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Managing the pest and disease risk of compostable wastes

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Short summary: Green waste recycling is a critical ecosystem service that conserves landfill space and soil quality. Regulatory changes for air quality are shifting green waste processing operations from composting, where materials are heated up, to chip and grind operations. During chipping and grinding, materials do not always reach a temperature that is high enough to kill insects, pathogens and weeds and waste piles may be moved within 48 hours, thus they could contribute to the spread of pests and diseases. This project is conducting an economic analysis of the impact of the regulatory policy changes on processing methods. In addition, studies are underway to demonstrate the effects of composting versus chipping and grinding on the survival of a group of select insects, pathogens and weeds. These studies will provide information for policy makers as to the environmental and productivity costs and benefits of chip and grind compared to composting.

Project summary: Approximately 73% of generated municipal waste is organic. The California Integrated Waste Management Act of 1989, AB939, required California counties to divert 50% of their wastes from landfills to beneficial uses by the year 2000. California met this goal, but in February 2012, a new law, AB341, increased the diversion goal to 75% by 2020. If California is to meet this new goal, its organic waste will need to be aggressively recycled in an economically and environmentally sound manner. Sustainable green waste recycling is a critical ecosystem service that conserves landfill space and soil quality. These wastes may be land applied with or without composting, however. Processors that do not compost are referred to as chip and grind (C&G) operations. During composting materials pass through a thermophilic phase that inactivates insects, bacterial, fungal, and protozoan pathogens, as well as most weed species. Conversely, although chipping may inactivate some organisms, others are likely to be spared. Weed seeds, for example, generally survive. Orchards, parks, gardens, farms, commercial landscapes, and roadsides all receive these C&G materials. C&G materials are typically used on the soil surface as mulches so any remaining pests and pathogens could be readily moved by water, wind, or wildlife to susceptible hosts. Moreover, according to Title 14, C&G pile temperatures may not exceed 122°F and piles should be removed within 48 hours. These chipped materials, compared to composted materials, may contribute significantly to the dissemination of residential garden or commercial landscape pests or pathogens – potentially causing great harm. On its web site, Calrecycle points out general concerns about Asian citrus psyllid, European Grapevine Moth, Light Brown Apple Moth, Sudden Oak Death, Lerp Psyllid, and Bark Beetle, but to date there is no integrated understanding of the relative effectiveness of C&G versus composting at constraining invasive pest or pathogen survival in green waste.

The risk chipped materials pose for urban invasive species spread may increase significantly in the near future as a result of newly proposed regulatory requirements designed to protect water and air quality. C&G facilities, which are already more profitable than compost operations, are exempt from

these costly new rules. This will mean that C&G units will be able to charge municipalities lower tipping fees while also charging users less than composters for their processed wastes. In other words, to a currently unknown extent this policy change is likely to further incentivize C&G over compost operations. Thus, understanding how these policy changes will affect the role greenwaste recycling plays in invasive species spread will require an assessment of processor, municipality, and customer preferences.

We propose to address two aspects of this problem. First, we will conduct an economic analysis of the impacts of regulatory policy changes for composting and C&G operations. We will survey processors and their users to predict how statewide production of composted and chipped green waste is likely to shift. Second, we will test via a series of field experiments the relative effectiveness of different processing methods on the survival of a select group of important insect pests, pathogens and weeds. Specifically, we will inoculate or infest municipal green waste with a suite of invasive species then monitor survival as a function of three treatment environments: 1) unprocessed bulk plant material, 2) chipped material, or 3) chipped and composted material. This project builds on previous research by the investigators and will lead to additional research and extension projects in the future. Our principal deliverable will be a white paper and accompanying extension program, derived from the literature and our experiments, designed to inform decision-makers and public stakeholders as to the environmental and productivity costs and benefits of C&G compared to composting.