blurred vision, confusion, headache, lightheadedness, nausea, stomach pain, excessive sweating, and vomiting.[26] In severe cases, heart arrhythmia, muscle cramps, extreme muscle twitching, paresthesia (the feeling of "pins and needles" all over the body), seizures, weakness, and unconsciousness occur.[26] Death may follow.

Toxic symptoms generally resolve themselves after 24 to 48 hours.[26] Supportive treatment for the symptoms is usually administered.[26] Because extreme vomiting occurs, decontamination (e.g., stomach pumping or the ingestion of activated charcoal) is usually not implemented unless ingestion has occurred within one hour.[26] Atropine is usually administered to counteract the low heart rate, and sympathomimetic drugs and liquids administered to raise the blood pressure.[26]

The herb is also a known teratogen.[23] However, no data exists on whether it can cause birth defects in human beings.[26]

The dry root of *Veratrum nigrum* can lower blood pressure and slow heart rate, possibly by stimulating the vagus nerve, if taken in small doses internally.[25] It has been used to treat hypertension and cardiac failure, and to treat pre-eclampsia during pregnancy.[4] It has been found to act as an antibiotic and insecticide.[4][25] Cyclopamine (11-deoxojervine) is one of the alkaloids isolated from the plant which interferes with the hedgehog signaling pathway (Hh). Cyclopamine is under investigation as a possible treatment for several cancers (such as basal cell carcinoma and medulloblastoma) and skin disorders (such as psoriasis), which result from excessive Hh activity.[27]

The dried rhizomes of *Veratrum nigrum* have been used in Chinese herbalism. All of the false hellebore species are collectively called "li lu" (■ ■) in China. Li lu is administered internally as an emetic, and is also used topically to kill parasites (such as tinea and scabies) or to stop itching.[23][24] It was most widely used to treat vascular disease.[4] Some herbalists refuse to prescribe li lu internally, citing the extreme difficulty in preparing a safe and effective dosage.[24]

In Asia, an extract of the herb is mixed with water in a 1 percent to 5 percent solution and used in many rural areas to kill fleas, their larvae, and their eggs in toilets.[4][23]

