The Garden Plot, October 2009
By Robin Mittenthal, University Apartments Community Gardens Committee

Possible garden tasks for October: Harvest anything that hasn't frozen. Cover salad greens and other desired plants with floating row cover (anchored with rocks or soil) to keep plants growing a little longer. Plant garlic in the last two weeks of the month, along with bulbs of tulips, daffodils, and other spring flowers. Drain water from hoses and store hoses and tools somewhere away from rain and snow (they will last much longer!). See the garden manual and previous Garden Plot columns at http://www.eagleheightsgardens.org/ for advice on these tasks.

News from the Eagle Heights Garden Committee August meeting: Gretel, our registrar, provided an update on our finances. As of now, we have much less money than we did at the same time last year. Unusually high portapotty and plumbing expenses, the purchase of some equipment, and higher-than-budgeted labor expenses burned through much of the extra cash that we had on hand. This is hardly an ideal situation, but it is prompting us to make some good changes in planning and budgeting (more details to be provided later this year). One thing that's clear is that having a registrar and garden worker(s) do their work to the standard we want it done requires paying them for many more hours than we have in the past. Also, while it's clearly a good use of our money to pay the registrar and/or a garden worker to run workdays, it's helpful to have one or more volunteer leaders who can supervise and motivate work crews. Several good ideas were generated for how to get more folks to volunteer. Hopefully these ideas will work for the remaining workdays of the season, which will mostly be devoted to addressing erosion in some of the steepest parts of the gardens.

There was a discussion of a joint Housing Assembly-Gardens Harvest Potluck, to be held in the gardens. This will hopefully happen early next summer. Mary Beth volunteered to coordinate. This meeting was itself a potluck and the food was great. Next month's meeting will also be a potluck, and will be held at 6 pm on Tuesday, Sept. 22, in room 108 of the Community Center. Please come and help run the gardens!

This month's column: Last month, I talked about the mechanisms that plants use to transport mineral nutrients like nitrogen, sulfur, and iron into their roots from the soil that surrounds them. Understanding the workings of the tiny protein "machines" that plants use for this tells you how plants get individual atoms or molecules of nutrients from the soil, but it doesn't explain how plants get *enough* nutrients to grow well.

Why is this an issue? Well, some plants, including most popular vegetables, grow quickly. Others, like trees, grow slowly but get very big. In either case, plants have no choice but to try to get the nutrients they need from the soil they start growing in. If they find themselves in an infertile spot, they can't get up and look for a better one the way you or I would go off to find a neighborhood with more restaurants.

So how do plants find enough nutrients? There are three basic ways. The first of these, which scientists call "root interception," is the closest plants get to finding a new place to grow. If a plant cannot get enough nutrients where it already has roots, but it has enough minerals and energy stored to grow more tissue, it can grow roots either down or out, away from the roots it already has. These new roots can then pick up, or "intercept," nutrients from the "new" soil they've moved into.

I should emphasize that when a root has moved into a new bit of soil, it must still wait for nutrients to come to it from that soil. As I tried to explain last month, plants "drink" their nutrients, taking them in with water, and it's the movement of nutrient-containing water to the surface of the root that ultimately gives the root access to nutrients.

The second mechanism plants rely on get more nutrients is one scientists call "mass flow." Mass flow is closely related to a process called "transpiration," the movement of water into, through, and out of plants (from the Latin *transpirare* meaning "to breathe through"). Transpiration is happening all the time in every living plant as the plant loses water from tiny holes in its leaves. This departing water pulls more water up the stem of the plant, and this in turn pulls water out of the soil and into the roots of the plant. The process then extends one

step further, as water farther away from the plant gets carried toward the plant. This water has nutrients dissolved in it that are then available to the plant.

The final way in which plants get access to nutrients other than those that immediately surround them is called "diffusion." You may remember a diffusion experiment from high school or college in which you put a drop of blue or red food coloring into a large container of clear water. Even if you didn't stir the water at all, the food coloring gradually moved out from the area of high concentration (the original location of the drop) to all of the areas of low concentration, and this continued until the water was uniformly blue or red.

If, in the same experiment, you could somehow take some of the food coloring out of a corner of the container, the rest of the food coloring would "diffuse" through the container, again redistributing itself from areas of high concentration to areas of low concentration until it was (again) uniformly distributed. This is similar to what plants are able to do, removing nutrients from the water immediately next to their roots. This then creates an area of low concentration into which nutrients move from farther away, and that area is then depleted of nutrients, which move in from still farther away, etc., etc.

For some nutrients, a single one of these mechanisms – either interception, mass flow, or diffusion – is sufficient to meet a plant's needs throughout its life. For other nutrients, two or three mechanisms must act together to get enough nutrient to the plant. If a plant is growing particularly fast, even all three mechanisms combined may not be sufficient to provide adequate nutrients unless you place fertilizer close to the roots of the plant. Because all three mechanisms require water, fertilizer alone isn't enough, either – you must provide enough water for the fertilizer to dissolve and move toward the plant.

Next month, I'll talk about what happens to plants when they don't get enough of one or more nutrients to grow well, and I'll discuss how you can in some cases "read" a nutrient-deficient plant to learn what it needs.