JOHN KEMPF AND DR. JAMES WHITE EXAMINE THE FASCINATING ROLES OF ENDOPHYTES

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A ROSE BY ANY OTHER NAME

Weeds are nature's mineral redistribution system and a way to sequester carbon at many depths in the soil

BY NIGEL PALMER

A ROSE BY ANY OTHER NAME ... WEEDS ARE OFTEN MISUNDERSTOOD.

Consider your definition of a weed. Most say they're unwanted plants that hurt the crops we want to grow. I would like to propose an alternative paradigm — a slightly different model or context for considering weeds: weeds are nature's mineral redistribution system and a way to sequester carbon at many depths in the soil.

In order to appreciate this point of view, let's review some characteristics of plants. Most importantly, plants absorb minerals into their frames in different proportions than the proportion of those minerals in the soil. By bringing these specific mineral proportions up and laying them down on the surface year after year, the minerals on top of the soil become different compared to lower down. Because of this, as time goes by, the plants that grow in this space will change. Consider a field that is no longer cultivated and the transitions that take place over time.

We know that plants send exudates into the soil through their roots. These are sugars — carbon — that feed the soil biology. The microbes consume them, poop, and are eaten by larger animals and die. Some of this life is eventually transformed into humic substances — relatively stable forms of carbon that become sequestered in the soil at various depths, depending on the root structure of the plants doing the exuding. Those lovely deep-rooted weeds in your garden or fields — the docks, dandelions, parsnips, thistles and more — are hard at work bringing the soil back into balance by transferring minerals from deep within the soil to the surface and extending the depth of humic substances into the soil.

We are lucky to have these amazing plants growing in soils that we have degraded — sometimes significantly. Consider the soil life that grows after a volcano blows the top off a mountain, or after a large oil spill or nuclear accident, or in an agricultural field that has had years of tilling with strong pesticides, fungicides and herbicides applied multiple times per year. Nature still offers us life that is able to grow in these spaces, sometimes creating brand-new, never-before-seen varieties to the

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mineral	Cl	S	P	Ca	Mg	K	Na	B	Fe	Mn	Cu	Zn	Al	Co	Mo	Si	Se	Ni
quack grass FPJ	932	6.32	38	98	22	97	1.46	0.12	2.54	4.11	0.32	0.28	2.62	0.02	0.03	51	1.59	0.01

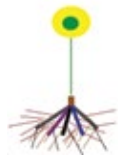

Table 1. Mineral analysis of quackgrass fermented plant juice. All values in parts per million (ppm).

rescue that will remediate even these toxic landscapes — i.e., super weeds!

A weed that proliferated in my garden before I began to understand this point of view was quackgrass — not an uncommon weed variety in many a garden. When at first I tried removing her from the garden space, discarding the material onto the compost pile, the green blades aboveground would snap at the root interface, leaving those stubborn roots in the ground to continue growing. While "weeding" these unwanted grasses from my garden one day, I thought about them in the context of nature's remineralization program and wondered what minerals might be in quack grass. I decided to gather some, make a fermented plant juice with them, and send the juice to a lab to evaluate all 18 of the minerals we are taught that plants need. By this time, analyzing homemade mineral amendments was a standard procedure for me. I had demonstrated that all plants had all of these 18 minerals in them and that they differed in their proportions. Dr. James Duke's USDA Phytochemical and Ethnobotanical database demonstrates these characteristics as well.

The analysis results revealed high concentrations of needed trace min-

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Using this method produced 27 potatoes from a single plant.

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erals (see Table 1). The quackgrass was indeed mining the minerals that this garden space needed and bringing them to the surface. The long runner roots were exuding sugars into the soil, feeding specific soil biology that mined these minerals. The quackgrass was remediating my soil, and I was hindering the work by disrupting the soil and moving the plant material to the compost pile. Why not change this perspective and work with the plants and nature to facilitate this activity, as well as growing food?

I now distribute quackgrass fermented plant juice on my garden space, speeding up the process of redistributing these minerals. I never take plant material from the garden but make rows of "little compost piles" of the entire plant in the garden space. Nature worked so hard to create these carbon materials that to remove them just doesn't make sense. The quackgrass has since subsided, but it has not been eliminated. I still use her assistance.

The beginning of spring brings early plants coming up all around the garden area, some of them the weeds we defined earlier, some the plants that I left to seed the previous year: dandelions, red clover, violets, parsnips, cilantro, dill, kale, collards, nettles, yellow doc, garlic and more. By letting plants go to seed, encouraging their natural cycles, they become my weeds. I much appreciate them all, especially in areas where the tomatoes will go into the ground sometime in June when soil temperatures get to 70 degrees Fahrenheit (21 C). A diverse cover crop is already established with various depth of roots feeding the soil for free with little or no labor. I manage the area by knocking the area down one or two times before the tomatoes go in, adding their leaves and stems as a green mulch to the soil, always leaving the roots intact, allowing some to go to maturity and other seeds below to germinate.

As the organic matter in the soil increases, the soil loosens up, and pulling these plants at the time of planting becomes much easier. The stinging nettles that populate the gar-

den pull up easily, with long strands of densely packed root hairs and soil aggregates clinging to them. These are laid between the cultivars with other weeds and existing mulch residue to facilitate the work of bringing a different spectrum of minerals to the soil surface and to add organic matter.

Rather than removing plants from the garden space, I am working with nature. Adding mineral rock dusts, compost, homemade mineral amendments, crushed oyster and/or shrimp shells contributes to producing a side dress that will nurture the plants throughout the growing season. Nature's hard work never leaves the garden!

So, the next time you are confounded by the weeds growing in your fields or beds, consider making a fermented plant juice of the plant material and finding out what minerals they contain. You may be surprised to find a mineral complement that is exactly what is needed. ACRES

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Fermented Plant Juice Recipe

- Pick plant material when it is wet with dew; don't wash
- Mix plant material with organic brown sugar, approximately 1:1 by weight
- Fill crock or glass jar with the plant and the sugar; cover top surface of material with sugar
- Weigh contents down and cover with a cloth
- Store out of sunlight at room temp for a week
- Strain out the liquid for use as a foliar or drench, diluted starting at 1:500. Store at room temperature.