Laboratory 10g Asexual Plant Propagation through Runners

Background

Clones may be started from runners. Runners grow as long side branches off a plant, and they produce tiny replicates of the parent plant along the end of the runner. These tiny replicates can be placed in media until they develop roots (see Figure 10.15). The runners can then be cut from the parent plant and are able to live independently (see Figure 10.16). Strawberry plants and spider plants *(Chlorophytum comosum)* are well known for propagation through runners.

Purpose

What is the difference in the rate of plantlet growth when attached or unattached to the parent plant?

Materials

Spider plants *(Chlorophytum comosum),* purchased/grown at least 6 months earlier to allow for spider formation

Cups, Styrofoam™, 6 oz
Permanent lab marker pens
Soil, potting
Lab scoops
Scissors, stainless steel
Beakers, 250 mL

Procedure

Note: Students will start plantlets either attached to or not attached to the parent plant.

1. Find a developing plantlet at the end of a spider plant *(Chlorophytum comosum)* runner.
2. Embed the plantlet in a Styrofoam™ cup pot with three holes punched in the bottom for drainage of prepared potting soil so that the base of the plantlet is covered with moistened potting soil mix.
3. Depending on which trial that you are assigned, either leave the runner attached to the parent plant or cut the runner (near the plantlet) to separate the plantlet from the parent plant.
4. Remove any dead or dying leaves from each plantlet. Count and record the number of leaves on the plantlet (consider this Day 0).
5. Place the plants in a location with indirect light.
6. Check every day to make sure that the medium is damp, but not soaked.

Figure 10.15. When strawberry plants grow, they send out lateral stems (runners) along the soil surface. New stems and leaves grow from the runners into new plants at regular intervals.
© Patrick Johns/Corbis.

Figure 10.16 Young strawberry plants are started by placing the runners barely embedded in soil, letting them root, and cutting them from the parent plant.
Photo by author.r.

7. Look for evidence of new growth. Record changes in the runner plantlets (color, wilting/turgidity, number of leaves, etc) over time in three separate data tables. The title of the data tables should be as follows:

   a. Changes in color in _____plantlets over ___ days
   b. Changes in turgidity in _____plantlets over ___ days
   c. Changes in number of leaves in _____plantlets over ___ days

   Design data tables to record daily observations, even if there are no observations on some days. Make the data as quantitative as possible, attempting to convert qualitative data to numerical data as in a 5 → 0 system. For example, for color, 5 = green and 0 = white. For turgidity, 5 = firm and completely turgid and 0 = limp and not turgid at all.
8. Grow the plant and plantlets until the plantlets have at least two new sets of leaves. Record the number of days until the appearance of the second set of new leaves. Gather data on "the number of days to two leaves" for each plantlet in the class. Put those data on a histogram that shows the frequency of plants growing two leaves by a certain number of days (eg, day 15, day 16, day 17, day 18, etc).
9. When the instructor decides to end the experiment (after "two new set of leaves" data), gently scoop up the plantlet from the medium. Gently dunk the plantlet's rooting area in a beaker of water, and then use a transfer pipet to gently wash the remaining medium from the roots. Be careful not to rinse soil down the sinks! Be careful not to break any roots. Count the number of roots present on the plantlet.
10. Share your data for the number of roots on the plantlet with other groups in the class. Collect enough data to have three samples that were attached to the parent plant and three samples that were not. Create a new data table for these data. Create a bar graph to show the average number of roots on unattached and attached runner plantlets after ___ days.

Conclusion

Discuss any evidence that plantlets attached to parent plants have an advantage over plantlets severed from the parent before rooting. In the discussion, include any explanations for the observed results and any concerns you have about the experimental design.

Thinking Like a Biotechnician

1. What benefits might the runner plantlets gain by remaining attached to the parent plant?
2. What disadvantage might the runner plantlets have by being attached to the parent?
3. Why might the size and/or age of a runner plantlet skew the results of this experiment?