Plant Lover's Almanac

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At last. This past weekend winter still embraced and encased us. Now harbingers of spring abound. Winter is technically with us until next week, but the icy ride has finally turned, at least for now. Hard to believe but Lilja Rogers poem has come full circle once more:

First the howling winds awoke us
Then the rains came down to soak us
Now – before the mind can focus –
Crocus.

We continue our Almaniac lessons in tree care today, but first, let us celebrate what Wordsworth wrote in "To My Sister" 217 years ago, but still seemingly fresh, especially gifted to us this week:

It is the first mild day of March: Each minute sweeter than before The redbreast sings from the tall larch That stands beside our door.

There is a blessing in the air, Which seems a sense of joy to yield To the bare trees, and mountains bare, And grass in the green field.

Now for our daily tree care lesson. We spoke before about how soil chemistry matters (soil pH and cation exchange capacity), how soil physics matters (the soil texture triangle of sand, silt, and clay), and why the living soil matters (add organic matter to improve soil structure!). Let us turn now to:

Where Roots Grow Matters. Contrary to popular belief and graphic representations in book after book, root systems are not mirror images of the above-ground parts of the trees we see. The absorbing (water and minerals) roots are shallow and wide. Research shows that for a typical large tree over half of the absorbing roots are within the top foot of soil and over 90% are within the top three feet of soil. As well, the root system does not stop with the "drip-line" of the tree, that imaginary circle where water would drip from the canopy leaves. Left unhindered, the root system would expand outward 2-3 diameters of the drip-line or more.

Of course, as those heroic and indefatigable graduate students who have researched where the wild roots grow will attest, there are variations on this theme. Soil type, tree species, obstructions such as roads and driveways and houses may change the equation of where these roots grow – but again – shallow and wide – is the rule that is only marginally excepted. Why does this matter? It matters because it means that we drastically alter the health of those roots if we change the soil grade over those root systems.

If roots really were a mirror image of the above-ground canopy, then adding soil over the root system would little change the environment of the roots. But with a shallow root system, adding soil on top or planting too deep at

transplanting drastically changes that all-important element for root health – oxygen. Oxygen concentration decreases with soil depth, so the more you bury the roots the more you stress the roots; even a few inches matters. Couple this with not understanding how far roots spread laterally, and there is much mischief to be made during construction projects around the roots of trees. Decline of tree health due to root stress is not typically immediate (trees are big organisms), but a failure to understand where roots is why tree decline in new developments where soil grade changes that were severe during house construction later haunts us years down the road.

And now, let us begin our movement up the plant...

Woodman, Spare That Bark. As we move up from roots to the stem of our learning tree, understanding the vascular (conducting) system of the tree matters. On the outside of that stem is the bark, but just on the inner portion of that bark are rings of plant tissue known as the phloem, inside that is an area of new growth known as the vascular cambium, and inside that rings of xylem. The xylem is made up of plant cells which take up minerals and water from the soil and transport these up the stems to the leaves. The rings of vascular cambium produce xylem cells to the inside, and phloem tissue to the outside. Phloem in turn, is made up of rings of cells that bring plant food, made in the leaves through the wonderful start-of-the-food-chain process of photosynthesis, down to the roots.

This is the only way that the energy source for plant cell metabolism gets to the roots. The life of the tree is thus vitally interconnected. Food, made in the leaves (more on that in an upcoming Almanac), travels through the stem in the phloem to nourish the roots which need this energy source to take up water and minerals needed by the stems and leaves and flowers and fruits. Oh, what wondrous life! But remember: the phloem is just on the inner portion of that bark – damage this with weed whips or lawnmowers and you damage the phloem.

But enough of these lessons. Now that you have finished today's Almanac, get thee to the woods and landscapes. Here is some of the rest of Wordsworth's poem I shared with OSU students after their midterm exam this past week, which fortunately coincided with the opening of their spring break:

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My sister! ('tis a wish of mine) Now that our morning meal is done, Make haste, your morning task resign; Come forth and feel the sun.

Edward will come with you;--and, pray, Put on with speed your woodland dress; And bring no book: for this one day We'll give to idleness.

No joyless forms shall regulate Our living calendar: We from to-day, my Friend, will date The opening of the year.

Love, now a universal birth, From heart to heart is stealing, From earth to man, from man to earth: --It is the hour of feeling. One moment now may give us more Than years of toiling reason: Our minds shall drink at every pore The spirit of the season.