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Quack Grass and Ecological Succession

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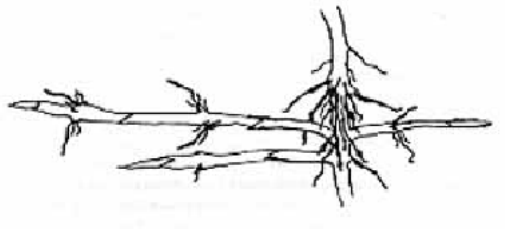
I think that most “wet side” Northwest farmers and gardeners would agree that weeds and their control constitute the main challenge to successful production. The frequent light rains of this region create extended periods of optimum conditions for weed seed germination and establishment. Sunny dry days, when newly cultivated weeds will dry out and die. are often a rare and precious gift, especially during moist and cloudy springs. But for many growers who are trying to become established on new land, it is not the persistent annual weeds - that offer the greatest problem, but rather the stubborn perennial grasses — especially the common spreading quack grass.



Sometimes called Couch Grass,. quackgrass (Agropyron repens) is a tenacious, quick-spreading pioneer on disturbed soil and it is very much at home in a garden or plowed field. In fact, most tillage and cultivation operations — plowing. spading, hoeing, and especially rotovating — actually propagate & spread quack grass by cutting up the tough, thin rhizomes which are its major means of increase. Even the smallest piece of these cut rhizomes is capable of generating a new plant; the more they are cut up, the more numerous will be the new stand of quack grass plants.

If by chance you aren’t acquainted with this grass by name, it can be easily identified by its rhizomes — the horizontally- growing underground stems which spread through the top four inches of the soil. These rhizomes are whitish, and they can be distinguished easily from roots because they have nodes every inch or so — a clear indication that they are modified stems rather than fibrous roots. The rhizomes are not only capable of growing new plants when cut, but can in fact grow right through a healthy potato or carrot, and form a mat sufficiently thick to choke out young fruit trees. In addition to its amazing growing stamina, quack grass is also known to produce allelopathic substances which retard the growth of many crops. These active inhibitors are produced both as root exudates from the growing plant and as byproducts of the decomposition of its tissues.

Quack grass also draws heavily on the nutrients and water found in the topsoil. This shallow, heavy feeding habit is a way of life for all grasses, and it is also one of the main reasons why they constitute a more serious problem in the garden or field than do the broadleaf weeds. These, for the most part, are deep-rooted plants which serve a vital function by opening up the deeper layers of soil with their strong tap roots and bringing up hard-earned nutrients to the region of the topsoil. In a climate where abundant rainfall results in a net movement of nutrients downward, such deep-rooted, deep-feeding plants can perform an important role in maintaining overall soil health.

To give fair credit to grasses, it should be recognized that their rapid growth, extensively fibrous

root system, and spreading form can make some of them valuable soil-protecting cover crops as well. But good cover crop and weed plants must either be easier to eliminate than quack grass or they must be less competitive than it is if they are to contribute to a productive field or garden situation.

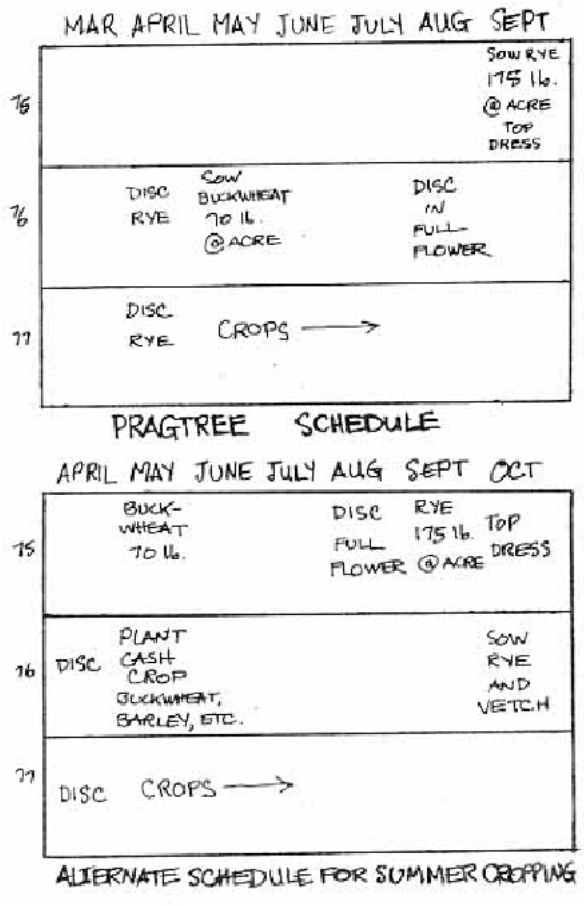
Quack grass can be very difficult to discourage. When faced with a quack-grass-ridden lawn or old pasture that is the site of a new garden area, there are two basic strategies that can be followed. The first tactic involves attempting to remove all of the viable rhizomes and crowns of the quack grass plants at the same time that the ground is prepared for cultivation. This of course can be done, but the tedium involved is immense; every inch of soil must be sifted, and the rhizomes must be manually removed. Patience and hard work with a fork and nimble fingers can clean Out a few square feet in an hour's time, generating a goodly pile of rhizomes in the process. (Incidentally, the herbalists claim that these rhizomes have a valuable diuretic action, and can be used in the treatment of urinary troubles and other ailments — including influenza.)

Separating rhizomes from the soil is slow work, but is far easier at digging time when the soil is rough and first laid open than it is after the precise work of planting has been done. Yet even the best initial efforts can result in only partial success; there always seem to be enough rhizome pieces left to start up a pesky new crop of the grass. If left unattended, these remaining plants will spread, and eventually they will reclaim the field. I have seen many gardens which have been given meticulous care and thorough spring digging for five or more years, and which are still under constant threat from residual quack grass that escapes the annual digging and sorting. Growing food under these conditions is less than fun. and it can often be much less than productive.

BIOLOGICAL CONTROL

The other approach to the quack grass problem is to rely on a simple form of biological control. By investing some time toward growing competitive green manure crops in a well- ordered succession, even a strong stand of quack grass can be successfully eliminated and, at the same time, the fertility of the soil is being improved.

At Pragtree Farm in 1975 quack grass thickly ramified the entire plow layer of soil in an old pasture which was being upgraded for vegetable crops. The grass was virtually eliminated from this field by a green manure sequence of buckwheat, winter rye, buckwheat, and winter rye again. In both 1975 and 1976 the rye was sown at about 175 lb. of seed per acre. It was sown in September for a good early start, then top dressed with chicken manure and disced under in April when it was about knee high. The buckwheat crops were sown in May at the rate of about 70 lb. /acre and these were disced down when in full bloom.



The advantage of this approach is that, in this field, the ground has been cleared of a persistent weed by means of plant competition. In other words, the field has undergone a process of ecological succession (as any ecosystem will), but in this case the direction of ecological change was determined by the growers who planted the green manure crops. In addition to clearing the field, the green manure succession has brought an enormous improvement to the fertility and structure of the soil, making it a much more suitable habitat for row crops. Very little labor was required.

The disadvantage of this method, of course, is that it has been “expensive”. Two seasons have passed and no cash crop has been produced on that field to compensate for the costs of seed, manures, labor, and taxes. However, I’m almost certain that the quack grass could have been effectively controlled in that field and still have allowed a cash crop to be produced there in 1976.

The alternative planting schedule would have gone something like this: 1975 — summer of buckwheat green manure followed by rye in September; the rye then top- dressed with manure during the winter months. 1976— Rye disced under and a summer cash crop planted, such as buckwheat, spring barley, oats, corn, or potatoes (this crop may have faced some quack grass competition, however). The cash crop would then have been followed in October with a heavy sowing of rye and vetch for wintering over. In subsequent seasons winter rye cover crops would maintain good soil conditions, preventing quack grass return and occupying the land only in the late fall, winter, and early spring.

As a point of contrast, there is a vegetable garden at Pragtree Farm which has been under intensive hand cultivation for much longer than the field which underwent the green manure sequence. This is a productive and beautiful garden. but it is being defended constantly from quack grass. The quack grass rhizomes have managed to survive careful bed preparations, pathway renovations and weeding routines. and every year the pleasure of gardening there is tempered by the demands of the weedy grass. From an ecological point of view, you might say that — in spite of all the digging, composting. and planting — that garden has not yet completed a certain necessary

succession. In other words, the quack grass has not yet met its competitive match. Consequently, it may be more direct to bring land into crop cultivation more slowly (but, in the long run, probably more successfully) by setting it. aside for a year or two of a transitional soil improvement program.

SUCCESSION

Quack grass is a good reminder of the ecological phenomenon of succession. It is a prominent part of the sequence that begins with newly-disturbed soil, and results ultimately in a climax forest. Quack grass can be found nearly everywhere in Western Washington. and while it is said that it cannot compete successfully with close-growing pasture grasses. it is nevertheless an important component of more pastures and hayfields. The reason for this is that, with a very few localized exceptions, this particular bio-geographical area is simply not prime grass habitat. In most soils in this region, a good stable and productive pasture is very difficult to establish and maintain. Pasture grasses are not favored, and they generally cannot offer sufficient competition to quack grass to keep this frequenter of disturbed soil in its place.

In fact, the quack grass is at home on open ground in Western Washington precisely because the other grasses are so out of place in the natural ecosystem for the area. Like the blackberry, quack grass is dedicated to preparing and repairing disturbed land for the eventual return of a coniferous forest, and as such it is an important part of natural succession. As quack grass grows, it alters the habitat by stabilizing the soil and increasing its humus content. In the process, the land becomes more hospitable to other plants, which in turn compete with the quackgrass and eventually succeed it. These now-established plant species improve soil conditions further, and flourish until they are out-competed b still other plants. This process continues until native evergreen have become dominant.

The use of green manure crops as competitive alternatives to quack grass thus changes the fundamental habitat alteration that would otherwise naturally occur with native plants over a longer period. Because such crops can outcompete with the quack grass, they can also alter the habitat of the soil in such a way as to favor a succession of other agricultural crops. As suggested earlier, buckwheat and rye are particularly useful competitors in suppressing quack grass in Western Washington but the general principle can be used in developing and maintaining stable agricultural ecosystems anywhere.