



INVASIVE WOODLAND PLANT SPECIES OF SOUTHERN ONTARIO

An Invasive plant is one that has moved into an area and reproduced so aggressively that it displaces some of the original plant community. In a forest ecosystem, an invasive species can be a tree, shrub, or herbaceous plant.

Some particularly persistent invasive species in Ontario woodlots are Common and Glossy Buckthorn (*Rhamnus cathartica*), Dog-Strangling Vine/Black Swallow Wort (*Cynnanchum rossicum*, *C. nigrum*), Garlic Mustard (*Alliaria petiolata*), and Norway maple (*Acer platanoides*).

Most plants that are brought into a new place are unable to compete, reproduce or survive away from the urban garden. But there are some plants that can outlast, out compete, and out reproduce the native species in an area. It has been reported that approximately 700 species (27% of the total flora) growing in Ontario are alien (White, D.J. Haber, Erich, 2003). For the most part the alien invasives have been transported into Canada from Europe. One of the biggest factors concerning the exotics success are the fact that these non-native plants have no natural control. In their native habitat, invasive exotics have natural controls, such as climate, animals, insects, and other plants. With these controls in place the plant does not become a problem, but without the controls the plants can become unmanageable



The problem with invasive species is that they have the potential to come into an area and take all the available resources, displacing the natural vegetation. If the habitat that the invasive is taking over is very unique then that could cause some flora and fauna in that area to become endangered.

One of the strongest weapons against invasive species is knowledge. When a person understands the scope of the problem, ways to identify the plant, and methods of control they will be more likely to take action.

The fight against invasive species can be very costly. Canada has spent over \$5.5 billion for battling 9 invasive species and over \$22 million in on-going annual costs. As the number of invasive species increases so will the cost of control.

The best way to reduce the cost of invasive species is to catch the problem early on. If communities can work together towards eradicating Common Buckthorn, Dog Strangling Vine, Garlic Mustard, and Norway Maple on their own properties, they can play a big part in helping to reduce the overall invasion.

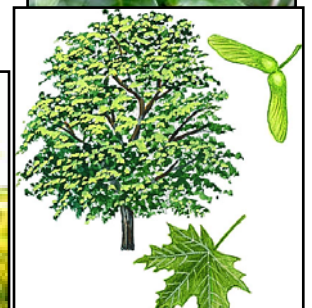
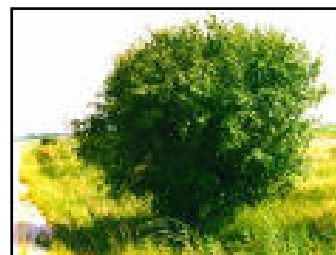


Figure 1 to 4 Invasive Species of South Ontario

COMMON BUCKTHORN (*Rhamnus cathartica*)

Description

Buckthorn generally reaches 20-25 feet in height and 10 inches in diameter. Most often they grow in a large shrub growth form, having a few to several stems from the base. The shrubs have spreading, loosely-branched crowns.

Common Buckthorn has leaves that are opposite or subopposite, with veins that are unusual in that they branch in alternate fashion from the midrib, and then run roughly parallel to the serrated leaf margins. Leaves are elliptical (ODNR, 2002).

Common Buckthorn is a dioecious species, it has small yellow-green male and female flowers on separate trees. On female trees, these become clusters of small, rounded, green fruits, which change to plump black fruits by late summer (upper right). Birds relish the fruits, and spread the seeds readily to areas where they easily germinate the following spring (ODNR, 2002).

The terminal buds of Common Buckthorn are actually modified spines. The young bark is smooth and shining with brown-gray bark that has prominent small lenticels (little white dots). Mature bark is also shiny, but becoming more scaly with horizontal lenticels (ODNR, 2002).

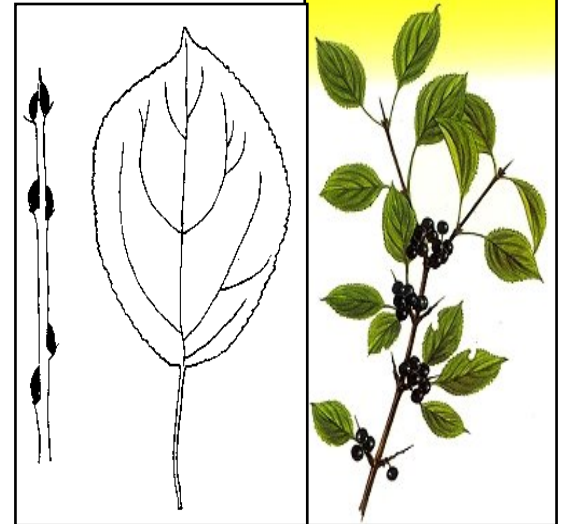
Distribution and Habitat

Common buckthorn is native to Europe and grows in West and North Asia. In North America, common buckthorn is naturalized from Nova Scotia to Saskatchewan. These species were probably introduced to North America before 1800, but did not become widespread and naturalized until the early 1900s. In the past they have been widely cultivated for hedges, and wildlife habitat.

- Prefers Clay Loams
- Grows best in full sun, but it is very shade tolerant.

Life History and Ecological Impact

Due to its hardiness and ability to survive a variety of soils and conditions, Common Buckthorn was an ideal plant to use as hedges. Buckthorn was widely planted. Buckthorn invades locations where growth is most favorable, thus woodlands and savannas are its targets, but may sometimes be found in open fields and prairies. Common buckthorn is characterized by long distance dispersal ability, prolific reproduction by seed, and wide habitat tolerance. Under full sun conditions, they can begin to produce seed a few years after establishment. Common buckthorn flowers bloom from May through June and fruit ripens August through September. The abundant fruits are eaten by birds, and the seeds are known to contain a laxative thus encouraging the long-distance dispersal.



(ODNR, 2002)



Figure 8 Buckthorn along a road
(ODNR, 2002)

Seedlings establish best in high light conditions, but can also germinate and grow in the shade.

Common Buckthorns have very rapid growth rates and re-sprout vigorously after they have been cut. Typical of several non-native understory shrub species, buckthorns leaf out very early and retain their leaves late in the growing season, thereby shading out native wildflowers

Control Options

There are a variety of different control measures for Common Buckthorn, both physical and chemical.

Buckthorns in natural areas are most effectively controlled by recognizing their appearance early and removing isolated plants before they begin to produce seed. With large infestations, the largest seed-producing plants should be removed first.

Physical/Mechanical Control Options

Some of the mechanical control methods available for Common Buckthorn include prescribed burn, girdling, and plant pulling and extraction.

- **Girdling:** Girdling or cutting stems can be very effective control option. Between December and March girdling and cutting must be followed by an application of glyphosate herbicide (ECan, 2003).
- **Plant Pulling:** Small patches of plants up to 0.4 inch diameter can be pulled when the soil is moist. Larger plants 0.5 inch to 1.5 inch diameters can be dug or pulled using a weed wrench. Disturbed soil will result from these techniques, and should be tamped down to minimize seeding.

Chemical Control Options

Chemical control methods are best done during the fall when most native plants are dormant yet buckthorns are still actively growing. This lessens the risk of affecting non-target plants. The buckthorns' green leaves will provide easy recognition and allow for a thorough treatment at this time.

- During the growing season, cutting stems off near ground level and treating them with glyphosate successfully curbs sprouting. Immediately after cutting, a 20%-25% active ingredient (a.i.) glyphosate should be applied to the stumps. Re-sprouts should be cut and treated again, or sprayed with a hand sprayer of 1.5% a.i. glyphosate (approved for use over water) solution to the foliage. Foliar application of glyphosate herbicide using a backpack sprayer is effective, but less selective.

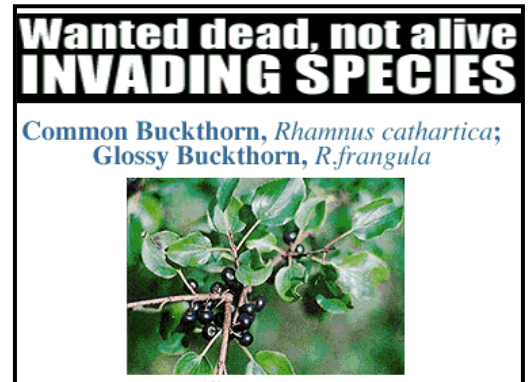


Figure 9, Warning (U OF W, 2002)

DOG-STRANGLING VINE (*Vincetoxicum nigrum*)

Description

Dog-strangling vine also known as Black Swallow wort; There has been quite a bit of discrepancy over this plants common and Latin name. For its common name it has been called Dog strangling vine, black swallow wort, and pale swallow wort. For the Latin name it has been called *Vincetoxicum nigrum*, *Cynnanchum rossicum*, and *C. nigrum*. For the purpose of this extension note the plant will be called Dog Strangling Vine. It is a herbaceous plant, sometimes having a woody base vine that can get up to 1-2m (3-6½ft) long. It is broad near the base and long-tapered to a slender tip. Leaves are dark green, opposite (2 per node), oval to oblong in shape with rounded bases and abruptly pointed tips.



Figure 20 Flower (MDA, 2002)

Flowers purple-brown to dark purple, small, in small umbel-like clusters at tips of stems and upper branches.

Seedpods are slender, 4-6cm (1½ -2¼in.) long releasing many, small, flat, seeds with white, silky parachutes. It flowers from late June until autumn



Figure 19 Leaves (TNC Weeds, 2002)



Figure 18 Seed Pods (TNC Weeds, 2002)

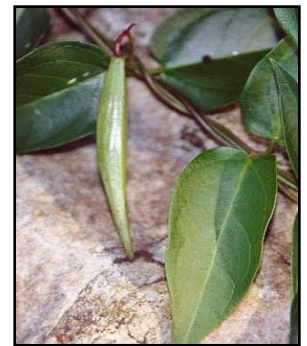


Figure 21 Vine (MDA, 2002)

Distribution and Habitat

Dog-strangling vine can grow in a wide range of habitats but prefers open sunny areas, as it is not tolerant to complete shade. It grows in ravines, hillsides, waste areas, fence lines and hedges. It is a perennial plant that reproduces by seed and by underground rhizomes.

Life History and Ecological Impact



Figure 22 Habitat of Vine (MDA, 2002)

Dog Strangling vine or black swallow wort was brought over from Europe into Canada during World War II to be evaluated as a possible filling for life jackets. The plant escaped from research plots and now it has established itself across Ontario. It takes over ecosystems, damaging previously existing biodiversity. It also has the ability to choke off woodlands and marshes. Dog Strangling Vine is alien to Canada and the plant doesn't have any natural enemies.

Control Methods

Gardeners can fight the invasive plant by cutting it back and covering it with mulch. In the first year of establishment it is possible to eradicate the plant by digging the plant out and making sure all roots are removed for the plant can re-sprout from root fragments left in the ground. By the second year manually pulling the plant becomes more difficult because the roots become stronger and larger. Seed spread can be controlled if the plant is cut back or pulled before it goes to seed. Larger infestations can be controlled by applying glyphosate (RoundUp) twice during the growing season, at the onset of flowering and 2 to 3 weeks later; re-treatments will be required for 2-3 years to eliminate surviving plants and new seedlings.

If local residents start to monitor and remove these plants from their own yards and other areas where it is commonly found, they can help to protect the native flora.

GARLIC MUSTARD (*Alliaria petiolata*)

Description

Garlic mustard is a cool-season biennial herb that ranges from 12 to 48 inches in height as an adult flowering plant. Leaves and stems emit the distinctive odor of onion or garlic when crushed (particularly in spring and early summer), and help distinguish the plant from all other woodland mustard plants. First year plants consist of a cluster of 3 or 4 round, scallop edged leaves rising 2 to 4 inches in a rosette. Second-year plants generally produce one or two flowering stems with numerous white flowers that have four separate petals. Garlic mustard is the only plant of this height in our woods with white flowers in May. Fruits are slender capsules 1 to 2.5 inches long that produce a single row of oblong black seeds with ridged seed coats. Stem leaves are alternate and triangular in shape, have large teeth, and can be 2 to 3 inches across in fruiting plants. Petioles are longer on the leaves towards the base. (WDNR, 2003).

Distribution and Habitat

Garlic mustard is native to Europe, and also occurs in northern Africa, Sri Lanka, and India. In North America, garlic mustard is now found in Quebec and Ontario, south to North Carolina and Kentucky (WDNR, 2003).

Garlic mustard grows in upland and floodplain forests, savannas, yards, and along roadsides, occasionally in full sun. It is shade-tolerant, and generally requires some shade; it is not commonly found in sunny habitats. It cannot tolerate acidic soils. The invasion of forests usually begins along the wood's edge, and progresses via streams, campgrounds, and trails.

The Garlic Mustards habitat needs are

- Shade Tolerant
- Calcareous soils, relatively high fertility

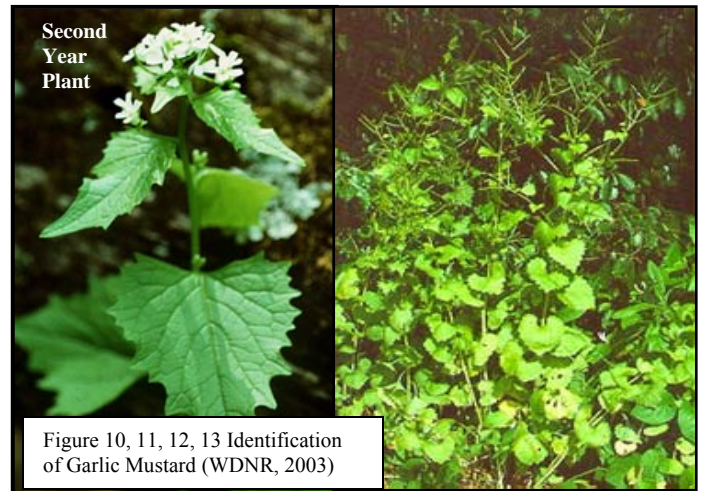


Figure 14 Garlic Mustard (Muma, 2003)

Life History and Ecological Impacts

Garlic Mustard originally came from Europe, introduced by early settlers. It was used as a vegetable for its high Vitamin A and C content, a garlic-flavored herb in cooking, and planted to prevent erosion. It was also used for medicinal purposes, treating gangrene and ulcers.

This species is a biennial that produces hundreds of seeds per plant. The seeds are transported by animals, flowing water and by human activities. In our areas a seed can lay dormant for 20 months before it germinates, and may remain viable in the

soil for up to five years. Garlic Mustard is a rapidly spreading woodland weed that is displacing native woodland wildflowers in Southern Ontario. It dominates the forest floor and can displace most native herbaceous species within ten years. This plant is a major threat to the survival of woodland herbaceous flora and the wildlife that depend on it. Unlike other plants that invade disturbed habitats, garlic mustard readily spreads into high quality forests. Plant stands can produce more than 62,000 seeds per square meter to quickly out compete local flora, changing the structure of plant communities on the forest floor. Garlic mustard is considered allelopathic, producing chemicals that inhibit the growth of other plants and mycorrhizal fungi. (KC L&W Resource Center, 2003)



Figure 15 Garlic Mustard (Muma, 2003)

Control Options

There are a variety of different control measures for Garlic Mustard, both mechanical and chemical.

Mechanical Control Options:

The most effective mechanical control method for Garlic Mustard is hand pulling.

- Pulling: Minor infestations can be eradicated by hand pulling at or before the onset of flowering, or by cutting the flower stalk as close to the soil surface as possible just as flowering begins (cutting a couple inches above ground level is not quite as effective). Cutting prior to this time may promote resprouting. Cutting flowering plants at the ground level has resulted in 99% mortality and eliminates seed production (WDNR, 2003).

Note: When pulling, the upper half of the root must be removed in order to stop buds at the root crown from sending up new flower stalks. It is essential that an area be monitored and plants removed for at least five years after the initial control effort.



Figure 16 Plant Pulling (FWS, 2003)

Chemical Control Options

- Several infestations can be controlled by applying 1-2% active ingredient solution of glyphosate to the foliage of individual plants and dense patches during late fall or early spring. At these times, most native plants are dormant, but garlic mustard is green and vulnerable. Glyphosate is a nonselective herbicide that will kill non-target plants if it comes into contact with them.



Figure 17 Volunteer Plant Pulling (FWS, 2003)

NORWAY MAPLE (*Acer platanoides*)

Description



Figure 22 Norway Maple Leaves (ISU, 2003)

Norway maple is a small-medium, deciduous tree with a broad, rounded crown. It can readily be distinguished from other maples because the leaves and twigs ooze milky sap when cut or torn.

Norway maple can be 60–65 feet in height with a trunk diameter of as much as 6–7 feet, and a branch spread of 70 feet when growing in the open. The bark is smooth and gray-brown; twigs are stout, brown with green buds with overlapping bud scales.

Norway maple has dark green leaves. A good characteristic that makes it distinguishable from sugar maple are the leaves; sugar maple leaves are generally longer than wide whereas the Norway maple leaves are wider than they are long. The leaves remain green until early November then turn bright yellow. In mid-to late April as the leaves are expanding the yellowish-green flowers of Norway maple appear in stalked clusters. The fruit of the Norway maple is a double samara; its wings diverge at nearly 180°.

Distribution and Habitat

The seeds are dispersed by wind in September when they are mature. They germinate readily, even in dense shade, and grow quickly when young. The tree is very efficient in using water and nutrients.

Norway maple is generally found growing in second-growth woodlands having a devastating impact on native forest communities. It invades natural areas in cities as well because it is so commonly used for general landscaping by municipalities as well as homeowners. Seedlings from Norway maple can form a monoculture crop and choke out other native tree species within a stand. Since not many other species of plants can exist underneath the canopy of a Norway maple the soil beneath the trees is bare and subject to erosion.

Life History and Ecological Impacts

Norway maple was first introduced to North America in the mid 1700s for cultivation as an ornamental landscape plant from Europe. Norway maple subsequently became one of the most popular trees for city plantings since then many cultivars have been developed including purple-leaved and columnar forms. Norway maple has escaped from areas where it was intentionally planted and it invades native woodlands. The ability to grow in deep shade makes it particularly threatening to native forest habitats. It is believed that the roots of this tree excrete a chemical (allelopathic) that inhibits the growth of any other species that tries to germinate or become established under its canopy.

Control Methods

Eliminate Norway maple from the use as a street tree and garden tree, substitute native trees. The use of a weed wrench (one can purchase it at local hardware stores) to pull young trees out of the ground is effective. Girdling the trunk followed by the use of a glyphosate (RoundUp) will also kill Norway maples. Cutting down the tree at the base and applying RoundUp at the stump will discourage re-sprouting. This must be done between December and March. Best control method is to not plant Norway maples at all.



Figure 23 Leaves (IPANE, 2001)



Figure 24 (Washington Edu, nd)



Figure 25 Volunteer clearing Norway maple (Brandywine, 2003)

Conclusion

Landowner Strategies

Controlling invasive species can be a daunting task. There are many factors that must be taken into account. However, with a control strategy in place, a landowner can work towards fighting the invasive species on their property. In this section a five year control strategy plan is outlined for each of the respective invasive species. Landowners must also keep in mind that for some of the invasive plants a longer strategy can be applied.

Buckthorn

- Inspect property
- Pull out small plants
- For larger plants cut the tree and apply chemical herbicide to stump
- Target seed producing trees to reduce seed bank
- Applying herbicide to trees frequently

Dog Strangling Vine

- Physically remove plant make sure all fragments are removed
- Apply RoundUp twice during growing season (onset of flowering and 2 to 3 weeks later)
- Re-treatments required for 2-3 years

Garlic Mustard

- Inspect property
- Hand pull before flowering make sure all fragments are removed
- Cut flower stalk as close to the soil surface as possible before flowering begins

Norway maple

- Pull out using a weed wrench when small
 - Girdle tree and apply RoundUp
 - Cut large trees and apply RoundUp to stumps
-

Autecology is a valuable resource in the fight against invasive species. The chart below outlines and summarizes the autecology and applicable control methods for Garlic Mustard, Common Buckthorn, Dog Strangling Vine, and Norway Maple

<i>Species</i>	<i>Autecology</i>	<i>Control Methods</i>
Garlic Mustard	<ul style="list-style-type: none"> ▪ Biennial, shade tolerant herb, blooms second spring; ▪ Prolific seed production, seed germinates two to six years after dropping; invades open woodlands, vigorous growth excludes native flora, especially spring flowers; ▪ Tends to prefer calcareous soils, relatively high fertility. 	<ul style="list-style-type: none"> ▪ Repeated removals each spring for four to six years required to deplete seed bank; ▪ Hand-pull twice in May-when flowers are just coming out, a week or two later when hidden plants come into view (do not allow seed to ripen on the plants); ▪ Burning may be the most effective method, particularly in fire-adapted communities.
Common Buckthorn	<ul style="list-style-type: none"> ▪ Shade tolerant, invades forest interiors and edges; ▪ Prefers clay loams; ▪ Forms dense thickets, crowds out native species; ▪ Seed dispersed by birds; ▪ Dioecious (male and female trees, target females for control). 	<ul style="list-style-type: none"> ▪ Cut in mid-July, leave a high stump (75 to 100cm) to minimize resprouting, or dig out stump; ▪ Will not root sucker; fire may be the most effective non-herbicidal control method
Dog Strangling Vine	<ul style="list-style-type: none"> ▪ Herbaceous plant prefers open sunny areas, not tolerant to complete shade; ▪ Small, flat, brownish seeds with long, white, silky parachutes; ▪ Takes over ecosystems, damaging previously existing bio-diversity. 	<ul style="list-style-type: none"> ▪ First year dig plant out, making sure all roots are removed for it can re-sprout from root fragments ▪ Control large infestations by applying RoundUp twice during the growing season ▪ Re-application will be required for 2-3 years to eliminate surviving plants and new seedlings
Norway Maple	<ul style="list-style-type: none"> ▪ Shade tolerant; ▪ Highly adaptable to different soil and moisture conditions; ▪ Heavy annual seed crops, wind-dispersed up to 100meters; ▪ Displaces native species by shading, and by outcompeting for moisture. 	<ul style="list-style-type: none"> ▪ First remove mature specimens to eliminate seed source ▪ Saplings and young trees under 20 to 25 cm will stump-sprout readily <ul style="list-style-type: none"> - Cut in July to minimize suckering, and cut back suckers as they appear; ▪ Hand-pull in spring, when soil is soft (root pieces do not regenerate)

(Havinga,1992)

There is a great need for people to understand and be aware of the invasive species in and around their area. Below is a list of other invasive species to watch out for in Canada.

Scientific Name	Common Name	Effect on Natural Area
<i>Acer negundo</i>	Manitoba maple	Takes place of native early-successional forest, aggressively invades all habitat types
<i>Aegopodium podagraria</i>	Goutweed	Dominates forest understory
<i>Alliaria petiolata</i>	Garlic mustard	Dominates forest herb layer
<i>Alnus glutinosa</i>	Black alder	Dominates wetlands, causes changes by shading
<i>Betula pendula</i>	European birch	Dominates open wetlands, causes changes by shading

Exotic species that are highly invasive but tend to only dominate certain niches or do not spread rapidly from major concentrations.

Scientific Name	Common Name	Effect on Natural Area
<i>Acer platanoides</i>	Norway maple	Dominates forest canopy
<i>Acer pseudoplatanus</i>	Sycamore maple	Dominates forest canopy
<i>Celastrus orbiculatus</i>	Oriental bittersweet	Dominates forests and forest edges
<i>Lotus corniculatus</i>	Bird-foot trefoil	Dominates meadows & prairies
<i>Lysimachia nummularia</i>	Moneywort	Dominates wet forest understory

(Urban Forest Associates, 2002)

Through knowledge and understanding one can prevent and reduce the exotic woodland plant invasion in Southern Ontario.

For more information on the Invasive woodland plants mentioned in the extension notes please refer to Common Buckthorn:

Common Buckthorn: http://www.cws-scf.ec.gc.ca/publications/inv/p7_e.cfm

Common Buckthorn: <http://www.dnr.state.wi.us/org/land/er/invasive/factsheets/buckthorns.htm>

Dog Strangling Vine:

http://www.gov.on.ca/OMAFRA/english/crops/facts/ontweeds/dogstrangling_vine.htm

Garlic Mustard:

<http://www.dnr.state.wi.us/org/land/er/invasive/factsheets/garlic.htm>

http://www.cws-scf.ec.gc.ca/publications/inv/p8_e.cfm

Norway Maple:

<http://www.unh.edu/neeg/normap.html>

<http://www.cnr.vt.edu/dendro/dendrology/syllabus/aplatanoides.htm>

<http://www.nps.gov/plants/alien/pubs/midatlantic/acpl.htm>

Other general information sites:

Invasive Exotic Plants in Canada: <http://24.43.82.29/nbs/IPCAN/fact1.html>

<http://www.serontario.org/pdfs/exotics.pdf>



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