2015 NYS IPM Community Grants Program – Home Composting Results

Type: Implementation

Title: Adding Compost as a Successful Strategy in CCE Master Gardener Volunteer's IPM Toolbox

Project Leader:
CCE Dutchess County - Joyce deVries Tomaselli

Cooperators:
Hudson Valley CCE Educators & Coordinators of Master Gardener Volunteer Programs
CCE Dutchess- Joyce deVries Tomaselli
CCE Orange - Debbie Lester
CCE Putnam - Kate Everitt & Jennifer Stengle
CCE Rockland – Anne Christian-Reuter
CCE Sullivan – Dayna Valenti
CCE Ulster - Dona Crawford
CCE Westchester – Amy Albam
Lori Brewer - Senior Extension Associate, Horticulture, Cornell University

Abstract (no more than 100 words):
Compost encourages healthy and balanced populations of soil organisms that can suppress plant pathogens by parasitizing them, or out competing them for food and water. The composting of garden, landscape and weed residuals also has the potential to destroy many serious plant pathogens and weed seeds. This project developed and piloted a two-day compost training for Hudson Valley CCE educators and Master Gardener Volunteers (MGV) to enhance the understanding and communication of best practices in composting and amending soil with compost to promote plant health and preventative pest management, and maximize their successful adoption in IPM strategies. IPM information such as rodent management and composting invasive species or diseased plants was included.

Background and Justification:
This effort will address Community IPM priorities to develop an IPM educational workshop and educate others about IPM, through outreach and demonstrations. We know that organics, such as food scraps, garden and weed residuals, leaves, grass clippings, and tree trimmings, comprise over 60% of our waste stream. This organic waste can be recycled through composting and create a resulting product which is a impactful resource in a gardener's IPM toolbox. Gardeners have long been using finished compost as an organic soil amendment to enhance soil health. By improving the structure, moisture-holding capacity, and nutrient content of the soil, compost encourages healthy, balanced populations of soil organisms that can suppress plant pathogens by parasitizing them, or out competing them for food and water. The composting of lawn, garden, landscape, and weed residuals also has the potential to result in the destruction of many serious plant pathogens and weed seeds. However, for composting and amending soil with compost to be successful as an IPM strategy, the practice must be done correctly. Hudson Valley CCE educators and Master Gardener Volunteers (MGV) expressed a need for enhanced literacy around composting practices and the use of finished compost as a soil amendment to maximize

success. We propose to develop and pilot a two-day compost training for this audience that will address this need. The training also will enhance the capacity and confidence of educators and volunteers in actively promoting composting along with its resulting product as an effective IPM strategy in the management of home, community and school gardens and/or landscapes. After this initial pilot, the materials and resources will be finalized and broadly shared across our CCE educator and MGV educational network to promote the use of compost as an IPM strategy.

Objectives:

1. Identify the best existing educational materials/displays that enhance literacy around composting practices and use of finished compost as a soil amendment;
2. Develop and pilot a two-day train-the-trainer workshop for Hudson Valley CCE educators and Master Gardener Volunteers (MGV) that will:
    a. Enhance understanding and confidence in best practices in composting and amending soil with compost that promote plant health and preventative pest management;
    b. Reinforce and practice how educators can promote awareness and adoption of compost related IPM principles and strategies in lawns, gardens and landscapes among gardeners;
    c. Lay the groundwork for a plan (logic model) for Hudson Valley county programs to implement at least one community outreach activity in 2015 around compost as an IPM strategy for plant health and preventative pest management. This will include coming up with a simple survey tool to use in outreach efforts across counties.
3. Raise awareness about the availability of educational materials for distribution to their audiences among our CCE networks;
4. Conduct an evaluation to determine how Hudson Valley CCE educators and MGV are incorporating new knowledge and materials in efforts to raise awareness and adoption of compost related IPM strategies in their communities. Gather observations to document changes in knowledge and possibly behaviors of participating gardeners.

Procedures:

1. Identify the best existing educational materials/displays by evaluating current resources. Consult with experts on current recommendations and research-based accuracy of all educational resources;
2. Develop a two-day train-the-trainer workshop to address:
    a. Understanding around specific topics including: How compost works; How to produce quality compost; Different compost systems including pro and cons; Recipes; Why compost; Why add compost to lawns, gardens, and landscapes; Regulation in home and community; Trouble shooting; Facts verse myths/ FAQs; GMO plant material and non-organic concerns in compost;.
    b. Confidence in promoting composting and use of compost in lawns, gardens, landscapes as a plant health and preventative pest management strategies;
    c. Public awareness and adoption of related IPM strategies;
    d. Public education pieces that our CCE programs might use and distribute.
3. Develop a train the trainer toolkit on composting and its use in lawns, gardens, and landscapes to maximize plant health and preventative pest management to use in above workshop;

4. Recruit CCE educator and volunteer teams from each Hudson Valley participating county for two-day workshops to be held at CCE Orange in Middletown October 28th and 29th;
5. Incorporate feedback from the pilot workshop to create a finalized toolkit to distribute among our network of CCE educators and volunteers;
6. A follow-up survey will be sent to counties in late winter 2016 to help determine if and how the county program has incorporated the new educational materials into program plans for the coming growing season. Additional follow up interviews will be conducted with counties during the growing season to obtain feedback on how the education and materials were received by local audiences and obtain anecdotal evidence on success in raising awareness and enhancing adoption of IPM strategies.

Summary of results:

1. A two day training on Home Composting was conducted for Hudson Valley CCE Educators and Master Gardener Volunteers (MGVs) with campus experts and CCE educators, on October 28 & 29 at CCE Orange County to enhance MGV's understanding and communication of best practices in composting and amending soil with compost to promote plant health and preventative pest management and subsequently increase their inclusion in IPM strategies.

2. Eighty attendees from seven counties received education on Cornell's Waste Management Institute (CWMI); how to create quality compost from garden, lawn and kitchen waste; how to address invasive species and manage diseased plants; how compost works in the soil; how to avoid and manage rodents and structural pests; choosing compost systems and understanding their pros and cons for different needs and spaces; compost uses; and troubleshooting.

3. A survey of attendees was conducted before the workshop and repeated afterwards. Respondents showed an increase in knowledge about the topic; added confidence answering questions about it; improved ability to explain how composting and the use of compost support a good IPM strategy; refined understanding of critical success factors for producing quality compost and using it well; and fresh ideas how more compost education could be incorporated into community outreach activities in 2016. Details are provided in Appendix F.

4. Each county participated in the planning, creation, review and delivery of the education and plans to promote composting and the use of compost as a standard component in an IPM strategy.

Additional Discussion:

1. Resources from Cornell CWMI and CCE Tompkins County were reviewed and included in the course material. See Appendix A. Additional resources from the EPA and other Universities were included to reiterate points or address gaps.

2. A two day workshop was developed and delivered. See Appendix B.
   - A PowerPoint presentation on home composting and vermicomposting created by CCE Dutchess (also based on CWMI content) was updated and speaker notes added.
   - Frequently asked Questions were collected cross county. Answers were researched by CCE and CU staff, organized and documented into a new file of FAQs for the workshop,

and distributed. A "Top Ten Things to Know" was created. See Appendix C.
- CU and CCE staff reviewed and vetted the new materials.
- Hands-on exercises were created to reinforce teaching points including beach ball trivia, building a compost pile, and practicing staffing a public event utilizing the display materials created for the workshop.
- Durable educational display boards used in the workshop have been created and shared with all the counties to support their future activities. See Appendix C. Fact sheets and tri-folds are also available. See Appendix D.

A Cornell Dropbox has been set up to contain and share the training materials across the Lower Hudson CCEs.

3. Each of the Lower Hudson counties sponsored up to 10 Master Gardener Volunteers to attend the training, making it clear that the MGVs will be active in tailoring the information to the needs of their county and delivering it proactively throughout the region. See Appendix E.

4. Feedback and updates from the training have been incorporated in the toolkit.

Project Location
The participating Counties were Dutchess, Putnam, Westchester, Rockland, Orange, Ulster and Sullivan.

Appendix A
MG Advanced Training: Resource List

Web Sites

- **Cornell Waste Management Institute**
- **Cornell Composting Fact Sheets**
- **Cornell Composting Science & Engineering**
- **Cornell Composting in Schools**

Fact Sheets

- **Home Composting Brochure**
- **Composting at Home – the Green and Brown Alternative**
- **Basics & Benefits of Composting**
- **Compost Uses**
- **Preparation of Food Scraps for Faster Composting**
- **Welded Wire Cylinder Bin**
- **Lasagna Composting**
- **"Stealth" (Indoor) Composting**
- **Troubleshooting**
- **Leaf Composting**
- **Winter Composting**
- **Vermicomposting**
- **Vermicomposting - Brochure**
- **Sources of Composting Worms**
- **Group Composting**
- **"Is it done yet?"**

Appendix B
MG Advanced Training: Compost Agenda

FIRST DAY – October 28

- **Welcome and Why Compost –** Lori Brewer, CU
    - Including relevance to IPM
- **Cornell CWMI** - Jean Bonhotal, CU
- **How to produce quality plant and food-based compost** – Joyce Tomaselli CCE Dutchess
    - Including considerations for weedy seeds, invasive species, diseased plant material
- **How does compost work in the soil**? – Erik Schellenberg CCE Orange
    - Including interaction with existing soil, benefits for pest management
- **Group Activity**: Beachball Compost Trivia – Kate Everitt CCE Putnam
- **Group Activity: Create good compost** - Joyce Tomaselli CCE Dutchess
    - Bag with potential ingredients to be included or excluded, including volumes/amounts.
- **Group Discussion**: **Evaluate the results of the compos**t "created"
    - Troubleshooting with discussion

SECOND DAY – October 29

- **Group activity** about how participants or others are using compost
- **Different compost systems & Additional considerations** – Joyce Tomaselli CCE Dutchess
    - Including large and small scale, at home and in an apartment, facts verse myths/ FAQs
- **Group activity** – review and discuss displays
    - Vermicomposting
    - Food waste composting
    - Bokashi
    - Hügelkultur
- **What goes on inside the compost pile** – Matt Frye
    - Including the insects and other arthropods (and mammals) that might visit a compost pile as detritivores or predators and possibly cause pest problems
- **Group Activity**: ROLE PLAY staffing a public event

Appendix C
CCE Home Composting: Top Ten Things to Know

1. **Why should we compost?** To reduce needless contributions to the waste stream, which turn into potent greenhouse gasses like methane and carbon dioxide. Instead, create a product which improves soil quality and promotes healthy plants.

2. **Who can compost?** There are approaches and systems available for home owners, apartment dwellers and communities, large, small and in between. Anyone, anywhere can compost.

3. **What can I put in my home compost pile?** Use plant wastes such as leaves, grass clippings and spent plants, non-protein food scraps, as well as paper, cardboard and wood ships. Layer 1 part Greens with 3 parts Browns. No meat, no dairy, no diseased or seedy plant material and be careful with manures.

4. **Will it smell?** Not if you add enough Browns.

5. **Will it attract pest**s? Not unless you add pest-attracting food. Lions and tigers and bears (oh my!) will not eat your compost if done correctly.

6. **Is it expensive and does it take up a lot of room?** No, simple systems can be built inexpensively.

7. **What do I do with the finished product?**. Compost is a valuable soil amendment and may also be used as mulch. Compost contains plant nutrients and improves both soil aeration and water-holding capacity.

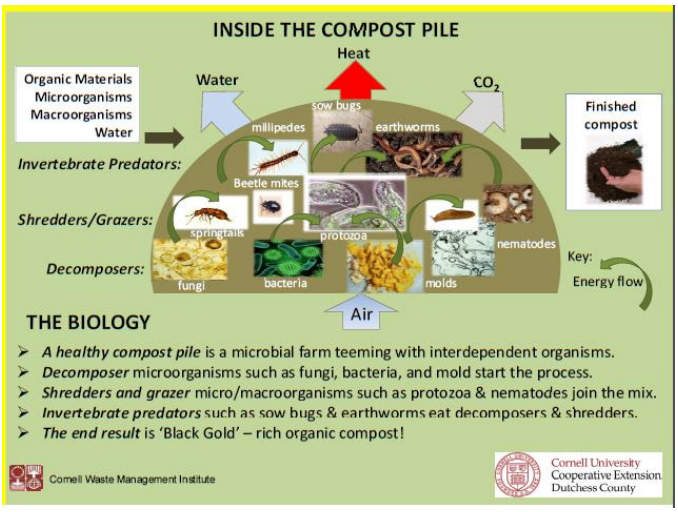
8. **What happens if I don't turn the pile?** Compost happens, but at a slower rate. The more you turn the pile, the quicker you will produce compost.

9. **When is compost finished and ready to be used?** It is dark, crumbly, earthy smelling (not smelling like ammonia or rotten eggs), the original materials are not recognizable, and it will no longer heat up, even after mixing.

10. **If I were to remember just the basics of home composting, what would it be?** That to compost effectively, you need the right combination of materials, space, air and water.

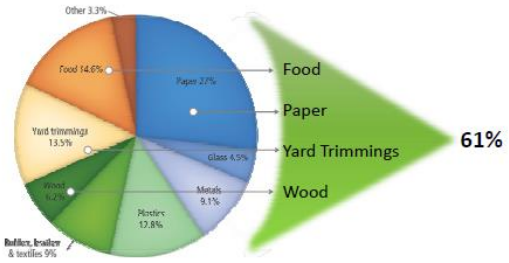
Appendix D
MG Advanced Training: Display Boards

23" by 31" heavy duty display boards, laminated polystyrene for educational use.

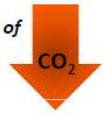


WHY COMPOST? DID YOU KNOW?

Total Municipal Solid Waste Generation (by material), 2013
254 Million Tons (before recycling)



- *61% of our solid waste is organic and can be composted.*
- *2013 recycling and composting prevented 34% of our solid waste from being put into landfills, eliminating 39 million cars' worth of CO_2.*



- *Composting helps create a healthier, more sustainable environment.*

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COMPOST MATERIALS

Home Composting: Combining Browns and Greens

Woodchips (400:1)
Cardboard (350:1)
Sawdust (325:1)
Newspaper (175:1)
Pine needles (80:1)
Straw (75:1)
Corn stalks (75:1)
Leaves (60:1)
Fruit waste (35:1)
Peanut shells (35:1)
Garden trimmings (30:1)
Weeds (30:1)
Hay (25:1)
Vegetable scraps (25:1)
Clover (23:1)
Coffee grounds (20:1)
Food waste (20:1)
Grass clippings (20:1)
Seaweed (19:1)
Manures (15:1)
Alfalfa (12:1)

Browns are high in Carbon

Greens are high in Nitrogen

To achieve the perfect carbon to nitrogen ratio (30:1), mix:

1 part Green + *2-3 parts Brown*

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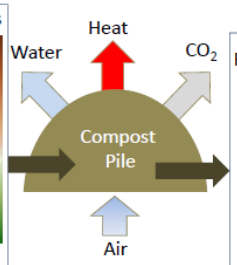
COMPOSTING BASICS

Components | **Process** | **Results**

Organic Materials
- woodchip
- cardboard
- newspaper
- corn stalk
- leaves
- garden trimmings
- vegetable scraps
- coffee grounds
- manures

Microorganisms
Macroorganisms
Water



Finished Compost

- ***Organic Materials:*** *add 1 part Green to 2-3 parts Brown.*
- ***Micro & Macroorganisms:*** *add soil, compost, or starters.*
- ***Water:*** *add as needed to make a handful feel moist.*
- ***Air:*** *add oxygen by turning the pile.*
- ***Shelter:*** *create a mass of at least 3'x3'x3'.*

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GETTING STARTED

- Alternate layers of greens & browns.
- Place kitchen scraps in center of green layer with outer edges being brown.
- Add finished compost or soil to speed decomposition.

Bottom layer: Sticks/stones for air

USING YOUR FINISHED COMPOST

- ***Soil Amendment:*** create healthy soil by incorporating ½ - 1" layer of compost into soil.
- ***Mulch:*** retain moisture & suppress disease by spreading 2-3" of compost without contacting plant stems or trunks.

- ***Potting Mixture:*** improve potting medium by adding up to 50% compost.

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TROUBLESHOOTING

Problem	Issue	Resolution
Damp and/or warm only in middle	Pile could be too small or weather too cold	Pile should be at least 3 cubic feet.
Nothing is happening!	1. Not enough nitrogen, oxygen, &/or water 2. Pieces too large 3. Cold weather 4. Compost is finished	1. Add greens, aerate, and/or add water. 2. Chop/shred compost. 3. Wait until spring. 4. You're done!
Matted leaves/grass clippings are not breaking down	Poor aeration or lack of moisture	Break up/shred materials and turn pile.
Smells like rotten eggs	1. Not enough oxygen 2. Pile is too wet and/or compacted	1. Aerate pile. 2. Add dry materials.
Smells like ammonia	Not enough brown/carbon	Add brown/carbon materials.
Attracts rodents or other animals	1. Inappropriate materials 2. Kitchen scraps too close to surface	1. Bury kitchen scraps near the center. 2. Switch to a rodent-proof closed bin.
Attracts insects	Normal composting	Not a problem
Attracts lots of fire ants	1. Pile too dry and/or not hot enough 2. Kitchen scraps too close to surface	1. Ensure right material mix and moisture. 2. Bury kitchen scraps near center.

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Appendix E
MG Advanced Training Invitation

You're Invited! October 28 & 29
Home Composting Train–the-Trainer for Master Gardener Volunteers

When: Wed. October 28 & Thur. October 29, 10:00am to 4:00pm (come at 9:30 to chat and meet).
You must plan to attend both days.

Location: CCE Orange County, 18 Seward Ave, Middletown, NY 10940

Register: Free to MGVs (A per-county fee will be charged to association) Contact your coordinator to let them know you are interested. Bring a bag lunch.

Home Composting is a topic which is growing in popularity. Some counties and communities have been asking for more information, education, and leadership from Cornell Extension staff and Master Gardeners. This program will give in depth advanced training to a core of MGs which then can be tailored and delivered across our Lower Hudson region. Cornell-based materials will be shared including frequently asked questions and answers. In this two-day collaborative program, we will share classroom presentations, hands-on exercises, learning games, and role-playing.

Appendix F
Summary of Pre and Post Survey

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Home Composting Pre and Post Survey Results

Lower Hudson Valley
CCE Master Gardener Volunteers
Training October, 2015

Joyce Tomaselli
CCEDC

Summary

Online survey. Pre-training: 47 responses. Post-training: 31 responses

Questions 1-3, 5-6 : True/False definitions
- Attendees understood Compost and IPM concepts before the training

Question 4: Rate of confidence
- All responses showed improvement from training
- Greatest increase in confidence:
  - How use of compost impacts pest management strategies
  - Composting and waste stream reduction

Question 7-9 : Fit within IPM strategy; Compost creation; Compost Use
- Concepts were understood, but training improved knowledge

Question 10: How CCE MG programs might incorporate more compost educational programming in community outreach activities
- Amazing responses, pre and post training
- Create compost programming, incorporate into existing education
- Deliver though demo gardens, workshops, speakers bureaus, Farmers' Markets
- Reach out to individuals, garden clubs, schools, communities, municipalities
- Utilize impactful visual materials as well as actual compost systems

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Concept Definition Verification

1. Organic materials are carbon-based compounds, previously derived only from living organisms (now also include lab-synthesized versions).
2. The decomposition of organic material by biological action has been taking place in nature since life first appeared on our planet.
3. When humans attempt to manage the decomposition of organic material to produce a soil amendment we call it "composting" and the final product of composting is called "compost."
5. Integrated pest management (IPM) helps gardeners reduce pests to levels an individual can live with, through methods that keep health and environmental risks as low as possible while balancing economic costs.
6. Integrated pest management (IPM) is integrated because it rarely relies on just one tactic as it brings together a range of biological, organic, cultural, mechanical, and chemical options for management of pests - insects, weeds, fungi, bacteria, viruses, wildlife and more.

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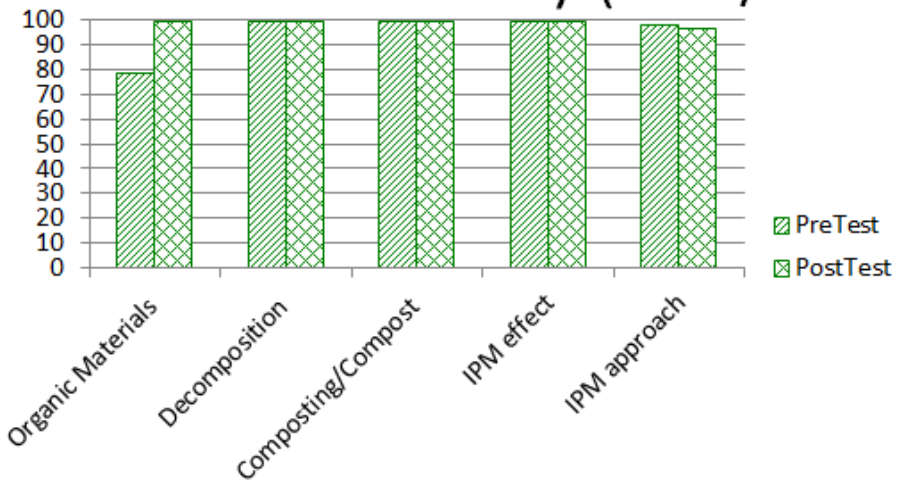
Definitions % Accuracy (True/False)



- Most respondents understood Compost and IPM concepts before the training. All but 1 did after the training.

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4. Confidence Assessment

I Feel: Inexperienced, Adequate, or Confident about:

- What is essential to produce quality plant-based compost
- Different compost systems
- Trouble shooting composting process
- Vermicomposting
- How compost interacts with soil when they are mixed
- How use of compost impacts pest management strategies
- How to use compost in edible landscapes (e.g. vegetable gardens)
- How to use compost in ornamental landscapes
- Water quality concerns associated with the use of compost products with high phosphorus content or with potential for run off
- Composting and waste stream reduction

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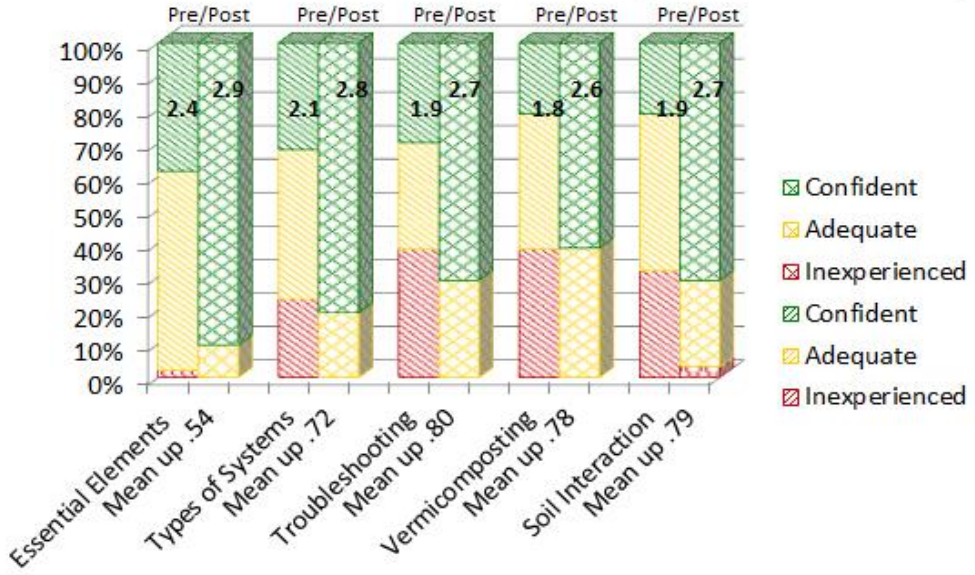
Q4. Confidence level – pre and post workshop



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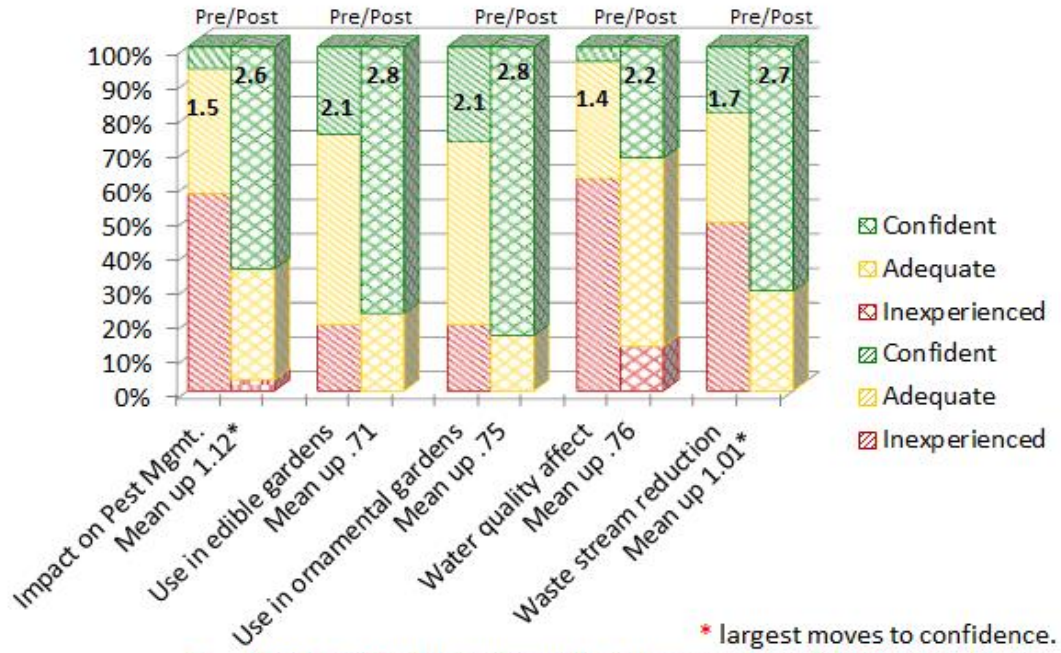
➢ Most respondents showed an increased confidence to address these topics. Mean response rate is indicated in each column.

Q4. Confidence level – pre and post workshop

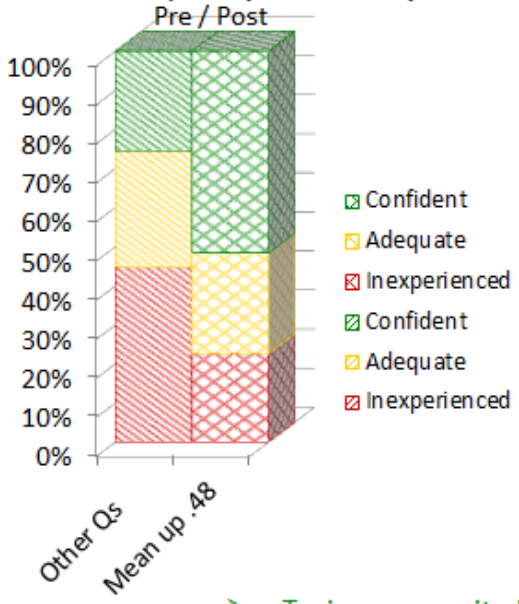


* largest moves to confidence.

➢ Most respondents showed an increased confidence to address these topics . Mean response rate is indicated in each column.

Q4. Confidence Assessment – Other Qs

Are there other composting areas that you hear questions about? Please specify and rate your confidence to answer them.



Summary of write-ins & count	Pre	Post
Materials to include or exclude	8	2
Pests prevention and management	7	3
Temperature and turning (including destroying seeds)	5	3
Systems available, pros and cons (e.g. for apartments)	4	2
Logistics and how to questions (including re. compost tea)	5	1
Troubleshooting (e.g. smell)	1	3
Waste reduction	0	1

➢ Topics were write-ins, while confidence level was overall, so improvement is difficult to assess.

Write-in responses

7. How might composting and the use of compost in yard and garden landscapes fit into a gardener's integrated pest management (IPM) strategy for plant health and preventative pest management?

Summary of write-ins & count	Pre	Post
Promotes plant health thus more resistant to pests and diseases	18	18
Improves water retention and drainage, thus healthier plants	7	2
Improves soil structure, thus healthier plants	6	9
Improves plant health, thus reduces need for chemical fertilizers or pesticides	5	2
Exclusion of seedy or diseased materials avoids spreading problems in soils	1	1
Beneficial microorganisms in compost are transferred to soils	6	5
As a mulch suppresses weeds and splash-up/fungal spread	6	0
Don't know the answer to this question	4	0

- Most respondents understood even prior to the workshop session that promoting soil & plant health is an effective IPM strategy since healthy plants have improved resistance to pests and diseases. Need to ensure clarity that compost (the product) is not a replacement to pesticides or fertilizers; it reduces the need.

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Write-in responses

8. What understanding do you think is most critical to producing quality compost?

Summary of write-ins & count	Pre	Post
Understanding of and proper balance of Green and Brown materials	35	21
Moisture	11	10
Aeration	6	6
Air, Water, Food and Shelter	1	2
Heat to kill seeds and pathogens	5	2
Particle size	1	0
Avoiding meat and dairy and pest attracting materials	1	0
Avoiding diseased or seedy material, seed	3	3
Don't know	1	0

- Consistent understanding shown of the need to balance greens and browns as well as needs for water & oxygen. Many write-ins included multiple topics which are included.

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Write-in responses

9. What understanding do you think is most critical in effectively using compost in gardens and landscapes?

Summary of write-ins & count	Pre	Post
When and how to use it (e.g. soil amendment, addition to potting soil, mulch)	18	13
The effect on soil (e.g. structure)	11	7
Knowing when it is finished and ready to use	6	2
Improved nutrient uptake	3	3
Knowledge that it is not a fertilizer	3	0
Moisture retention and drainage	2	0
How to use it instead of commercial amendments	2	0
It's easy to create and not problematic (e.g. smelly)	1	0
Don't know	1	0

- Write-ins included multiple topics which are included.

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Write-in responses

10. In your opinion, how might your CCE Master Gardener Volunteer program incorporate more compost education into your planned community outreach activities in 2016?

Summary of write-ins & count	Pre	Post
Include signage and examples in demonstration gardens	13	7
Deliver educational programs/workshops to residents	9	13
Deliver educational programs/workshops to schools & communities	12	6
Increase community engagement and initiatives	6	2
Increase awareness at Farmers' Markets	5	4
Collaborate with municipalities	3	3
Incorporate the topic into all MG educational programming	3	3
Utilize impactful visual materials	3	3
Engage corporations and businesses	2	0

- The responses were filled with more great ideas than can be adequately summarized! This represents the bulk of them.

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Favorite Quotes from Write-ins

- Compost in landscaping is like fiber in our diets (the latter can be used for the runs or constipation, and facilitates healthy conditions in the colon) in that compost helps just about every adverse condition one can find in their gardens. Not a cure-all, but essential for promoting health.
- It is most important to look at your compost to understand its condition, look at your soil to understand its conditions and watch what happens when you use compost in your garden and landscape.
- With every gardening program, school or community a short introduction to composting should be added. They come hand in hand with good gardening and health eating practices. (I always stress it is not always what you produce in your compost, but what you do not put in the waste stream). Everyone wins.

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