
Russian Comfrey for Fertilizer, Feed and More

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Comfrey is a unique perennial plant that requires minimal maintenance after planting and that can give high, sustained yields of nutrient-rich leaves for use as fertilizer, animal feed and more.

Julie van Zevern, a member of ECHO's network, worked with an herbal clinic in Zimbabwe that uses comfrey in a medicinal manner (more on that later in the article). Julie also mentioned that comfrey is used as a fertilizer in Zimbabwe by Foundations for Farming (FFF). I (Dawn) contacted FFF and asked for more information about their use of comfrey.

Hazel Edwards from the FFF office in Harare responded. "We were first introduced to [the use of comfrey as a fertilizer] by a local farmer, Rory Maloney, a fairly large market gardener who supplies fresh produce for the Harare vegetable market. He said it improved the health and disease resistance of his crops."

Hazel commented that comfrey is high in potassium (K) and other micronutrients, and "seems to improve fruiting and disease resistance."

She notes that it is most effective when "applied to solanaceous [e.g. tomato and potato] and leguminous plants, as they are potassium responsive. [It can] be applied every two weeks as a drench or foliar spray. [We] haven't done the scientific study on this with controls, etc., to quantify the response."

A handout from FFF gives this advice about making comfrey tea:

With its high levels of potash, comfrey tea can be used as an excellent fertilizer for tomato, pepper, cucumber and potato plants. The smell while it is 'cooking' is strong. Pick a handful of leaves. Place them in a container with enough water to cover the leaves (1-2 kg comfrey leaves in a 20 L bucket). Cover and let this [sit] for four weeks in cool weather or two weeks in hot weather. Then squeeze the leaves to extract as much juice as possible. Strain and use at a rate of one liter comfrey juice to 20 liters of water. Use as a foliar feed and soil drench around the plants. Put the solid wastes into the compost pile. Dried...comfrey leaves have the following percentages of NPK: 0.75%, 0.25%, 0.20%. Fertilizing potatoes with comfrey will provide the crop with an excellent source of potassium and trace elements. Comfrey leaves contain two or three times more potassium than farmyard manure.

The plants used at the FFF office are from a local farmer. Hazel commented that it is fairly common there and not difficult to find.

Bill Cotton, an ECHO volunteer who lives in the Cotswolds in England, shared information about the use there of comfrey as a plant fertilizer. He uses comfrey to make a fertilizer 'tea'; lays leaves on the ground; and uses the leaves for making compost. He shared, "The important things to note are:

- Comfrey is very vigorous and can be harvested up to four times each year. It will grow well on the poorest soils and in well-lit as well as shady areas.
- Note that in England, comfrey is the basis of much organic gardening and was initiated by Henry Doubleday who is the originator of 'no dig' gardening using 12 x 4 foot plots that you can walk around rather than on, thus avoiding compaction.
- Concentrated comfrey leaf liquid can be produced in a bucket or similar container (see Figure 3). Add leaves to the container, but do not add water at this point, since the leaves will make their own [black] liquid concentrate. Prior to use, dilute the concentrate with water [using a five to one ratio of water to comfrey extract]. It is an inexpensive way to produce fertilizer.
- Note that comfrey leaves have a long reputation as a healer of cuts, rashes and other skin ailments." Bill, an avid gardener and a former teacher of Rural Science, suggested that I contact the organization "Garden Organic" (originally the Henry Doubleday Research Association). They pointed me to a recently reprinted book by Lawrence Hills called *Comfrey: Past, Present and Future*.

The rest of this article includes relevant abstracted information from Hills' book.

History and cultivar development

The primary comfrey cultivars available today are the result of Hills' research at Bocking in Essex, England, which led to the development of strains of Russian comfrey (*Symphytum uplandicum*, referred to as *S. peregrinum* in Hills' book) designated as varieties Bocking 1 through Bocking 21. Russian comfrey is the result of a cross between *S. asperrimum* (aka prickly comfrey) and *S. peregrinum* (aka common comfrey). During Hills' years of experimentation, comfrey was grown in many different countries around the globe.

Hills observed that Bocking 14 was the most common clone in South Africa. It was highest in potash, resistant to comfrey rust, and highest in allantoin (the main active ingredient for medicinal purposes). Bocking 14 is also the variety recommended for garden cultivation and feeding to pigs and poultry (if leaves are first harvested and wilted).



Figure 2. Comfrey regrowth after harvesting leaves. Photo by Bill Cotton.

[An internet search will show frequent mention of Bocking 14, as well as Bocking 4. The two cultivars are similar; however, Bocking 4 is said to have a deeper root system, with greater drought tolerance, than Bocking 14. Bocking 4 is reportedly best for fertilizer use, while Bocking 14 is best for animal fodder.]

Growth and yield

Russian comfrey can grow up to 6 feet, 8 inches in height when allowed to flower [if you are growing for the leaves, flowering is not desirable]. The flowers start out blue and then change to magenta. It is perennial, typically cut six to eight times per year, with a leaf biomass yield of 40 to 100 tons/acre/ year (fresh weight). In temperate areas, leaves start growing early in the spring. In the tropics, leaves can generally be harvested year-round.

Environmental requirements

Comfrey adapts to a wide range of soils but grows best in moist, fertile and well-drained soil. Though not influenced heavily by pH, growth is best with a soil pH of 6.0 to 7.0. With its deep roots, comfrey is quite tolerant of dry, sandy soils, as long as those soils are supplied with sufficient nutrients. It is both cold and heat tolerant, so multiple leaf harvests per year are possible in most parts of the world. It grows best with full sun but tolerates partial shade.

Propagation and management

Russian comfrey is usually propagated from root cuttings, crown divisions or transplants. Root cuttings are the cheapest option for starting a new planting. Use roots that are 1½ to 6 inches long and ¼ to ¾ inches in diameter (Teynor et al., 1997, www.hort.purdue.edu/newcrop/afcm/comfrey.html). (<http://www.hort.purdue.edu/newcrop/afcm/comfrey.html>.) Lay the cuttings flat and cover with 2 inches of soil. Added manure or mulch is helpful. Hills' book suggests transplanting root cuttings in holes filled with aged manure. Space the plants on a 3 foot X 3 foot grid (see Hill's book and www.coescomfrey.com/grow.html (<http://www.coescomfrey.com/grow.html>) for additional information).

Because comfrey is propagated by root cuttings, it is possible to take cuttings from consistently high yielders where records have been kept (records are very important!). A comfrey plant can live as long as an orchard, so be careful in selecting where to locate it. Here are some helpful tips:

- Roots can grow at least four feet deep. If a hard pan is present, break it up so that the roots can grow deep.
- Plant comfrey close to where it will be fed to animals (as cut-and-carry). This will also make it easier to haul manure back to the plants.
- Do not plant comfrey under trees; the latte will block the sun and their roots will take nutrients and moisture

Hills commented about comfrey, "It is only a crop when it is kept clean, cut and manured." We will look at each piece of advice in turn:

Keep it clean. As with most crops, keeping comfrey plants weeded is a good management practice. Mulch can help to keep weeds down.

Keep it cut. Regular cutting of comfrey leaves generally results in higher annual yields. Since most animals will not graze comfrey, but will eat the leaves once they are wilted, it is a good option to 'cut and carry.' Hills shared insights from many farmers who have grown comfrey. He concluded that cutting more often resulted in better yields, and in better opinions of the plant. One article stressed that plants should not be allowed to become hard and woody. Leaves can typically be cut six to eight times per year.

Keep it manured/fed. Comfrey requires little maintenance, but because of its fast growth and inability to fix its own nitrogen, it benefits greatly from fertility inputs with rapid release of nitrogen. Nitrogen from compost will not be available quickly enough. High nitrogen manures (e.g. poultry, pig, cattle, etc.) work well.

Potential Problems / Disadvantages

An awareness of potential problems and disadvantages with comfrey (listed below) is important before deciding whether or not to introduce the plant. In many cases, comfrey compensates for the disadvantages in other ways (also listed below).

Potential for weediness. Although Russian comfrey rarely sets seed, it can be difficult to remove once it is established on a plot of ground. Trying to dig it out will only worsen the problem, because every piece of severed root will begin to grow into a new plant! One option for getting rid of it is to let pigs in to the area. Another (on a garden scale) is to use ammonium sulphamate. A third option (one that I read about online) is to build a hot compost pile directly on top of the comfrey plant that you wish to remove.

Initially expensive to plant. Early on, inflated claims were made for comfrey, in order to compensate for the cost of root cuttings and to make sales. The high price often meant that only small plots were established, and they were often neglected. However, once planted, comfrey can provide leaves for more than 20 years.

High nitrogen requirement. Unlike leguminous plants, comfrey does not fix nitrogen. However, if grown as feed for animals, the animals' manure can be used to provide much-needed nitrogen back to the comfrey plants. If grown purely for animal fodder, the decision to plant comfrey versus legumes would depend largely on the time it takes for comfrey to become established and the leaf yield of comfrey versus legumes.

Uncertain potential for silage. It is difficult to make silage with comfrey alone. A better option is to add comfrey to other plants when making silage (with comfrey as up to 25% of the weight).

Drying comfrey is difficult and time-consuming. Leaves need to be harvested before stems are too thick, and shouldn't be dried above 180 degrees F, to prevent proteins from coagulating and allantoin from being lost.

Pyrethrum eelworm. Despite comfrey's good growth in Kenya, Hills wrote that it was "not a country of comfrey growers." Having formerly grown pyrethrum, a nematode called pyrethrum eelworm (*Pratylenchus destructor*) was built up in the soil and could kill comfrey. Kenya still produces pyrethrum, so the threat likely still exists there.

Termites don't normally eat living roots, but Hills commented that they will eat comfrey roots if they dry out during a long drought.

Rust can be a problem where wild comfrey is also found. However, the Bocking 14 variety seems relatively resistant to rust.

Analysis of Comfrey

The best nutritional value of comfrey is found in the leaves. Analysis of a Bocking 14 comfrey plant, cut in autumn, showed it to contain 2.77% calcium; 0.75% phosphoric acid; 7.09% potash; and 0.144% iron. Analysis of dried comfrey leaves showed them to be a rich source of protein, including the amino acids tryptophan and methionine. Comfrey seems to provide all the nutrients that pigs need, including vitamin B12, which normally must be obtained from animal products. Four pounds of fresh comfrey per day supplies enough B12 for a pig. Experience has indicated that the comfrey can also provide necessary B12 for chickens, cows and sheep. Hills commented, "For pigs and poultry, comfrey is cheaper than fishmeal or B12 injections."

Comfrey for Animal Feed

[Note: The following information on feeding comfrey to livestock comes from Hills' book, initially published in 1976. However, more recent research has identified potential risks of feeding with comfrey, particularly with large amounts. Caution is advised related to using comfrey as animal feed.]

Animals seem to prefer comfrey when it has first been allowed to wilt, especially initially. EDN Issue 123 5 In a report from a Saskatchewan (Canada) farm, cows did not at first appear to like fresh forage, but ate it when it was slightly wilted. Later they would willingly eat fresh forage.

Pigs. Hills wrote that pigs generally like comfrey, right from the start, and that up to 30 percent of pig meal can be replaced with cut comfrey. One option is to cut and carry the leaves to tethered pigs.

Young comfrey leaves, without any coarse stems, can be fed to a sow with many piglets. According to Hills, "Stronger piglets will start eating comfrey very early, which gives a chance to the weaklings [to nurse]."

Chickens. Comfrey is well-suited as a feed for chickens. Chickens' digestive systems are not equipped to handle much fiber (fiber should be kept to between 5 and 8 percent of the diet). Comfrey is low in fiber and high in protein and minerals, especially when cut regularly. It has a protein to fiber ratio of about three to two. If

the high-yielding Bocking 14 strain of comfrey is planted, 30 plants spaced at 3 feet by 3 feet (for example, six plants by five plants) will yield enough comfrey to feed 12 birds their entire allotment of green plant matter.

Comfrey can be an inexpensive source of vitamin A. Second-year hens fed half a ratio of comfrey laid large eggs with deep yellow yolks. The flesh of chickens that have been fed comfrey also ends up being more yellow, perhaps because of increased vitamin A content.

Chopping comfrey with a chaff cutter is especially recommended for birds less than eight weeks old. Another method for feeding comfrey to chickens is to hang it on a string and let birds jump for it (so it doesn't get trampled on).

Cattle. Comfrey is palatable to cattle, and has also helped to correct loose stools. Sometimes, comfrey is most available when there is also ample grass, making it less important as a feed source (this is true in Britain). However, Hills wrote that in Japan, where grass was less available, comfrey made economic sense. In Kenya, comfrey was especially valuable for cattle during the dry season. A bullock can eat about 37.5 kg of comfrey per day.

Goats. Goats need fiber and protein. They can be fed comfrey for protein and minerals, but must also be given plenty of roughage.

Comfrey as Garden Compost

In ordinary garden plant material, the carbon to nitrogen ratio (C to N) is about 80 to 1, and with composting, the ratio goes down to about 10 to 1. Before composting, comfrey already has a C to N ratio of 14 to 1.

Comfrey is a good general fertilizer and an excellent source of potash. It can be mixed with other ingredients to make good compost. Hills wrote that "A comfrey bed is in effect a method of exchanging crude nitrogen for a balanced organic fertilizer." It can be manured with straight chicken manure, or with a 2 to 1 mix of water and urine, referred to by Hills as Household Liquid Activator or HLA (and described by him as "the best and cheapest of compost heap activators," and a source of potash and nitrogen).

Alternatively, comfrey can be used as a kind of 'instant compost.' "Four wheelbarrows of cut and wilted comfrey will produce three wheelbarrows of instant compost with no need to build or turn a compost pile." Apply it as a surface mulch, or incorporate it into the soil, depending on the crop. Do note that it will not leave much humus/organic matter in the soil. Comfrey as instant compost can be quite effective. Hills wrote that 1 ½ pounds of wilted comfrey applied per foot of row doubled the yield of potatoes compared to those grown with no manure, and gave higher yields than with a similar amount (by weight) of manure or compost.

Another form of comfrey fertilizer is manure tea (see the beginning of this article for a method that FFF uses).

Medicinal Use of Comfrey



Figure 3. Making comfrey tea. Photo by Bill Cotton.

name *Symphytum* comes from Greek, and means “to make grow together”—a reference to the way comfrey is used to promote healing of wounds. Another reference is the common name for comfrey: ‘knitbone.’ A molecule called allantoin is the active ingredient in comfrey that makes it medically useful. Allantoin is highest in comfrey stems up until a comfrey plant flowers.

Hills listed recipes for comfrey leaf tea and for poultices, but warned against making an ointment that would “sit around,” due to the risk of infection. [Caution: In more recent years, research has resulted in concerns-pertaining especially to internal use-regarding adverse effects on the liver of pyrrolizidine alkaloids in comfrey. Some of the literature says that the harmful effects are only caused by consuming comfrey in large amounts; however, ECHO is not able to make recommendations as to the medical use of comfrey.]

Obtaining Comfrey

ECHO does not supply comfrey. Import of comfrey can be tricky, because root cuttings can be destroyed by fumigation and other precautionary treatments.

Because of a short historical period of widespread interest in comfrey, it may already be available in your country. If you are in Zimbabwe, contact Foundations for Farming to inquire about root cuttings.

Conclusion

Russian comfrey has high potential for the small farm, provided that it is kept clean, cut and fed. Once established, it can be a long-term source of feed for animals and fertilizer for the garden. Ultimately, yield is what determines the benefit of comfrey versus other options. Legumes are less demanding of nitrogen than comfrey; however comfrey could be a good option if it produces higher leaf yields. Comfrey also can supply a wide variety of other important nutrients. We hope this article helps you decide whether or not to look for the plant in your area.

Let us know of your experience if you grow comfrey in a warm climate.