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Soil Health Educational Resources

Abstract

Soil health and cover crops are topics of interest to farmers, gardeners, and students. Three soil health and cover crop demonstrations provide educational resources. Demonstration one outlines two educational cover crop seed displays, including the advantages and disadvantages. Demonstration two shows how to construct and grow a cover crop root and shoot display. Demonstration three offers several soil health websites, bulletins and books, and videos on growing and managing cover crops. These educational resources may be used to educate Extension clientele on soil health concepts.

Keywords: [soil health](#), [soil quality](#), [cover crops](#), [environmental education](#), [demonstrations](#)

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Introduction

Improving soil health has become a way to use nutrients and chemical inputs efficiently. Soil exercises have been used to educate clientele using clay (Kleinschmidt, 2011), soil aggregates (Wortman & Brubaker, 2004), and bricks/sponges (Hoorman, 2014). Three educational exercises are explained,

including 1) cover crop seed displays, 2) a cover crop plant display, and 3) websites, bulletins, and books on soil health.

Exercise #1: Cover Crops Seed Displays

Extension clientele are interested in learning how to plant, drill, or broadcast cover crop seeds. Visual cover crop seed displays enhance education and learning. Free cover crop seed may be obtained from local dealers or at soil health workshops.

Materials Required

Seed Display One

- 64 glass containers (0.5-inch diameter, 2-inch long)
- Metal display case
- 64 cover crop varieties

Labels

Seed Display Two

- 36 pint mason jars
- Cardboard box
- 36 cover crop seed varieties (1 pint)
- Large labels for seeding rates and planting depth

Procedure for Displays

In Seed Display One, cover crop seed varieties are displayed in 64 glass vials measuring 0.5-inch diameter and 2 inches long, with a small label. Advantages include many seeds are displayed, but disadvantages are that little or no educational information on seeding rates or seeding depth can be displayed. A one-page educational front and back information sheet may be used separately with this display. The total estimated cost is \$75 plus seed for the metal case plus 64 vials (Figure 1).

Figure 1.
Small Cover Crop Seed Display



In Seed Display Two, 36 pint jars (2 cups seed) are used to display cover crop seed. The advantages are that drilled and broadcast seeding rates plus seeding depths can be added to each jar on a large label. The disadvantage is that fewer seeds may be displayed. The jars may break when dropped, so transporting glass jars is more hazardous. Mason jars may be purchased and carried in the original cardboard box. The estimated cost is \$60 for three dozen mason jars and labels plus seed cost (Figure 2).

Figure 2.

Large Cover Crop Seed Display



Exercise #2: Cover Crops Root and Shoot Display

With many new cover crop varieties, students (4-H, FFA, college students), gardeners, and farmers are curious about plant growth. Cover crop plant displays can be used to display above ground shoots and below ground roots.

Materials Required

- Blue grow light, potting soil, water bottle, cardboard
- 24 - ¾" plastic tubes, 12 inches long
- Pan for holding excess water at bottom

- 1 – 8' pine board, 4" wide x $\frac{3}{4}$ " thick
- 12 screws, screwdriver, 1" drill bit, drill, saw

Procedure for Displays

A cover crop root and shoot display can be constructed to demonstrate cover crop root growth below ground and shoot growth above ground. Twenty-four different cover crops may be grown indoors to demonstrate cover crop growing characteristic. Plastic tubes $\frac{3}{4}$ " in diameter by 1 foot deep may be filled with potting soil, watered daily (due to small soil volume), and grown with a blue grow light (75 watt) to promote plant growth.

A simple display can be constructed by purchasing one pine board $\frac{3}{4}$ " deep, 8' long, and 4" wide. Cut two boards, 2 foot long and two boards 1 foot long. Drill 24 1" holes in the top boards using the first board as a pattern, slightly hollow out the second 2 foot board (to hold tubes on bottom), and drill $\frac{1}{4}$ " hole through hollowed out area (bottom) to let water drain. Use three screws at top and bottom on two sides to fasten and construct a stand to hold the plastics tubes and growing plants. Add soil, seed, blue grow light (8 hours of daily light), and water daily. Add cardboard to sides so roots grow to outside of tubes, and remove cardboard when displaying plants and roots. The total estimated cost is \$50 for plastic tubes, potting soil, seed, grow light, boards, and screws (Figure 3).

Figure 3.
Cover Crop Plant Root and Shoot Display



Exercise #3: Soil Health and Cover Crop Educational Resources

Student, home gardeners, farmers, and Extension educators seeking information on soil health and how to select, grow, manage, and purchase cover crops should examine the following educational resources.

Materials Required

- Websites
 - Midwest Cover Crops Council: www.mccc.msu.edu
 - <http://www.sare.org/Learning-Center/Topic-Rooms/Cover-Crops/li>
 - NRCS: Unlocking the Secrets of the Soil, <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/>
- Bulletins/Books
 - *Midwest Cover Crop Field Guide*, 2nd Edition, Bulletin ID-433 <https://ag.purdue.edu/agry/dtc/Pages/CCFG.aspx> (\$5.00)
 - *USDA-SARE Book: Managing Cover Crops Profitability, 3rd Edition* <http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition> (\$19.95)
- Videos
 - NRCS: Soil Health Unlocking the Secrets of Soil, <http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/soils/health/?cid=stelpfdb1048858>.

There are a number of educational resources on soil health and cover crops, including websites, publications, and videos. The Midwest Cover Crop Council website includes fact sheets and educational resources from 14 Midwest Universities. The website offers a computerized cover crop selection program to help people select the proper cover crops or cover crop mixture. A 161 page Bulletin ID-433 *Midwest Cover Crop Field Guide, 2nd Edition*, offers information on growing and managing 29 cover crops. The Natural Resource Conservation Service (NRCS) has educational materials on its website called *Unlocking the Secrets of the Soil* and numerous videos (3 – 15 minutes) segments on growing cover crops around the country.

Conclusion

Soil health and cover crops are important topics for Extension clientele to learn how to sustain our soil resources. Cover crop seed displays allow youth, gardeners, and farmers to see the seed and understand how it can be planted in the soil. Cover crop root and shoot displays let the learner see how the plants grow and the characteristics of each unique cover crop species. Educational resources like websites, bulletins, books, and videos help clientele learn how to manage these plants to sustain our soil and the environment.

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