

CONTROLLING QUACKGRASS

By Jean Duval

It is difficult to eliminate quackgrass (also known as couchgrass or twitchgrass) in an organic system, especially in field crops, where soil cultivation is generally less intensive and acreages are generally large.

Quackgrass is especially difficult to eradicate in heavy, poorly drained or stony soils. Nevertheless, it is possible when you know how to do it.

Biology

Quackgrass can be easily identified by its auricles, the tiny hooks hugging the stem. It reproduces through seeds, but mostly through rhizomes. Quackgrass forms tillers (shoots) as its rhizomes spread out in all directions. A small section of rhizome can produce a new quackgrass plant but only one of its nodes (or buds) will produce a stem. The other buds become inactive as soon as one successfully produces a stem. A plant can produce rhizomes as early as the three-leaf stage when the temperature is between 2°C and 30°C.

Seed propagation is less common than rhizome propagation. The seeds have to be exposed to temperature variations in order to germinate. However, seeds can germinate even if they have not been 'harvested' at full maturity (often in August). They sur-

vive for up to four years in the ground.

If the soil is not cultivated, the rhizomes will only develop near the soil surface, often at a depth of less than 10 cm (4 in.). The deeper a rhizome segment is buried, the less able it is to produce stems that will reach the surface.

Prevention

To prevent propagation by rhizome, it is important to:

- Clean equipment well—rhizomes can stick to plows, harrows, etc.
- Isolate or work infested areas separately from non-infested areas.
- Spread manure, compost and soil with caution if it has been invaded by quackgrass.
- Not allow grasslands to deteriorate by keeping them for longer than three years.

To prevent propagation by seed, it is important to:

- Use clean seed for crops, especially for oats and brome.
- Avoid losses during harvesting. Normally, most weed seeds are thrown back to the field during harvesting. Some farmers close the sieves at the back so that weed seeds stay with the harvested crop. It is then possible to screen for weed seeds before storing or selling the crop.
- Use clean straw when mulching (eg. for berries).
- Avoid late haying.
- Cut ungrazed grass in pasture fields.

To out-compete quackgrass, it is advisable to:

- Correct problem areas (e.g. wet spots) so that the crops don't have any obstacles to their growth that could give quackgrass an advantage.
- Plant groundcover plants, such as a living mulch of white clover in sweet corn.
- Increase seeding rates of crops.



Quackgrass and rhizome system.

- Plant orchardgrass or brome-grass on field edges.
- Grow crops that tolerate low to medium infestation, such as winter cereals, buckwheat or potatoes.

Principles of rhizome destruction

Quackgrass rhizomes can be killed in an organic system using two methods: depletion and desiccation. Depletion involves cutting up the rhizomes and repeating the operation when the quackgrass starts to grow again to deplete the food reserves of the rhizomes. Desiccation involves bringing the rhizomes up to the surface, where they are exposed to the open air and they dry out (weather permitting).

Short fallow

The short fallow technique is the best way to control quackgrass in field crops. The method involves repeated tilling of the soil over a three to six-week period. Grassland is best suited to the short fallow method because the quackgrass rhizomes are concentrated near the surface. The best time to do this is in July and August, which is usually the driest period of the year. Avoid short fallow in the spring.

The three stages of a short fallow are:

1. Stubble plowing with heavy discs, chisel plows, a combination of these, C-type cultivators or modified plows (without mouldboards), but not a mouldboard plow. It is unnecessary to stubble-plow at a depth greater than that of most of the rhizomes.

2. Repeated harrowing with a vibrashank cultivator can bring

the rhizomes up to the surface (desiccation approach) or a disc harrow can be used to cut the rhizomes (depletion approach) finely. It is important not to allow the quackgrass leaves to grow longer than 12.5 cm (5 in.) or have more than three or four leaves per stem.

3. Sowing a green manure crop or winter grain after a short fallow is recommended to recover the nutrients released by the fallow, prevent regrowth of quackgrass, reduce erosion and rebuild soil structure. The more finely the rhizomes are cut, the less able they are to compete with the green manure crop.

Plowing

Standard mouldboard plowing will control up to 75% of the rhizomes but the ones left behind are very difficult to control; this can create a worse problem after a year or two. Plowing is, however, a good method to finish a short fallow. Fall plowing or spring plowing (in a light soil) is a solution of last resort that will limit the extent to which quackgrass competes with the crop, but only at the start of the next season. Deep plowing, although fairly effective, is not recommended from an organic farming standpoint which promotes respect for the living soil.

Long fallow with successive green manure crops

This method is recommended particularly before establishing perennial crops, such as fruit, berries and asparagus, and for horticultural crops in general. Starting in spring, the same operations are done as for a short fallow: stubble plowing, repeated harrowing, and the plants should never be allowed

to grow more than three leaves per stem. Afterwards, buckwheat (or another green manure crop) should be sown at a rate of about 50 kg/ha (45 lb/a) in early to mid-June, when there is no longer any risk of frost.

When about 40% of the buckwheat has flowered, it is better to destroy it because it quickly sets seed and turns into a weed. At this stage, quackgrass is still visible in the buckwheat.

Destroy the buckwheat by going over it with a disc harrow, allowing it to dry, and going over it again with a disc harrow a few days later. You can then sow buckwheat again or continue harrowing once a week until early September, when it is time to plant winter rye (to be turned in the following spring) or a spring grain (which will be winter-killed). There are several variations of the long fallow method with consecutive green manure crops. The long fallow without crops is no longer recommended because a field worked in this way is exposed to wind and water erosion throughout the season, and the technique is potentially very polluting.

Rototilling

The rototiller is the ideal tool for killing quackgrass using the depletion method. The rototiller has to till the earth at a depth of about 10 to 15 cm (4 to 6 inches), preferably in hot, dry weather. During this first tilling, the tractor speed should be slow but the rototiller blades should be spinning at high power to ensure that the rhizomes are properly cut off. Once the quackgrass is well dried out and before new growth reaches a height of 12.5 cm (5 in.), go over the area again with the

rototiller at the same depth or down to a depth of 20 cm (8 in.) if necessary. Rototill the area several times, if need be, before sowing a competitive green manure crop.

Other options

Specialized equipment like the CMN couchgrass killer (www.cmn.dk/; click on “Kvik-killer”), consists of a series of 48-cm (19-in.) sweeps, followed by a series of knives that slowly rotate in the opposite direction of the movement of the tractor. This action brings quackgrass rhizomes and the roots of other perennial weeds to the surface. Dry weather or frost will then kill the rhizomes. Potato diggers and rod weeders can be used in a similar fashion.

Opaque plastic mulch can be used on small areas to prevent the growth of quackgrass, but to destroy the rhizomes completely, the mulch must be left in place for a full season (at least six months) or even two seasons. The mulch has to extend beyond the infested area by a full metre.

Organic mulches are not recommended against quackgrass.

Woven groundcovers (polypropylene sheets) are only appropriate for perennial crops such as vines and highbush blueberries.

Solarization can be a good small-scale way to eliminate a quackgrass patch. Cover the infested area with a transparent plastic sheet for six weeks during the hottest part of the summer. Be sure to seal the edges of the plastic sheet thoroughly. Afterwards, rototill the area and plant winter grain or a green manure crop.

Burning of quackgrass is not recommended. A single burn carried out in May stimulates the production of quackgrass stems. However, repeated burning in the spring (from May to early June) can significantly weaken the stand. Quackgrass is highly sensitive to burning just before it flowers.

Repeated mowing, as with burning, will reduce the rhizome reserves, but mowing alone rarely eradicates quackgrass, although it prevents seed production. Mowing carried out between the middle and end of June is highly effective at depleting quackgrass. Mowing can be a good front-line strategy but has to be followed by a period of fallow.

Intensive pasturing in the spring or fall when the quackgrass is growing actively can also weaken quackgrass before mechanical control operations are carried out. Pasturing promotes the development of rhizomes close to the surface and causes the production of fine rhizomes. Sheep, which tend to nibble down to ground level, are the best to weaken quackgrass. Pigs can do a very good job of cleaning out any quackgrass rhizomes if they are left long enough to root through the entire area; some books recommend a density of 15 pigs per hectare (2.5 acres) for one month. This method is not advised in areas with heavy soil, where pigs can damage the soil structure during a rainy season. Lastly, young geese can be used to control quackgrass on strawberry farms.

Controlling weeds in row crops such as corn can help slow the growth of quackgrass early in the

season. Preference should be given to cultivators fitted with wide, rather than narrow, sweeps. If weeding is not preceded or followed by other control measures, it will simply cause the quackgrass to spread even more.

This article has been reprinted from the proceedings of the Guelph Organic Conference 2006, based on a talk presented by Jean Duval. A longer version of the article, including references, is available at www.organicagcentre.ca/Docs/Quackgrass_final_rev_JD.pdf.

Jean Duval is a professional agrologist and a former board member of COG. He has served as an organic inspector, a technical advisor for McGill's Ecological Agriculture project, and now works as an agro-environmental farm advisor to organic farmers in southern Quebec.

WholisticResponse.com

**To All Things in Life,
There is a
Wholistic Response...**

- ✿ Herbs ✿ Teas
- ✿ Spices ✿ Accessories
- ✿ Health Products
- ✿ Books ✿ and more!

*Highest Quality Products for
Health and Wellness and the
Convenience of Secure
On-line Shopping*

www.wholisticresponse.com