

December 4, 2014

Ken Decio  
Waste Permitting, Compliance, and Mitigation Division  
California Department of Resources, Recycling, and Recovery  
P. O. Box 4025  
Sacramento, CA 95812-4025

Dear Mr. Decio:

As you know, I have been a professional consultant, advisor, researcher, and advocate in the field of composting for over 25 years. My company, Integrated Waste Management Consulting, LLC has provided consulting services to public and private clients since 1995. Over the years I have worked with many owners and operators of compost facilities in California and beyond. In 1993, I was appointed to the then California Integrated Waste Management Board's Compost Advisory Panel, to help develop the first set of composting regulations and I have attended meetings, participated in stakeholder groups, and submitted detailed comments to every iteration of the "composting regs." since that time.

The following provides my comments on the proposed amendments to California Code of Regulations, Title 14, Division 7, Chapters, 1, 3, 3.1 and 5 and create new Chapter 3.2. Rather than line-by-line edits, I have organized my comments and supporting arguments along a few of the major topic areas. These include the need to better regulate direct land application of uncomposted green material (and an argument for why standards for this practice versus composting need not be identical); the proposed inerts contamination standard for compost; and the definition of food material.

## **I. CALRECYCLE MUST INCREASE REGULATION, OVERSIGHT, AND ENFORCEMENT OF DIRECT LAND APPLICATION OF UNCOMPOSTED GREEN MATERIAL**

1. Direct land application (DLA) of uncomposted green material to agricultural land is all but unregulated in California.
2. Given the closure of the Puente Hills Landfill – prior to November 2013 one of the largest users of green material ADC, and the passage of AB 1594 (Williams) which will phase out diversion credit for the use of green material as ADC, hundreds of thousands of tons of green material is looking for a new home. Unfortunately the "next, cheapest" home for

Ken Decio

California Department of Resources, Recycling, and Recovery

December 4, 2014

Page 2 of 7

uncomposted green material is often direct application to agricultural land. While this practice, properly done, can have agronomic benefits, experience has shown that some may take advantage of weak oversight and weaker enforcement to abuse this potential outlet.

3. Given that the DLA of uncomposted green material can often be conducted across county lines, it is imperative that CalRecycle via the Local Enforcement Agencies enforce this practice at the source, that is, at the processor, not at the field.
4. Given the stated purpose of the proposed regulatory amendments “to protect public health, safety, and the environment” it seems contrary to logic that the practice of DLA of uncomposted green material should be significantly less regulated than the same feedstock sent to a permitted compost facility, or that the operational, reporting, and enforcement standards should be so different. For example, in order for compost to leave a permitted compost facility, it must meet:
  - a. The time and temperature process requirements of the Process to Further Reduce Pathogens (PFRP);
  - b. The lab testing requirements of the PFRP process (both *fecal coliform* and *Salmonella*);
  - c. The heavy metals testing requirements; and
  - d. Potentially, (depending on how these amendments end up), also pass an inerts test.

Current practice and enforcement of DLA of uncomposted green material must meet none of these standards. I am pleased and wholeheartedly support that CalRecycle is proposing to adopt the provisions of proposed 17852(a)(24.5)(A). However, it is unclear from the “Proposed Regulation Text” exactly how and where these standards will be enforced. I would hope and expect that the standards would be similar to, if not greater than, those for a permitted compost facility, that is, all analytical tests are conducted, and results received prior to material leaving the facility, per every 5,000 cubic yards, properly sampled to assure a random and representative sample, and available at all times for LEA inspection.

5. To be clear, I am supportive of the 0.1 percent contamination threshold for inert contaminants in uncomposted green material to be applied directly to agricultural land. As discussed below, I do not agree that the contamination limit for DLA of uncomposted green material be the same for finished compost. The reason for this largely has to do with the difficulty in overseeing the application of uncomposted green material DLA, the potential for abuse, and also the economic reality of DLA. In many cases owners of the agricultural land where uncomposted green material DLA is applied are compensated. This sets up a financial

disincentive for quality control. Conversely, in most cases, finished compost is a desired commodity and most tons are paid for. This is an incredibly important distinction and warrants a different level of regulation.

6. Although it is not perhaps specifically within the mission of CalRecycle to minimize the distribution of potentially harmful plants and insects, evidence is mounting<sup>1</sup> that the spreading of uncomposted green material may be a potential vector for imported pests. California has a significant problem with imported pests. Transport and spreading of green material is already regulated (to some extent) in some counties under quarantine zones. In a few cases composting is recognized as a treatment for material containing the imported pest. CalRecycle should work closely with local agricultural commissioners and the Department of Food and Agriculture (CDFA) to assure that green material diversion practices do not inadvertently spread imported pests to non-affected areas.

## **II. PROPOSED PHYSICAL CONTAMINATION LIMITS FOR COMPOST ARE NOT NEEDED**

1. There has been no compelling evidence (or any evidence) presented to demonstrate the need for an inerts contamination standard in compost from a permitted facility. No demonstrated threat to public health, no demonstrated threat to safety, no demonstrated threat to the environment.
2. The proposed 0.1 percent standard was developed as an extremely low standard for land application to help LEAs make *field* determinations about contaminants in uncomposted green material applied to agricultural land. It is not a practical or useful standard for finished compost.
3. Given the proposed 12-inch limit in DLA (potentially as much as 300 - 400 tons per acre) a very low inerts threshold is appropriate for DLA. Compost is more typically applied at 3 to 5 tons to the acre in agricultural applications. The level of potential harm from this greater level of application (for DLA) warrants greater regulation and controls.
4. Regardless, the quality of a given compost depends on its intended use. Different markets have different quality specifications and requirements. For over 20 years municipally-derived compost has found significant uses and benefits in both agricultural and horticultural markets. CalRecycle has presented no evidence that a physical contamination standard for

---

<sup>1</sup> Correspondence and attachments from Temecula Valley Wine Growers Association to Supervisor Jeff Stone, October 15, 2014.

compost will protect public health, safety, and/or the environment. Over 20 years of experience with finished compost has shown that the market will self-regulate.

5. Experience in Europe<sup>2</sup> has shown that an end product contamination standard will not have the intended result of cleaning up upstream contamination of compost feedstocks. To wit:

*“Quality assurance schemes such as PAS 100 and 110, together with Quality Protocols (QPs), are valuable tools in providing confidence among farmers to use compost and digestate. They are however less useful in driving quality in the feedstock supply chain, an area where more work needs to be undertaken”.*

6. While analytical laboratories may be functionally capable of analyzing contaminants in compost to 0.1 percent. There is currently no “method detection limit” (MDL) for physical contaminants in compost that gives operators, compost buyers, regulators, and/or the labs any confidence in the testing results. According to one lab:

*“Method detection limits (MDLs) are meant to convey some degree of confidence. MDLs are often based on the reproducibility of a test result at a reasonably low concentration. Usually this is done by analyzing replicates of samples with known concentrations of an analyte. To the best of my knowledge, a statistically based MDL has not been established for TMECC 3.05 or 3.08. To do so would require the development of replicate samples which, in this case, would be replicate windrows/piles spiked with known amounts of physical contaminants. Replicate samples can be made and tested in the lab but would only yield a “lab” detection limit representative of just a few gallons, not a method detection limit for samples collected in the field which are meant to be representative of up to 5000 cubic yards. For physical contaminant testing, sampling in the field has to be considered part of the analysis method to produce a meaningful MDL.”*

7. While some observers have advocated for a “phased-in” approach to physical contaminants. I do not believe this is the correct approach. The currently proposed standard (0.1 percent) has no basis in science or practice. To propose a different standard would be to similarly grab a number from thin air. This will not serve the composting industry nor has it been demonstrated to protect public health, safety, or the environment. The growth and expansion of California’s compost industry is an amazing recycling success story. Adding needless testing to an unsupported standard will help grab defeat from the jaws of victory.

---

<sup>2</sup> Circular Organics: Biowaste in a Circular Economy, ESA 2014.

Ken Decio

California Department of Resources, Recycling, and Recovery

December 4, 2014

Page 5 of 7

8. While it is unclear how the 100+ composters might react to the imposition of a 0.1 percent standard, it is possible that many will merely buy smaller screens for their screening equipment. This will have the unintended consequence of creating more unmarketable “overs” from the screening process and create a very fine compost product that may have fewer market outlets. At the end of the day we may have less compost and less markets for it.
9. The Standardized Regulatory Impact Assessment of the proposed contamination standard, while admittedly a compliance document rather than an in depth study of the economics of composting, clearly underestimates the impact that this standard may have on the existing compost infrastructure. And while I appreciate that basing the estimates on the current state of the industry is one place to start, it seems disingenuous at best given that four significant developments in 2014 are likely to significantly expand the size of the compost and/or digestion industry:
  - a) AB 1826 will require significant diversion of commercial food scraps
  - b) AB 1594 will phase out diversion credit for green material used as ADC
  - c) Increased regulation of DLA of green material contained in the proposed regulations; and
  - d) CalRecycle recently funded five out of a possible 44 eligible projects that will either compost or digest organic feedstocks. The response to the recent grant request seems to indicate a healthy and growing diversion industry for these materials.

While the Standardized Regulatory Impact Assessment asserts that the proposed contaminant limit will “reduce litter and minimize the amount of plastic entering surface water and the ocean while creating new jobs and increasing the market value of compost” there is no evidence for these assertions. No documentation of litter or surface water or ocean contamination is presented. The Department of Finance (DOF) finds the assertion that higher costs equals more jobs to be suspect; CalRecycle further asserts (in their response to the DOF comment) that the proposed regulation will...”offer greater certainty for investment”. I have no idea how an extremely low contamination standard, which even the analytical labs may find challenging to support, will lead to greater investor certainty. In fact, I think the opposite may be true. Finally, no data whatsoever is presented to document that creating a contaminant standard will have any impact on the end product cost of compost.

10. Although I have not seen all of the comments to be submitted in this round, it would seem telling that there appears to be little constituency for the proposed contamination standard. I am not aware of any user groups asking for or supporting the 0.1 percent standard. I am not aware of any environmental groups asking for or supporting the 0.1 percent standard. Applying the field standard for uncomposted green material to agricultural land, to compost appears to be supported solely by CalRecycle staff.

### **III DEFINITION OF VEGETATIVE FOOD MATERIAL**

- I. As discussed in my letter of April 30, 2013, the new proposed definition of Vegetative Food Material (17852(a)(20)(A) is so restrictive as to be a prohibition on all but a very small fraction of the universe of food scraps that are now required to be collected under AB 1826 (Chesbro). Since the definition was crafted well before the passage of AB 1826, perhaps now is an excellent time to re-visit this definition and make it far more general, such that one of the many, many notification tier composting facilities might actually be able to help their communities comply with AB 1826. I would suggest removing the new, proposed (20)(A) definition and keeping the current definition of food material. CalRecycle has presented no evidence that allowing food material at a lower tier composting facility increases the risk to the public health, safety, and the environment. There is no scientific basis to suggest that food material cannot be handled, nuisance-free at any scale (The impacts of compost facilities, particularly odor, are subjective and probably have significantly more to do with surrounding land use than feedstocks or scale). CalRecycle has a robust infrastructure for approving and enforcing the existing Title 14 and Title 27 regulations. If we are to meet the goals and intent of AB 1826, as well as the larger 75% recycling goal, jurisdictions must have as many possible avenues for recycling or composting food scraps as possible.

I look forward to discussing my comments with you over the next several months.

Please contact me if I can provide any additional information.

Sincerely,

A handwritten signature in black ink, appearing to read "Matthew Cotton". The signature is fluid and cursive, with the first name "Matthew" written in a larger, more prominent script than the last name "Cotton".

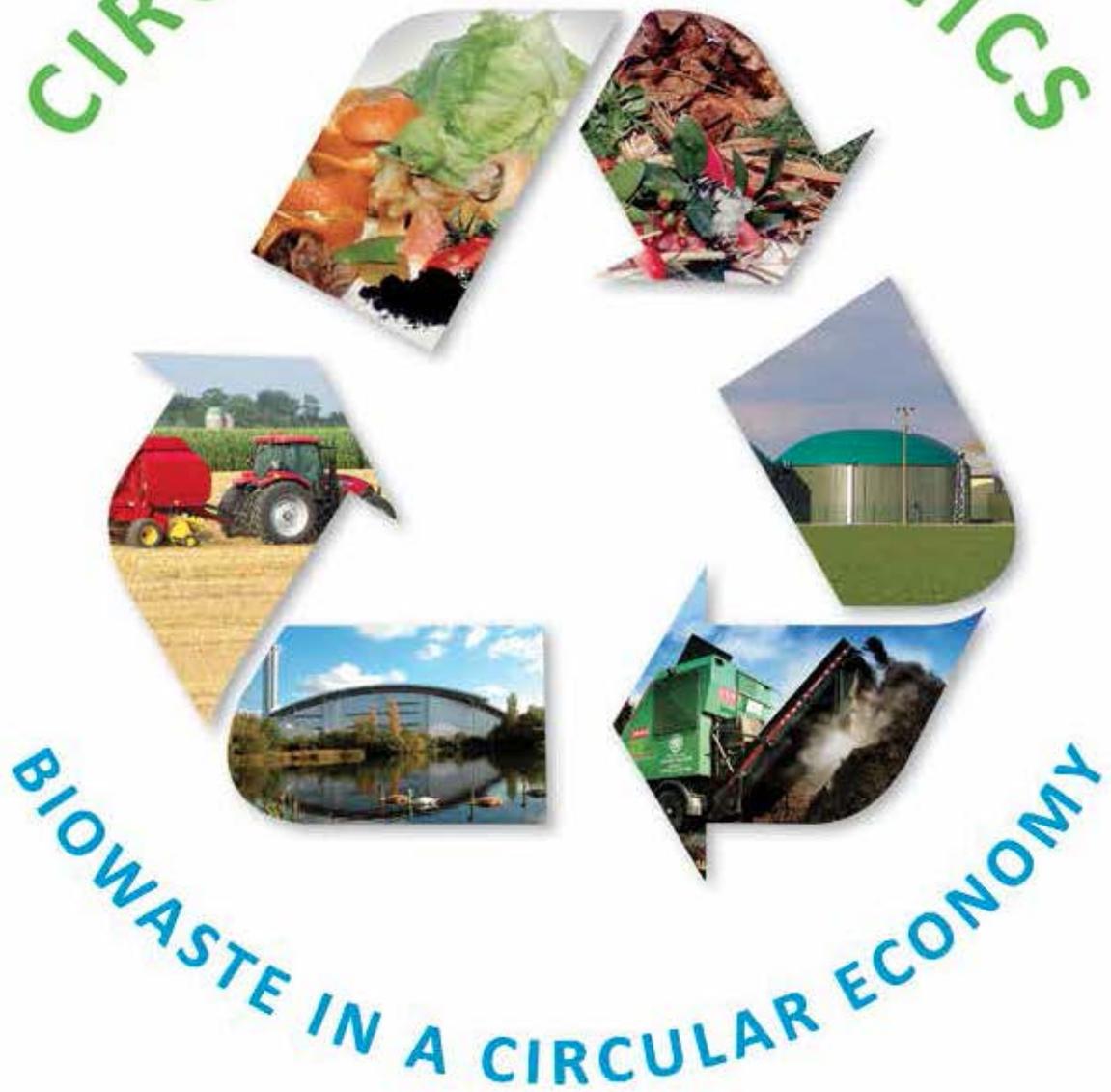
Matthew Cotton, Principal

Attachments

Circular Organics: Biowaste in a Circular Economy, ESA 2014.

Correspondence and attachments from Temecula Valley Wine Growers Association to Supervisor Jeff Stone, October 15, 2014.

# CIRCULAR ORGANICS



## Foreword

Exciting, yet challenging times lie ahead for the biowaste treatment industry. We have recently seen a justified outcry over the scale of food waste generated both in the UK and beyond. This is driving new efforts above all to prevent food waste but also to then maximise the value from that which inevitably remains. New proposals from Brussels are shaking up the regulatory framework and accentuating the debate over what we do with the waste that is collected and diverted from landfills.

At the same time, the industry is faced with a range of sometimes overlapping challenges. These include inconsistent and quickly changing regulations, a lack of suitable feedstock opportunities and a severe squeeze on local authority budgets, all of which make life increasingly difficult for operators. These challenges should not be taken lightly.



**David Palmer-Jones**  
Chairman, ESA

ESA believes that a large part of the solution lies in improved understanding of the value of biowaste-derived outputs. The biowaste sector needs to move beyond landfill diversion that is achieved through blunt regulatory fixes, to a more product driven process that truly values the outputs from biowaste treatments in line with the biowaste hierarchy. Value and quality should be the focus, driving food and green waste out of landfills so it can be used to grow food and plants in our fields and gardens more sustainably, as well as developing new and innovative products that can help boost the so called 'bioeconomy'. This is the vision of ESA's Biotreatment Strategy.

# Organics Recycling in a Circular Economy

## *A Biowaste Strategy from ESA*

### Introduction

How to achieve a more circular economy has received considerable attention in waste and resource management policy debate over the last few years, highlighting especially the benefits and challenges of treating waste as a resource. However, the debate often concerns the technical components of a circular economy such as plastics, metal, and electronic waste among others. At the same time, about 40-50 % of our household bins consist of biowaste<sup>1</sup>, an organic nutrient and potential energy source, which has received less attention until very recently.

Biowaste as a resource has been acknowledged as part of the UK Government's renewable energy policy by providing green energy and using it to mitigate climate change. However, there are also clear benefits from using organic matter and nutrients in supporting ecosystem services and benefiting sustainable farming. In addition, all these policies and feedstock hold, as yet, untapped potential to drive innovation by stimulating emerging sectors within the 'bioeconomy'.

ESA's members are uniquely placed to add value to this debate as they collect, consolidate, treat, and make energy and products from waste, covering a substantial element of the sustainable circle of biowaste.

The purpose of this strategy is to seek to explore and address the main challenges faced by the organics

recycling industry in unlocking the benefits of biowaste and moving towards a more circular economy.

The Strategy identifies 5 key barriers to achieving this:

- 1 Failure to identify the full potential of biowaste;
- 2 Uncertainty over feedstock security;
- 3 Inadequate feedstock quality drivers;
- 4 Unclear waste hierarchy for biowaste;
- 5 Increasingly complex and onerous policies and regulations.

It also presents concrete actions on how these barriers might be tackled, involving stakeholders across the supply chain.

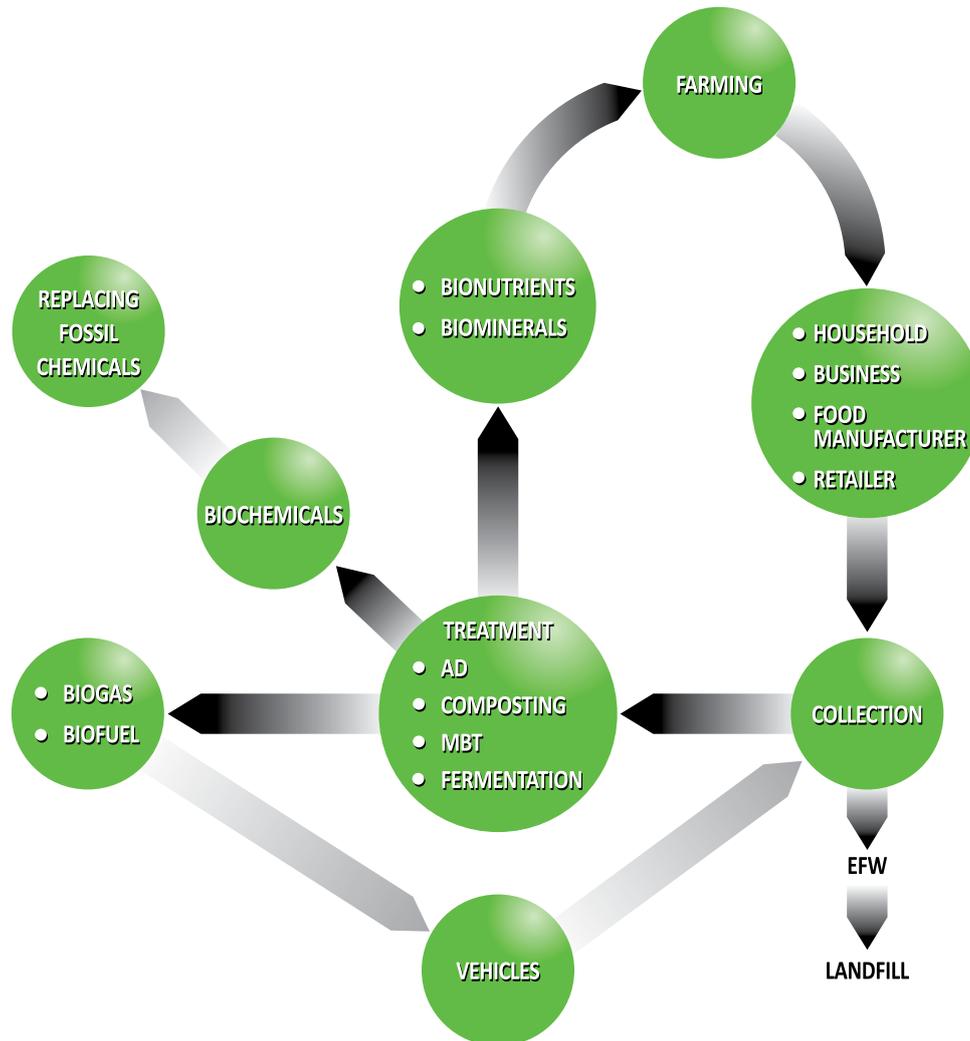
The message from this strategy is clear: in order to move towards a more circular economy for biowaste, we need to take the next step beyond landfill diversion to focus on the full value chain of biowastes and biotreatments.

Quality and confidence are the key words in this new, product-driven phase, one which can only be achieved by all partners in the supply chain working together.



<sup>1</sup> The Waste Framework Directive's definition of biowaste is: "biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants".

Image 1: **Biotreatment Circular Economy Diagram**



Source: **Environmental Services Association (ESA)**

## From Biowaste to Resource

Biodegradable waste arises from agriculture, sewage and waste from households and industry. This report focuses in particular on waste from households and industry, but many of the messages can be applied to both agriculture and sewage.

### Biowaste prevention

According to WRAP, in the three years from 2009 – 2012, 1.1 million tonnes of food waste were prevented (enough to fill Wembley stadium). However, 4.2 million tonnes of food

and drink waste from households in the UK is still considered avoidable (edible, rather than say unavoidable like banana peel)<sup>2</sup>. To address the food waste issue on the European level, the EU has recently introduced a draft legislative package which includes a 30% aspirational food waste reduction target by 2025.

WRAP is doing important work with its “Love Food, Hate Waste” campaign, for example, working with the packaging industry, local authorities and consumers to highlight the benefits of packaging in preserving food.

<sup>2</sup> WRAP (November 2013), *Household Food and Drink Waste in the United Kingdom 2012*, <http://www.wrap.org.uk/sites/files/wrap/hhfdw-2012-main.pdf>, p3

Recent funding cuts have however put pressure on this initiative and similar programmes, which risks limiting their impact and/or their sustained delivery. Diversion of near or on date food to food banks has also been an increasing trend.

The retail industry's 'Courtauld 3 Commitment' included a waste prevention target of 5% by 2015, which is a positive step in the right direction. One example of its delivery is retailers across the sector being advised to use "best before" instead of "use by" dates more widely, and to make sure that food close to its "use by" date that cannot be sold reaches food banks and food charities.

In addition, more can be done earlier in the supply chain at farms and by manufacturers, something which has attracted attention in reports from the House of Lords, the Global Food Security Programme and the Institution of Mechanical Engineers<sup>3</sup> among others.

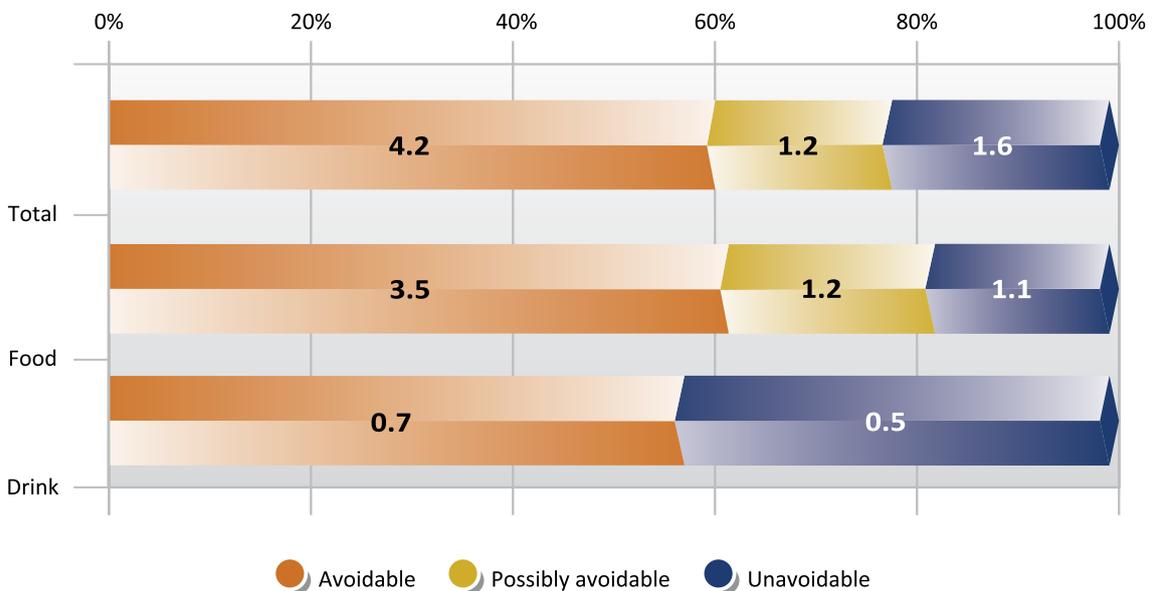
Finally, there are different views on the environmental benefits and burdens of home composting. This can be seen as another form of

waste prevention or local recycling. The question is: which problem are we trying to solve? This deserves further research and analysis.

### Animal Feed

Using food waste, where possible, as animal feed, conforms to a higher element of the waste hierarchy and should be more environmentally friendly than disposal, recovery or recycling. Currently, it is illegal to feed farm animals with catering food waste, but carefully selected foodstuff from bakers, retailers and confectioners can be used. Organisations such as 'The Pig Idea' have recently popularised the suggestion that all source separated food waste should be allowed as pig feed. However, the Environment Agency (EA) and the Animal Health and Veterinary Laboratories Agency (AHVLA), as well as pig industry groups such as BPEX, are worried about the food safety aspects and the potential risks to animals and human health. The important thing is making sure the food is safe and suitable for farm animals, through better segregation at source between animal and plant-derived materials.

**Image 2: Weight of household waste in 2012 by food and drink, split by avoidability (in million tonnes):**



Source: **Household Food and Drink Waste in the United Kingdom 2012**, WRAP, November 2013, page 31

<sup>3</sup> Institution of Mechanical Engineers (January 2013), *Global food, waste not, want not*, Global Food Security (2013), *Food waste within global food systems*, House of Lords, The European Union Committee (April 2014), *Counting the Cost of Food Waste: EU Food Waste, Prevention*.

# Brief overview of the main biotreatments in the UK

For biowaste that cannot be prevented, Composting, Anaerobic digestion (AD) and Mechanical Biological Treatment (MBT) are the three main biotreatment processes currently employed when measured in terms of tonnages treated. Other treatments such as fermentation are emerging as interesting options for the future.

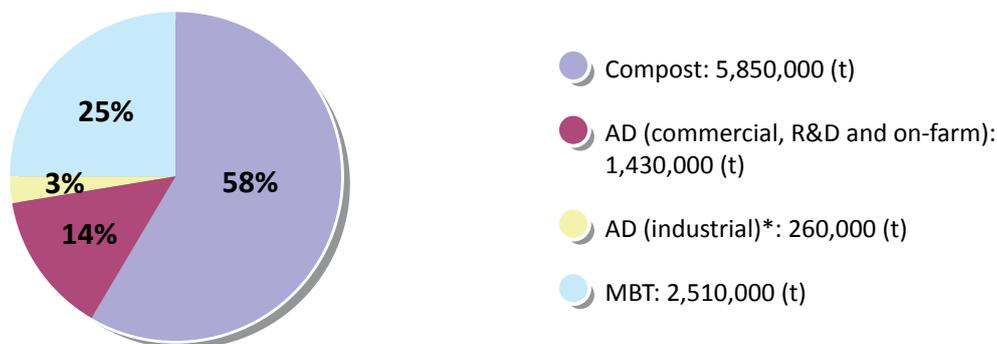
## Composting

*Open Air Windrow (OAW)* is today the biggest biowaste treatment type by tonnage in the UK, taking green waste exclusively. *In-Vessel Composting (IVC)* takes both mixed food and garden waste, and separately collected food waste. The OAW activity generally takes place in an open air facility, while IVC is primarily in an enclosed facility in compliance with Animal By-Products legislation and operating in a more enclosed environment. The former is generally less costly to build and operate but the latter can enable food and green waste to be collected together, allowing in some circumstances a more cost effective system compared to separate food and green waste collections. Neither OAW nor IVC treatment produces usable energy rich biogas, and IVC generally requires more energy to operate than OAW, and can sometimes struggle to effectively treat the waste if food loading in the co-collected material is too great a proportion of the whole. Compost from OAW and IVC is often used in agriculture, horticulture or specialist plant and cropping applications.

## Anaerobic Digestion (AD)

*Anaerobic Digestion (AD)* technology treats the organic waste in an environment where oxygen is substantially absent and in doing so enables the creation of a useful high energy content gas and agriculturally useful digestate. Most household and commercial waste feedstock AD plants operating in the UK today receive separately collected food waste, although some technology types can accommodate a proportion of green waste. Some facilities are linked to MBT plants and treat the generally mechanically separated organic output in an AD plant. The solid/liquid by-product of which can then get sent as compost or compost like output (CLO) to land for land maintenance or restoration after further treatment. AD digestate output can be presented in a whole digestate form or in the form of separated fibre and liquor fractions. Due to the relatively immature market for digestate, WRAP figures show that in 2012 only 24% of whole digestate from commercial AD sites (sites accepting waste for a gate fee) was sold off site as a product whilst 48% was given away free of charge or deployed at a cost to the producer. The remainder was mainly used by the operators themselves in local schemes<sup>4</sup>. The biogas generated by AD plants contains significant proportions of methane, which can be combusted for electricity, injected to the gas grid, used for vehicle fuels or burnt in a boiler, with the energy used as heat. An important benefit of the biogas produced by the AD plant process is the ability to store and transport the fuel prior to use.

Image 3: UK biological treatment sector by input tonnage in 2012:



Source: *A survey of the UK organics recycling industry in 2012*, WRAP, August 2013, page 3

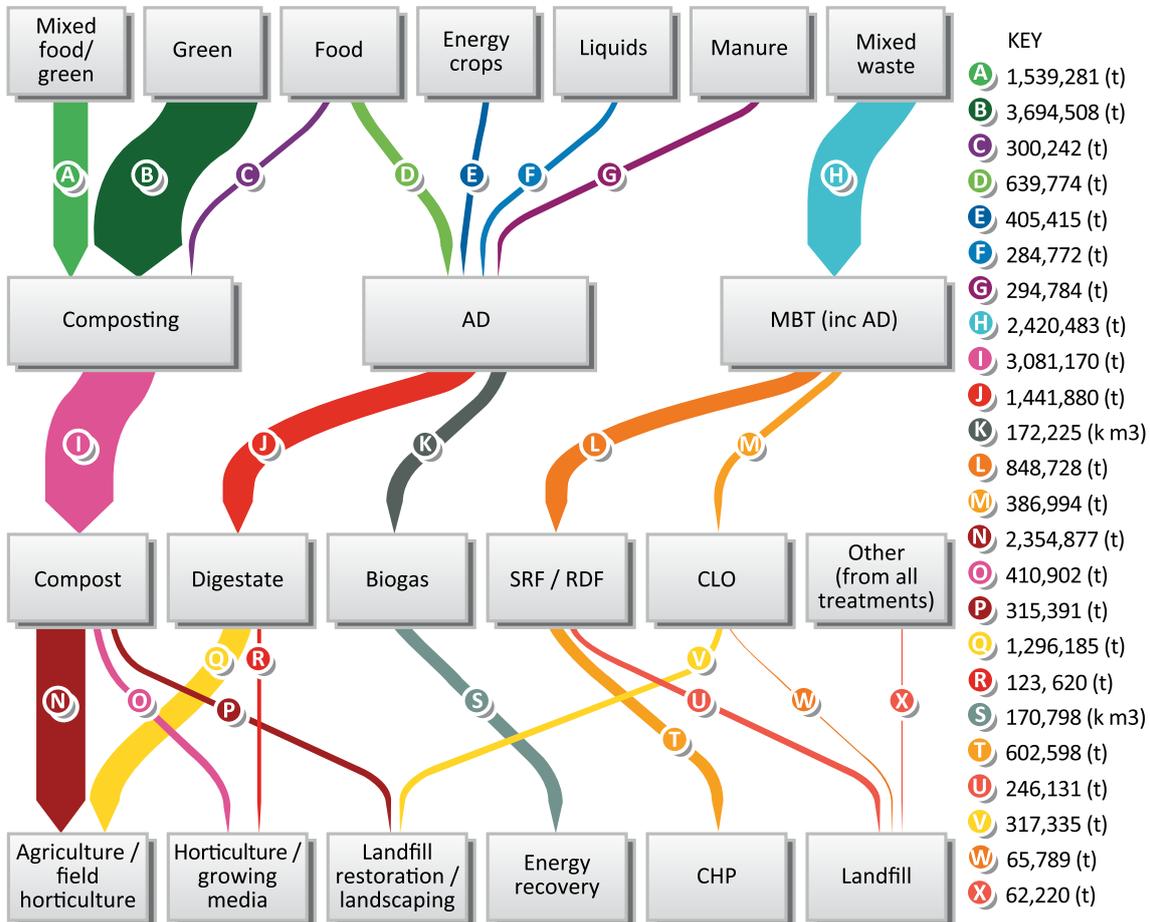
<sup>4</sup> WRAP (August 2013), *A survey of the UK organics recycling industry in 2012*, p60

## Mechanical Biological Treatment (MBT)

Mechanical Biological Treatment (MBT) takes residual waste and, through the application of various mechanical, thermal and biological treatment activities, separates out the dry solids. These solids are often used as Refuse Derived Fuel (RDF) / Solid Recovered Fuel (SRF), (~51% of total in the UK), organic waste (~22%) and recyclates (~11%). The remainder is generally sent to landfill or used as aggregates<sup>5</sup>. As mentioned earlier, the organic waste component is then further treated in either IVC or AD technologies.

Apart from the main treatment methods described above, technology and innovation are playing an increasingly important role in developing new channels for biowaste treatments and products, and they are forming a potentially important part of the future bioeconomy<sup>6</sup>. For example, according to the NNFCC, a UK based consultancy, UK industrial biotechnology sales are projected to grow by 5 to 11 per cent per year, or between £4bn and £12bn in total by 2025<sup>7</sup>. A 2013-2014 House of Lords inquiry into the Bioeconomy heard estimates from the Department of Business, Innovation and Skills (BIS) of £100bn in terms of the total economic opportunity embedded in the bioeconomy in the UK<sup>8</sup>.

Image 4: UK Organics Sector 2012



Source: **A survey of the UK organics recycling industry in 2012**, WRAP, August 2013, page 21, 45 and 66 (the diagram has been simplified to only include the main flows above 50 000 tonnes and doesn't capture for example green waste going to dry AD) - edited by ESA

<sup>5</sup> WRAP (August 2013), A survey of the UK organics recycling industry in 2012, p69

<sup>6</sup> According to the 2012 European Commission Communication *Innovating for Sustainable Growth: A Bioeconomy for Europe* the bioeconomy "encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products<sup>1</sup> and bioenergy. It includes agriculture, forestry,

fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries".

<sup>7</sup> NNFCC (2013), *Newsletter 27 Summer 2013*, p2

<sup>8</sup> House of Lords Science and Technology Select Committee (2014), *Waste or resource? Stimulating a bioeconomy*, 3rd report of session 2013-2014, p24

# The importance of collecting biowaste

Uncollected biowaste can cause nuisance, contamination and can be a source of uncontrolled pathogens and bioaerosols. Once collected, it can be safely managed through landfilling, although that will not enable its full beneficial potential to be utilised. It can also be collected as part of general waste to be used as fuel for Energy from Waste (EfW) plants, utilised in MBT facilities and if collected separately can be used in OAW, IVC and AD plants.

The three key reasons for treating biowaste can be summarised as:

- 1 climate change mitigation
- 2 energy production
- 3 returning organic matter to soil

## Key reasons for treating biowaste

### Climate change mitigation

Mitigating greenhouse gases (GHG) has effectively been the key regulatory driver for recycling organic waste. Diversion of biowaste from landfills is one of the main purposes of the landfill tax, which reached £80 per tonne in April 2014. The EU 2020 EU landfill diversion target is currently 35% of 1995 levels of biodegradable municipal waste<sup>9</sup>. However, the legislative package recently presented by the European Commission proposes phasing out landfilling by 2025 for recyclable waste (including biowaste). Diverting biowaste from landfill avoids methane emissions, which although captured and utilised in energy production, are less efficiently collected than the gas in fully enclosed systems. Utilising biowaste for energy brings benefits in terms of offsetting fossil fuel based energy sources. The biogenic component in residual waste and RDF/SRF also contribute to renewable energy production. According to WRAP's updated research review from 2010 called "Environmental benefits of recycling" AD is seen as the preferred option in terms of GHG mitigation<sup>10</sup>. This has led the Government to support AD as the optimal biotreatment for food waste. However, replenishing carbon stored in soil and diverting peat from becoming a growing media can also have significant GHG mitigation

benefits that are not yet properly recognised. According to the Food and Agriculture Organization of the United Nations (FAO), nearly 90% of the climate change mitigation potential of agriculture globally comes from soil carbon sequestration, including increasing the levels of organic matter in soil<sup>11</sup>. Furthermore, the net environmental benefit of biowaste treatment must reflect the energy consumed in the collection and movement of the waste from production source to treatment location.

The value of using biowaste to displace peat consumption cannot be overstated. According to Defra, UK soils contain around 10 billion tonnes of carbon, half of which is found in our peat habitats. If this were released to the air, it would be equivalent to more than 50 times the UK's current annual GHG emissions<sup>12</sup>. It is vitally important that these peat wetlands are conserved and the compost and digestate outputs from biowaste treatment can play an important role in their reduced consumption. Currently most of the peat consumed in the UK is derived from non-renewable sources imported from Ireland and the Baltic states and is used as compost (growing media). According to the latest Government estimate, the UK compost market is only 58% peat free<sup>13</sup>, despite an earlier target to reach 90% by 2010<sup>14</sup>. The current

<sup>9</sup> Official Journal (1999), *Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste*, p5

<sup>10</sup> WRAP (March 2010), *Environmental benefits of recycling – 2010 update*, p4

<sup>11</sup> FAO (November 2009), *Promoting climate-smart agriculture*, <http://www.fao.org/news/story/en/item/36894/icode/>

<sup>12</sup> Defra (September 2009), *Safeguarding our soils – A Strategy for England*, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69261/pb13297-soil-strategy-090910.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69261/pb13297-soil-strategy-090910.pdf), p2

<sup>13</sup> Defra (June 2011), *Reducing and phasing out the horticultural use of peat in England*, p1

<sup>14</sup> Defra (September 2009), *Safeguarding our Soils A Strategy for England*, p20



ambition, laid out in the Natural Environment White Paper (NEWP), is zero peat use by 2030<sup>15</sup>.

In addition, replacing inorganic, or mineral, fertilisers with compost and digestate based products offer significant potential for climate change mitigation. In agriculture, the majority of GHG emissions do not come from carbon dioxide, but from nitrous oxide and methane, with the former making up the larger part. The main source of this nitrous oxide is inorganic nitrogen fertilisers. According to the Soil Association it takes 7 tonnes of CO<sub>2</sub> equivalent (and 108 tonnes of water) to produce each 1 tonne of inorganic fertilisers<sup>16</sup>.

## Energy production

The Government has made a legally binding commitment to having 15% of the UK's energy demand being met from renewable sources by 2020, compared to about 4% in 2012<sup>17</sup>.

Renewable energy from biowaste has traditionally been produced through landfill gas capture, combustion (either directly or through an MBT plant pre-treatment), and to a greater extent over the last 5 years in AD. According to the Department of Energy & Climate Change (DECC) "Energy trends – June 2014" report, the electricity generation from landfill gas was 5,169

TWh in 2013. For AD the same figure was 707 GWh in 2013<sup>18</sup> with an additional 761 GWh from sewage sludge digestion. The Department for Environment, Food & Rural Affairs (Defra) and DECC estimated in their "Anaerobic Digestion Strategy and Action Plan" in 2011 that electricity generation from AD could grow to 3-5TWh by 2020<sup>19</sup>. The impressive growth in AD from food waste, from 68 plants in September 2011 to 145 in May 2014<sup>20</sup> and with a further 200 new facilities obtaining planning permission<sup>21</sup>, has largely been sparked by a range of Government incentives. These incentives, including the Renewables Obligation (RO); Feed-in Tariffs (FITs) for small scale (under 5 MW) electricity generation; the Renewable Heat Incentive (RHI) tariff scheme (for industry, commercial premises and the public sector) and the relatively new Contract for Difference (CfD) all influence the biotreatment value chain in respect of the type of energy produced. Furthermore, the influence of landfill tax cannot be underestimated in driving active materials away from landfill. However, there are currently no direct incentives that support the nutrients and mineral benefits of biowaste treatment.

Another pertinent route of energy recovery is that of capturing used cooking oils where their reuse as vehicle fuel has become a significant industry. According to a Department for Transport

<sup>15</sup> Defra (February 2014), *Natural Environment White Paper, Implementation update report*, p13

<sup>16</sup> Soil Association (2008), *An inconvenient truth about food – Neither secure nor resilient*, p7-8

<sup>17</sup> DECC (November 2013), *UK Renewable Energy Roadmap, Update 2013*, p4

<sup>18</sup> DECC (June 2014), *Energy Trends*, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/326368/ET\\_June\\_2014.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/326368/ET_June_2014.pdf), p47

<sup>19</sup> Green Investment Bank, 2013, *Anaerobic Digestion Market Report*, p2

<sup>20</sup> ADBA (July 2014), <http://adbiogas.co.uk/wp-content/uploads/2014/06/July-2014-ADBA-AD-market-update.pdf>, p1

<sup>21</sup> Defra (August 2013), *Anaerobic Digestion Strategy and Action Plan Annual Report 2012-13*, p3

(DfT) commissioned report, the UK generates an estimated 250 million litres of used cooking oil per year, of which 61% was turned into biodiesel in 2011-2012<sup>22</sup>. In 2011, this made up 89% of all biodiesel feedstock for transportation<sup>23</sup>.

## Returning organic matter to the soil

While current GHG mitigating policies are critical for landfill diversion and for incentivising the energy component of the AD sector, the interest in the secondary products by farmers or other landowners is not as well known. The relative benefits of those products in producing good crops and improving restored land, when compared to either inorganic or non-waste alternatives, are less well accepted and have no direct incentives.

Environment policy on biodiversity and sustainable farming increasingly highlights the important role of organic matter in providing vital ecosystem services, such as food production, water regulation, erosion control, soil formation and retention and nutrient cycling. This arises from the loss of topsoil which, according to the EA, amounts to 2.2 million tonnes per year<sup>24</sup>. Organic matter is already heavily utilised in farming through its use of self-generated manure. Again, the EA estimates that UK farmers use around 90 million tonnes of manure or slurry, and 1.1 million tonnes of sewage sludge<sup>25</sup> per year. A clear benefit of digestate compared to manure is the former's higher content of readily available nitrogen, which, with good nutrient management by the farmers, can be translated into higher crop available nitrogen (i.e. nitrate taken up by the

crops). Increasing the demand for organic matter from treated waste to complement manure will however require more work on understanding deployment and usage rates, meeting quality expectations and perceptions from end users.

An interesting policy tool to support ecosystem services is the Defra Action Plan on Payments for Ecosystem Services (PES)<sup>26</sup>, which looks at how sustainable management of ecosystem services can be incentivised through direct payments from the beneficiaries of those services (whether public or private). The PES Action Plan for example highlights a peatland carbon code to drive investment in protecting peat.

According to CL:AIRE, a UK not-for-profit organisation, compost and compost like output (CLO) have an important potential role in helping to restore contaminated land by "improving the soil fertility, increasing the water and nutrient holding capacity, stabilising the soil pH, improving soil aeration and enhancing revegetation. In addition to revitalising the soil, they are also believed to immobilise metals thereby breaking contaminant-receptor pathways and reducing the ecotoxicity of the contaminants"<sup>27</sup>.

The Organics Recycling Group (ORG), which is part of the Renewable Energy Association (REA), together with large waste management companies, have developed guidance on quality standards for CLO and separated organic materials (SOM)<sup>28</sup> that are vitally important to long term deployment of these secondary resources.



<sup>22</sup> Ecofys (November 2013), *Trends in the UCO market*, p11

<sup>23</sup> LRS (September 2013), *The market for biodiesel production from used cooking oils and fats, oils and greases in London*, p5

<sup>24</sup> Environment Agency, *Our corporate strategy 2010-2015*, p2

<sup>25</sup> DECC and Defra (2011), *Anaerobic Digestion Strategy and Action Plan*, p12-13

<sup>26</sup> Defra (May 2013), *Developing the potential for Payments for Ecosystem Services: an Action Plan*

<sup>27</sup> CL:AIRE (April 2008), *CL:AIRE sub:im bulletin*, sub 10, p2

<sup>28</sup> Organics Recycling Group (July 2013), *Separated organic materials (SOMs) land restoration end-use standard*, [http://www.organics-recycling.org.uk/uploads/article2633/SOMs%20Land%20Restoration%20End%20Use%20Standard\\_Final.pdf](http://www.organics-recycling.org.uk/uploads/article2633/SOMs%20Land%20Restoration%20End%20Use%20Standard_Final.pdf)

# Barriers to a Circular Economy for Biowaste

Moving towards a circular economy for biowaste holds great potential, but also significant challenges. The main challenges are listed below. Their resolution is crucial to taking the next steps, beyond landfill diversion to producing valuable, green products.

## Failure to identify the full potential of biowaste

Food waste competes with energy crops as feedstock to AD for the production of green energy, and digestate and compost competes with inorganic fertilisers and peat for use on land and in gardens respectively. As long as the true cost and benefits of making choices between these types of material is not understood and are not supported by well informed policies, the UK will fail to unlock the full potential in biowaste.

More concretely, the main issues are:

- 1 Current incentives for biowaste treatment mainly focus on the production of renewable energy. At the same time, there are no significant incentives or commercial recognition for high quality resource compost and digestate, for example in terms of nutrient and mineral content. This favours AD when compared to IVC or OAW, but also fails to recognise the benefits of the products from all the treatment technologies.
- 2 The benefits of returning nutrients and organic matter to soil have not been properly recognised by Defra, as part of their support for ecosystem services, such as the Payment for Ecosystem Services. The UK therefore risks underestimating the true value of compost and digestate in terms of nutrient cycling, avoiding soil erosion and water retention (a pertinent issue after the floods of 2013/14).
- 3 The use of peat based compost (growing media) is a major source of greenhouse gases. Its use is also unnecessary in many cases, given the availability of biowaste derived compost, which can replace most of the peat. The fact that the price of using compost with peat does not always reflect the full costs to the environment, together

with an often poor understanding among compost users of the alternatives, such as peat free compost, impairs its wider acceptance and use.

- 4 A key cost consideration for the landspreading of all biowaste products is the transportation burden from treatment plant to the end user. Clever location and deployment of these resources can ensure optimum distances for transport and avoid the risks of impairing the economic benefits through poor location and expensive deployment. The use and value of biowaste products therefore depends to a large degree on the proximity to, and demand from, end users.

## Lack of feedstock security

Investment in biotreatment infrastructure is secured by the availability of suitable feedstock, i.e. food waste, garden waste etc. In recent years a large number of AD plants have been built or have received planning permission, increasing the actual and potential treatment capacity. At the same time WRAP and commercial organisations have employed significant resources in minimising waste at source, and the adoption of new 'food only' municipal and commercial source separated food collections has only achieved limited growth in feedstock availability. Simultaneously, increasing numbers of local authorities have adopted an additional charging mechanism for green waste collections, leading in the majority of cases to less green waste being collected.

This disparity, with new infrastructure coming on quicker than collected volumes, is leading to local feedstock shortages. If this continues and minimisation campaigns and actions gain traction, there is a high risk that treatment over capacity will result. It should also be noted that given the cost of transporting compost and digestate, there can still be treatment under capacity at a regional level<sup>29</sup>, whilst having over capacity at a local level. We believe that there are three main factors that need to be considered:

<sup>29</sup> Eunomia (July 2011), *Anaerobic Digestion Market Outlook*, p12-14

**1 Increasing participation in food waste collections:** According to WRAP about 55% of local authorities and 44% of UK households participate in food waste collections (of which 50% is collected together with green waste). Given the age of the housing stock in the UK and therefore their design constraints for waste management, separate food waste collections can be particularly challenging, especially for flats and other high density living accommodation. A study by WRAP in 2011, of 13 local authorities in England and Wales estimated that the average participation rate for separate food collections for flats was around 30%, with an average yield of 0.63 kg per household<sup>30</sup> a week compared to about 5 kg generated<sup>31</sup>. This raises questions not only about how to encourage a greater availability of food collections but also how to increase the participation rate, not least in urban areas. Consideration should be given to the structural housing limitations of existing buildings and identifying opportunities that could be obtained through waste collection infrastructure in refurbishments and new builds.

**2 Data from C&I sources:** It is uncommon in the commercial and industrial (C&I) sector for weight and composition data to be collected. The collection of this data, and its consolidation and analysis, is essential to understanding waste mix and generation per industrial sector. Although more data

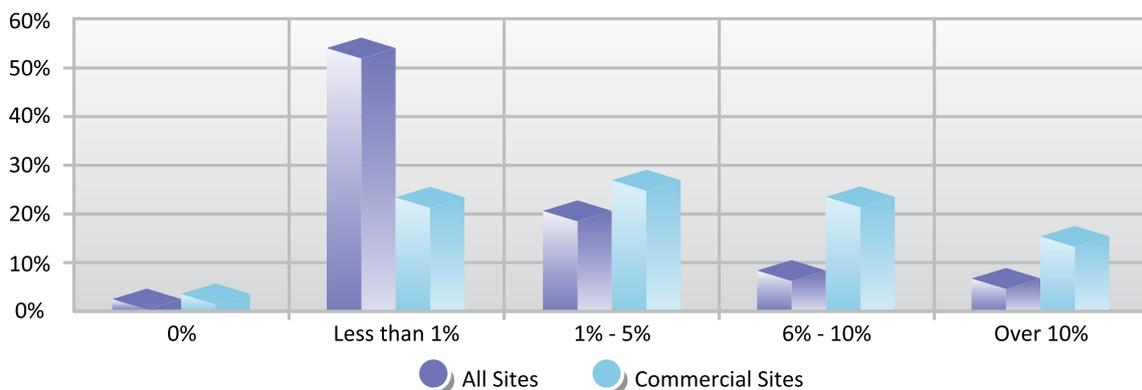
is becoming available, it is currently not sufficiently widely available and complete to allow the modelling and analysis that is more common in municipal waste. Without good data it is difficult to identify factors such as the success of minimisation campaigns. More work is needed to assess the quantity and quality of feedstock and how that relates to current and planned capacity.

**3 Classifying AD:** Finally, there is uncertainty over what is required for Anaerobic Digestion to be considered recycling instead of recovery, prompting some local authorities to send their biowaste to composting facilities, with reference to the waste hierarchy. At the same time, Defra is openly supporting AD as the environmentally best option for food waste<sup>32</sup>. Using digestate from AD for agricultural purposes has proven environmental benefits that need to be taken into account as a valuable contribution to land bank maintenance and biowaste recycling.

### Inadequate feedstock quality drivers

Quality assurance schemes such as PAS 100 and 110, together with Quality Protocols (QPs), are valuable tools in providing confidence among farmers to use compost and digestate. They are however less useful in driving quality in the feedstock supply chain, an area where more work needs to be undertaken.

**Image 5: Typical levels of rejects, all AD site classifications and commercial sites, UK 2012 (as % responses in ASORI 2012)**



Source: **Household Food and Drink Waste in the United Kingdom 2012**, WRAP, November 2013, page 57

<sup>30</sup> WRAP, <http://www.WRAP.org.uk/content/recycling-collections-flats-food-waste-collections>

<sup>31</sup> WRAP (November 2013), *Household Food and Drink Waste in the United Kingdom 2012*, <http://www.wrap.org.uk/sites/files/wrap/hhfdw-2012-main.pdf>, p4

<sup>32</sup> Defra (June 2011), *Guidance on applying the Waste Hierarchy*, p5 [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69403/pb13530-waste-hierarchy-guidance.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf)

Targeting contamination at the point of generation of the biowaste far earlier in the supply chain, with monitoring requirements, better feedback to Councils and commercial producers, is essential to drive down contamination levels. The current system of reporting recycling levels based on the collections rather than the output masks input quality issues and fails to drive continual improvement. The challenge of reaching out to residents and companies about contamination could be addressed by focusing on the avoidable and non-food related contamination, such as plastic bags, rather than the embedded contamination such as food wrapping.

The success of the PAS 100 / 110 and the QPs relies on the assumption that the cost of meeting the requirements is compensated for by the price of the end product. PAS 100 / 110 and the QPs are aimed at limiting emissions while meeting market demands on the quality of the end product, which raises the question of how these market demands are best understood and whether all benefits listed earlier are reflected in the price. According to ADBA, nutrients in digestate could be worth over £200 million to UK farming<sup>33</sup>.

Increased demand for PAS from consumer-facing organisations such as the Soil Association, local authorities and retailers (who themselves send food waste to AD) could also help to drive demand.

### **Unclear waste hierarchy for biowaste use**

The finite amount of biodegradable feedstock means it is crucial that the output is used in the best way possible. In order to ensure that high quality biowaste outputs are favoured and used appropriately, ESA calls for a clear waste hierarchy for biowaste (See *Image 6*). This will naturally vary depending on season and weather, but the default should be clear to help guide both policy makers and the market.

### **Increasingly complex and onerous policies and regulations**

Regulations play a crucial role in ensuring that biowaste treatment facilities and their operations and outputs, are managed, designed and operated in a manner appropriate for people, animals, and the environment. However, increasingly prescriptive requirements by the EA and AHVLA to regulate a growing, and increasingly diverse, sector bring more complication and costs, which given recent cuts to the regulators are a growing burden on operators. It is therefore more important than ever that regulations and guidance take a coordinated, complementary, risk and site specific based approach, with good dialogue between regulators and operators. Unfortunately, unless carefully managed and appropriately resourced this can make consistency between operations more difficult and puts more pressure on the regulators' staff. Furthermore, it adds challenges to avoid conflicting rules regulating emissions, handling of animal by-products, planning and best available technologies (BATs). In addition, the lack of clarity in terms of frequency and process for reviewing standards and regulations creates uncertainty for investors.

ESA would like to see a number of points considered:

- 1 More consistency between how different materials are regulated (i.e. clear, understandable criteria to be assessed against)
- 2 More joined up thinking between different regulators (EA, SEPA, NRW, NIEA and the AHVLA)
- 3 Better enforced regulations

<sup>33</sup> ADBA (2014), <http://adbiogas.co.uk/about-ad/how-ad-benefits-everyone/>



Image 6: **Biowaste Use Hierarchy**



Source: **Environmental Services Association (ESA)**

## ESA's position on...

- **Food waste prevention targets**

The Circular Economy package published by the European Commission in July 2014 put forward an aspirational food waste reduction target of 30% by 2025 compared to a 2017 baseline. ESA strongly supports the waste hierarchy, and efforts to reduce waste are rightly at the top. However, the details and practicalities of a food waste prevention target are important to consider, for example how to accurately measure the baseline and how to measure success. Using 2017 as a baseline year also risks penalising those member states that have already made progress on food waste prevention.

- **Mandatory biowaste collections**

The Commission's Circular Economy package would require Member States to ensure separate collection of all biowaste by 2025. ESA strongly supports separate food waste collections, but we do not favour making these collections mandatory everywhere. Extending the requirement to all biowaste rather than just food waste would also raise a number of practical questions. ESA believes that there is "no one size fits all" collection system which is best in all circumstances. The design of waste collection schemes is complex and depends on factors such as the demographics, geography, housing stock and proximity to treatment facilities of a given local area. We believe that local authorities working with industry under a clear biowaste hierarchy understanding are best placed to decide what type of biowaste collection service is most suitable for them to achieve an optimum recycling rate of quality material within their budget. Reducing contamination in digestate should help drive separate food waste collections more widely by strengthening the value of the digestate and therefore the economic case for such collections.

- **Landfill bans on biodegradable waste**

The Circular Economy proposals from the European Commission proposed that biodegradable waste should not be landfilled by 2025. ESA strongly supports and encourages further landfill diversion, but we believe that an outright ban would raise some important practical issues; would be difficult to enforce and could promote solutions adverse to the biowaste hierarchy. Instead, if the policy and commercial drivers are correctly established, biowaste will be recovered because it is correctly valued and its benefits are maximised.

We believe that the measures outlined in this strategy, together with the landfill tax and waste targets, are better and less costly ways of increasing recycling of organics in the supply chain. Coordinated 'push and pull' policies will ultimately achieve better feedstock security and long term viable solutions for the industry.



# An Agenda for Action

## 1 Unlocking the full benefits of biowaste

- **Adopt a biowaste hierarchy**

ESA is committed to adopting a biowaste hierarchy such as presented earlier in this document. ESA calls on Defra, the EA and other stakeholders to work with ESA and other industry members to support the development and adoption of a hierarchy in order to make sure that high quality output is used for high quality applications and the true value of the materials and their outputs are clearly understood and appreciated.

- **Better coordination between policy areas**

There are currently a number of initiatives looking at how to foster thriving ecosystem services. However, these initiatives lack a clear link to the organics recycling sector, which if made would allow a better assessment of how compost and digestate can play a bigger role. We therefore call on Defra to invite the waste and resource management industry to participate in activities on ecosystem services, such as the Ecosystem Knowledge Network and the Growing Media Panel.

- **Implement a peat levy**

As spelled out earlier in this document, a peat levy to divert peat and other fossil based additives from compost would have a significant impact on reducing GHG emissions by reducing peat use. Using peat for compost, when waste derived compost is sufficient, makes little sense, not least with a growing and more quality focused organics sector. Our 'Beyond Landfill' report references RSPB research which suggests that a 4p per litre levy on retail bags of peat-based growing medium would raise £88 million in public revenues. However, a higher levy is likely to be needed to allow the investment in the work necessary to promote and establish the true value of biowaste and its products in the wider environment and market place.

- **Set up a commonly adopted life cycle assessment (LCA) tool**

Since the Waste and Resources Assessment Tool for the Environment (WRATE) software is no longer promoted by the EA, there is a lack of an up-to-date, common and relevant LCA tool. ESA call on Defra and the EA to either develop a new tool, or update WRATE on AD and other treatment methods, as well as taking into account the benefits of product use and fossil source materials offsetting, and the carbon sequestration from applying compost and digestate to land. This would help continually inform an established biowaste hierarchy, and assist local authorities and industry in making better informed decisions on waste management services. ESA and its members are willing to assist in this work.

- **Encourage local authorities to procure waste derived products**

Today, there is a lack of joined up thinking within local authorities between waste management and procurement departments. Local authorities could act as a significant end user of biowaste derived compost and digestate in gardens and parks, driving up the demand for such products. ESA calls on local authorities to consider a more circular procurement approach to reduce costs and impact on the environment and better establish end use markets.



## 2 Improving feedstock security

- **Estimate the success of waste prevention**

ESA calls on the Governments, WRAP and Zero Waste Scotland to estimate, as accurately as possible, the expected tonnages saved through waste prevention and minimisation. This will then help guide further investment in new infrastructure according to needs. Overestimating waste prevention will risk holding back investment, while underestimating it is likely to create over capacity.

- **Develop a Code of Practice for monitoring contamination**

Input quality is crucial in order to drive biowaste up the waste hierarchy. We therefore encourage Defra, WRAP, the EA and other key stakeholders, to work with ESA to develop a fit for purpose voluntary Code of Practice (CoP) for monitoring contamination in biowaste. The CoP would report on input volume, reject volume and the volume of the product, as well as including best practice on quality management. Such an initiative would improve visibility of quality across the industry, give transparent information on contamination to local authorities and industry, and increase confidence in the end product. The CoP could be made mandatory once lessons have been learned, in a similar way to the MRF code of practice. Prior to the CoP, more work needs to be done on estimating the amount of contamination in biowaste.

- **Clarify the classification of AD**

AD is classified as recovery, not recycling, in Defra's Waste Hierarchy Guidance. Given that AD is seen by Defra as the best use for food waste, from an environmental point of view, it would be unfortunate if local authorities did not consider AD on the basis of the waste hierarchy. We therefore urge Defra to clarify via the LGA, NAWDO, LARAC and ADEPT, under which circumstances AD can, and should, be classified as recycling, and correctly establish this treatment type within the biowaste hierarchy.

- **Learn from Scotland and Wales**

ESA calls on Defra to produce a 'lessons learned' report by the end of 2016 from initiatives in Scotland and Wales, including the mandatory food waste collections for businesses generating more than 50kg/week, and the target in Wales to reduce food waste by 1.5% per year. This will further inform the policy context and decision making process.



# Guidelines

# Regulations

### 3 Making regulation smarter

- **Create a cross sector working group**

The increasing complexity and diversity of the organics recycling industry requires a coherent regulatory approach. ESA therefore call on Defra and the EA to relaunch the Biowaste Regulatory Forum in a new format. In this new format it must have a stronger, results-based focus, and a clear mandate to ensure a practicable approach to existing regulations and guidance from the EA, the AHVLA and DCLG. A similar group was formed on regulatory issues with landfill gas, which worked well.

- **Update best practice on odour management**

One task for the cross sector working group mentioned above would be to help the REA update “An Industry guide for the prevention

and control of odours at biowaste processing facilities”, which was developed by the Composting Association in 2007. ESA will also work closely with the EA, and other trade associations within the same group, to ensure that the Best Available Technology for the biotreatment sector, as part of the Waste treatment BREF revision, properly addresses public concerns with odours.

- **Promote the EA/ESA Waste Placement Scheme at biotreatment facilities**

ESA currently helps place a number of EA officers, put forward by the EA, at waste treatment sites to improve officers’ technical and practical understanding of these facilities. ESA is committed to making more biotreatment facilities available for such placements for the EA and other regulators. ESA will encourage the EA to make use of these facilities.

## Appendix 1 - Glossary

**AD**

Anaerobic digestion

**ADBA**

Anaerobic Digestion and Biogas Association

**ADEPT**

The Association of Directors of Environment, Economy, Planning & Transport

**AHVLA**

Animal Health and Veterinary Laboratories Agency

**BAT**

Best Available Technology

**Biowaste**

Biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants

**BIS**

Department for Business, Innovation & Skills

**CLO**

Compost like output

**CfD**

Contract for Difference

**Contaminated Land: Applications in Real Environments (CL:AIRE)**

Independent not-for-profit organisation

**C&I**

Commercial and industrial

**DECC**

Department of Energy and Climate Change

**Defra**

Department for Environment, Food and Rural Affairs

**DfT**

Department for Transport

**EA**

Environment Agency

**EfW**

Energy from Waste

**FAO**

Food and Agriculture Organization of the United Nations

**FiTs**

Feed-in Tariffs

**GHG**

Greenhouse gases

**IVC**

In-Vessel Composting

**LARAC**

Local Authority Recycling Advisory Committee

**LCA**

Life cycle assessment

**LGA**

Local Government Association

**MBT**

Mechanical biological treatment

**NAWDO**

National Association of Waste Disposal Officers

**NEWP**

Natural Environment White Paper

**NIEA**

Northern Ireland Environment Agency

**NNFCC**

National Non-Food Crop Centre (The Bioeconomy Consultants) at the University of York

**OAW**

Open Air Windrow

**ORG**

The Organics Recycling Group

**Organic waste**

Waste of animal or plant origin which, for recovery purposes, can be decomposed by micro-organisms, other larger soil-borne organisms or enzymes

**PAS**

Publicly Available Specification by the British Standards Institution (BSI)

**PES**

Payments for Ecosystem Services

**QP**

Quality Protocol

**RDF**

Refuse Derived Fuel

**REA**

Renewable Energy Association

**RHI**

Renewable Heat Incentive

**RO**

Renewables Obligation

**rWFD**

Waste Framework Directive

**SEPA**

Scottish Environment Protection Agency

**SOM**

Separated organic materials

**SRF**

Solid Recovered Fuel

**WRAP**

Waste & Resources Action Programme

**WRATE**

Waste and Resources Assessment Tool for the Environment



For more information about this report, please contact:

Jakob Rindegren, Recycling Policy Adviser ([j-rindegren@esauk.org](mailto:j-rindegren@esauk.org))

Toni Waters, Communications Officer ([t-waters@esauk.org](mailto:t-waters@esauk.org))

**Environmental Services Association**

154 Buckingham Palace Road, London SW1W 9TR

Telephone: 0207 824 8882

Web: [www.esauk.org](http://www.esauk.org)

Twitter: ESA: [@ESA\\_tweets](https://twitter.com/ESA_tweets) / SESA: [@SESA\\_tweets](https://twitter.com/SESA_tweets) / WESA: [@WESA\\_tweets](https://twitter.com/WESA_tweets)

This report has kindly been supported by the  
Recycling Registration Service

Printed on 100% recycled paper

*September 2014*

# TEMECULA VALLEY

WINEGROWERS

October 15, 2014

Mr. Jeff Stone  
Riverside County Third District Supervisor  
37600 Sky Canyon Drive, #505  
Murrieta, CA 92563

15  
OCT 20 2014  
M. Stone  
From: [unclear]

RE: Un-composted Green waste

Dear Supervisor Stone:

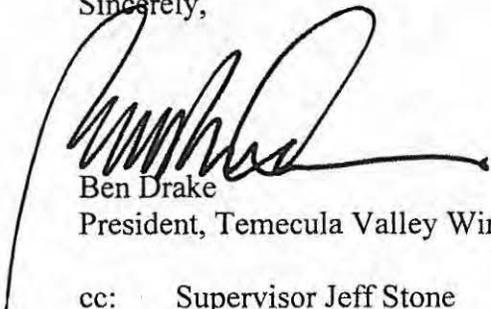
On behalf of the members of the Temecula Valley Winegrowers Association, I am requesting that Riverside County mandate a restriction on the use of un-composted green waste.

The application of this product has initiated a serious pest/disease complex of avocados and landscape trees. The Polyphagous Shot Hole Borer is an invasive beetle that carries two fungi that cause a disease called Fusarium Dieback, which interrupts the transport of water and nutrients in over 110 tree species including: Box elder, California sycamore, Coast live oak, Avocado and Japanese maple.

The solution to the bore would be to have all green waste composted before being applied anywhere in Riverside County. The composting kills the bore during the composting process. This would be readily accepted by all agricultural users in Riverside County

We appreciate your prompt response and thank you for your continued support of Temecula Valley wine country.

Sincerely,



Ben Drake  
President, Temecula Valley Winegrowers Association

✓  
Let's do

cc: Supervisor Jeff Stone  
Supervisor Marion Ashley  
Supervisor John Benoit  
Supervisor Kevin Jeffries  
Tom Bellamore

Supervisor John F. Tavaglione  
Mr. George Johnson  
Ms. Olivia Barnes  
John Snyder  
Steve Pastor

attachment

PO Box 1601, Temecula, CA 92593  
p: 951.699.3626 | 800.801.9463 | f: 951.699.2353  
www.temeculawines.org

## A serious pest/disease complex of avocados and landscape trees

Akif Eskalen, Dept. of Plant Pathology and Microbiology, Richard Stouthamer, Dept. of Entomology, UC Riverside  
Timothy Spann, California Avocado Commission

Both the fungus and the beetle were found on several backyard avocado (cv. Hass, Bacon, Fuerte, Nabal) trees in residential neighborhoods in Los Angeles and Orange Counties in 2012. The beetle now infests a large area of Los Angeles and Orange Counties and the western edges of San Bernardino and Riverside Counties.

**Fusarium dieback symptoms:** White powdery exudate either dry (Fig. A) or surrounded by wet discoloration of the outer bark (Fig. B) in association with a single beetle exit hole (Fig. C). While there is no visible injury to the bark at this stage of colonization, examination of the wood under the infested spot bored by the beetle, reveals brown discolored necrosis caused by the fungus (Fig. D, E).

**The beetle:** An exotic ambrosia beetle (*Euwallacea* sp.) that is very small and hard to see. The beetle holes penetrate ~1–4 cm (0.4–1.57 inch) into the wood and there are often many exit holes on an infested tree (Fig. B). Females are black colored and about 1.8–2.5 mm (0.07–0.1 inch) long [Fig. F, G (right)], males are brown colored and about 1.5 mm (0.05 inch) long [Fig. G (left)]. The exit hole on avocado is about 0.85 mm (0.033 inch) in diameter.

**Background:** The Polyphagous Shot Hole Borer is an ambrosia beetle that has a symbiosis with *Fusarium euwallaceae* and is a serious problem for the Israeli avocado industry. The Polyphagous Shot Hole Borer was first reported on black locust (*Robinia pseudoacacia*), lychee (*Litchi chinensis*), and Box elder (*Acer negundo*) trees, but is now known to attack more than 110 different tree species.

**Known Hosts:** The following is a selected list of common landscape trees from more than 110 known hosts: box elder, castor bean, avocado, coast live oak, English oak, valley oak, California sycamore, big leaf maple, Japanese maple, red willow, goldenrain tree, olive, persimmon, silk tree, American sweet gum, coral tree, weeping willow, blue palo verde, palo verde, Chinese willow, white alder.

### What to do:

- Look for a single exit hole with surrounding white powdery exudate.
- Scrape off the bark layer around the infected area to see the canker.
- Follow the gallery to look for the beetle (it may or may not be present).
- **DO NOT** move infested wood out of the infested area, including firewood.
- Look for other hosts (castor bean, box elder, black locust, coast live oak) showing symptoms of the beetle/disease.
- There are no effective treatments against this pest/disease complex.
- If you remove an infested tree, chip it or cut it into firewood and cover with clear plastic for at least 2 months to kill any remaining beetles. **DO NOT** move the tree from your property to prevent spreading the beetle and disease.

### Who to contact if you find the problem:

If you suspect that you have found this beetle or seen symptoms of the disease on your tree or in surrounding areas please contact either your local Cooperative Extension Office or Dr. Akif Eskalen by phone 951-827-3499 or email at [akif.eskalen@ucr.edu](mailto:akif.eskalen@ucr.edu).





# Polyphagous Shot Hole Borer + Fusarium Dieback A New Pest Complex in Southern California

## BACKGROUND



The Polyphagous Shot Hole Borer (PSHB), *Euwallacea* sp., is an invasive beetle that carries two fungi: *Fusarium euwallaceae* and *Graphium* sp. The adult female (A) tunnels galleries into a wide variety of host trees, where it lays its eggs and grows the fungi. The fungi cause a disease called Fusarium Dieback (FD), which interrupts the transport of water and nutrients in over 110 tree species. Once the beetle/fungal complex has killed the host tree, pregnant females fly in search of a new host.

Photo credit: (A) Gevork Arakelian/LA County Dept of Agriculture

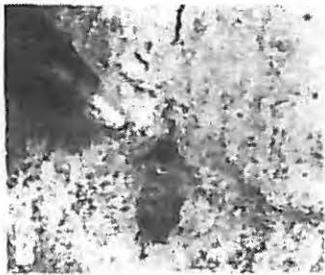
## HOSTS

PSHB attacks hundreds of tree species, but it can only successfully lay its eggs and/or grow the fungi in certain hosts. These include: Box elder, California sycamore, London plane, Coast live oak, Avocado, White alder, Japanese maple, Liquidambar, and Red willow. Visit [eskalenlab.ucr.edu](http://eskalenlab.ucr.edu) for the full list.

## EXTERNAL SIGNS + SYMPTOMS

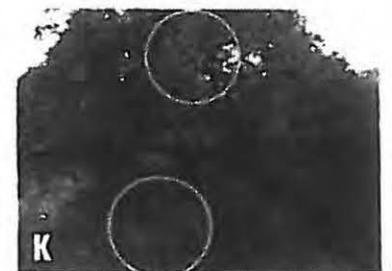
Attack symptoms, a host tree's visible response to stress, vary among host species. Staining (C, D), sugary exudate (E), gumming (F, G), and/or frass (H) may be noticeable before the tiny beetles (females are typically 1.8-2.5 mm long). Beneath or near these symptoms, you may also see the beetle's entry/exit holes (B), which are ~0.85 mm in diameter. The abdomen of the female beetle can sometimes be seen sticking out of the hole.

Species pictured: C. California sycamore, D. White alder, E. Avocado, F. Titoki, G. Chinese flame tree, H. Red willow



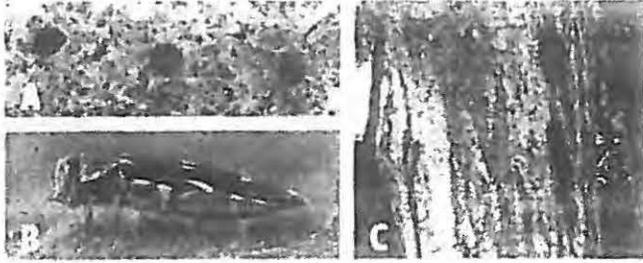
## INTERNAL SYMPTOMS

*Fusarium euwallaceae* causes brown to black discoloration in infected wood. Scraping away bark over the entry/exit hole reveals dark staining around the gallery (I), and cross sections of cut branches (J) show the extent of infection. Advanced infections eventually lead to branch dieback (K).



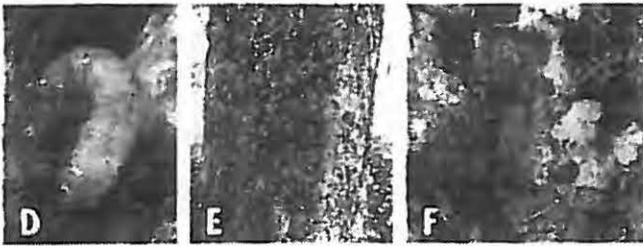
Authors: Monica Dimson (UCCE Orange); John Kabashima, Ph.D (UCCE Orange); and Akif Eskalen, Ph.D (UC Riverside)  
Images provided by authors unless cited otherwise.

Look out for staining or bark damage caused by other wood-boring beetles and/or fungi, which can be mistaken for similar signs and symptoms of PSHB/FD.



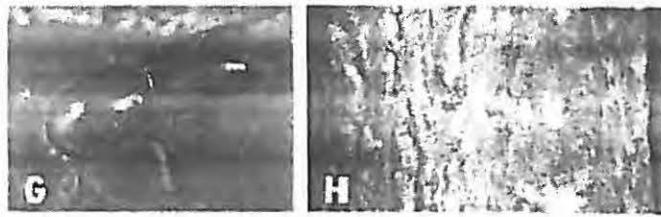
**Goldspotted oak borer, *Agrilus auroguttatus***

Hosts: Coast live oak, canyon live oak, CA black oak  
 Look for: D-shaped exit-holes (A) <4 mm wide but larger than those of PSHB, beetles ~10 mm long (B), bark staining (C), crown thinning, associated woodpecker damage



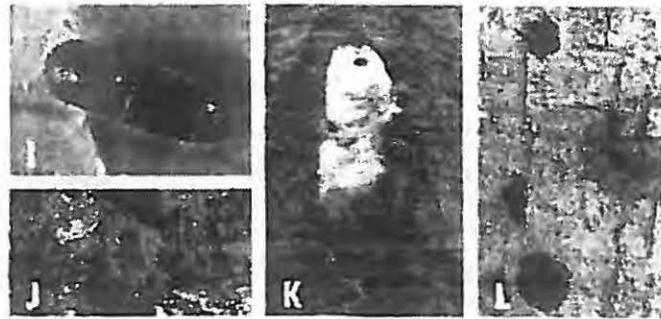
**Western sycamore borer, *Synanthedon resplendens***

Hosts: Species of sycamore, oak, and ceanothus  
 Look for: whitish/pink larvae 25-38 mm long (D), roughened bark (E), reddish sawdust-like frass and/or pupal cases (F) in bark crevices or on ground, bleeding



**Oak ambrosia beetles, *Monarthrum dentiger*, *M. scutellare* (G)**

Hosts: Oak species, tanoak, CA buckeye  
 Look for: slightly larger beetles (*M. scutellare*: 3.5-4.1 mm long, *M. dentiger*: 1.9-2.4 mm) and entry-holes (1-1.5 mm diameter) with bleeding, frothing, bubbling or white boring dust (H) that is tan when oxidized; often attack stressed trees



**Foamy bark canker, *Geosmithia pallida* + Western oak bark beetle, *Pseudopityophthorus pubipennis***

Hosts: Coast live oak  
 Look for: beetles 1.7-2.3 mm long (I); smaller entry-holes than those of PSHB; reddish frass (J), reddish sap, wet discoloration, and/or foamy liquid from entry-hole (K); dead tissue around entry hole, beneath bark (L)

Photo credit: (A), (C) Tom Coleman/USDA (B) Center for Invasive Species Research <cisr.ucr.edu>. (D), (G), (H), (I), (J) UC IPM <ipm.ucanr.edu>

Stay up-to-date on the latest PSHB research at Eskalen Lab (<http://eskalenlab.ucr.edu>) or the UC Riverside Center for Invasive Species Research (<http://cisr.ucr.edu>)

**HOW TO REPORT A SUSPECT TREE**

Please report suspected tree infestations in Orange County to [pshb.ucce.oc@gmail.com](mailto:pshb.ucce.oc@gmail.com). Report trees outside of Orange County to UC Riverside at [eskalenlab@gmail.com](mailto:eskalenlab@gmail.com). Submit the following information:

- Your contact information (name, city, phone number, email)
- Suspect tree species
- Description of suspect tree's location (and/or GPS coordinates)
- Description of suspect tree's symptoms
- Photos of suspect tree and close-up photos of symptoms (see examples)

Based on the symptom description and photos, UC Riverside or UCCE Orange will decide whether a field assessment is warranted.



Take photos of suspect trees from several distances. Include photos of:

1. the trunk or symptomatic branches
2. the symptoms (close-up)
3. the entry/exit hole, if visible, with a ballpoint pen for scale (remove gumming or exudate if necessary)

If dieback is observed, include a picture of the entire tree.



## Polyphagous Shot Hole Borer and Fusarium Dieback Research Update

Dr. Akif Eskalen and Dr. Richard Stouthamer, UC Riverside, continue to make advances in polyphagous shot hole borer (PSHB) and fusarium dieback research. Currently, the researchers are monitoring the 2013 late summer movement of PSHB in California.

Below is a high-level summary of current PSHB research.

### Fungi and galleries

- Three fungi are associated with PSHB: *Fusarium euwallacea*, *Graphium* sp., and *Sarocladium* sp. (formerly *Acremonium* sp.).
- *Fusarium* has been identified as the primary food source for adult beetles and *Graphium* as the primary larvae food source.
- *Sarocladium* prevents other fungi from invading larvae galleries. Further research is being conducted to determine if a bacteria is also involved in protecting larvae from fungi.

### Control methods

- Solarization control method research indicated that clear plastic reduces beetles more quickly up to 12 weeks. After 12 weeks, both black and clear plastic reduced beetle populations comparably; neither eliminated beetle populations.
- Pesticide trials on castor bean logs indicated that Onyx (bifenthrin) performed best for the first six weeks.
- None of the pesticides — Onyx, Danitol (fenprothrin) or Safari 20 SG (dinotefuran) — prevented beetle attacks at 8 weeks.

### Host species

- Field collections indicated that red willow, box elder, Japanese maple, castor bean, coast live oak, camellia and palo verde had the highest beetle attack rates and largest gallery densities.
- California sycamore, avocado and liquidambar had the highest attack rates in bucket studies where logs were exposed to PSHB attack.
- 'Zutano' avocado varieties were primarily used in the research, but other avocado varieties will be examined in the future.

## ***How can I minimize the spread and infestation of Polyphagous shot hole borer/Fusarium Dieback (PSHB/FD) in California avocado groves?***

1. Avoid movement of any plant material such as firewood, pruning debris and chipping material.
2. Avoid receiving chipping material and untreated mulches from anywhere in California.
3. Take measures to ensure that harvest bins are clean, that avocados placed in bins are free of any beetles, and that no other plant material (leaves, stems, twigs) finds its way into bins. Do not cover bins with branches or other plant material that may harbor beetles. Even though the beetle and fungus do not attack avocado fruit, there is a possibility that beetles may be spread by the movement of harvest bins.
4. Inspect your avocado trees periodically for the common symptoms of PSHB/FD. Follow this link for aid in identifying PSHB: <http://eskalenlab.ucr.edu/handouts/homeownerhandout.pdf>
5. Look for other hosts surrounding the grove (castor bean, sycamore, maple, coast live oak, goldenrain) that may be infested with the beetle/disease and examine these hosts for symptoms. If these trees appear infested, follow the protocols outlined here.
6. Remove all castor bean plants near your avocado grove. Seed clusters should be clipped from castor bean plants that have matured, and the clusters should be placed in garbage bags and destroyed. Castor bean plants should then be sprayed with a herbicide like RoundUp. Inspect mature castor bean plants for infestation by cutting them at the base and examining them for congregating beetles. The base of the plant can then be sprayed with Danitol to ensure that beetles do not penetrate the plants.
7. Sterilize tools to prevent to spread of the disease with either 25% household bleach, Lysol® cleaning solution, or 70% ethyl alcohol.

### ***How can I identify PSHB/FD?***

Look for a single entry/exit hole surrounded by wet discoloration of the outer bark on your trees. Multiple entry holes may be found on the trunk and primary branches of each tree.

1. Scrape off the bark layer around the infected area to look for brown discolored necrosis caused by the fungus.
2. Follow the gallery towards the center of the tree to look for the beetle (may or may not be present).
3. Send several pictures of the suspected tree and its symptoms to [eskalenlab@gmail.com](mailto:eskalenlab@gmail.com).
4. If dieback is observed, send suspected plant samples to the Eskalen Lab. For more information visit <http://eskalenlab.ucr.edu/avocado.html>.

### ***What do I do with heavily infested trees?***

Remove the infested branches of the tree.

1. Chip infested wood on-site to a size of one inch or smaller.
2. If the wood is too large to chip, it should be covered on-site with a clear plastic tarp and exposed to sunlight (solarization) for several months.
3. Solarize chipped material as well using a clear plastic tarp and covering for several months.
4. Don't move infested plant material without first chipping and solarizing it.

### ***Who to contact if you find the problem:***

If you suspect that you have Polyphagous shot hole borer/Fusarium dieback on your tree, please contact your local farm advisor, pest control advisor, county Ag Commissioner office or Dr. Akif Eskalen by either phone 951-827-3499 or email at [eskalenlab@gmail.com](mailto:eskalenlab@gmail.com). For more information visit <http://eskalenlab.ucr.edu/avocado.html>.