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Wonderful Woodchip

Tuesday 27 February 2018
at Tolhurst Organic C.I.C, Hardwick

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The European Agricultural Fund for Rural Development: Europe investing in rural areas

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Wonderful Woodchip Agenda

10.30: Welcome

10.45: Results of woodchip compost field lab trial (Anja)

11.00: Ramial woodchip trials and initial results (Sally)

11.15: Walled garden tour

12.00: Introductions to hedgerow management plan (William/Jack) and public goods tool (Samantha). Choice of workshop

- **hedgerow and woodland management plan**
- **public goods tool assessment**

13.00: Lunch

13.45: Tour of field scale (woodchip compost, ramial woodchip trial, agroforestry)

15.15: Wrap up in the field and departure

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Ramial Woodchip Trials @ Tolly's

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Ramial Chipped Wood (RCW)

- Fresh un-composted woodchip chipped when leaves off
- Smaller diameter material (<7cm)
- Smaller younger branches most nutritionally dense
- Previous research in Canada/ US positive results in terms of soil biological activity, SOM, water holding capacity and nutrient levels of soils.
- Very little further research

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Ramial Woodchip Trials - AIMS

- Determine whether applying woodchip (composted and un-composted) is beneficial to soil health and structure
- Review methods of producing woodchip on-farm and efficient application; compare self-supply vs bought-in chip/compost
- Practical guidelines on optimum application rates, time of application, stage in a rotation, species of tree, size of chip etc.
- 2018: Trials on 3 farms

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Woodchip production

Chip sourced from boundary hedges

- 2017: 28 year old hedge - last cut 9 years ago
- 2018: 12 year old trees on field edge coppiced

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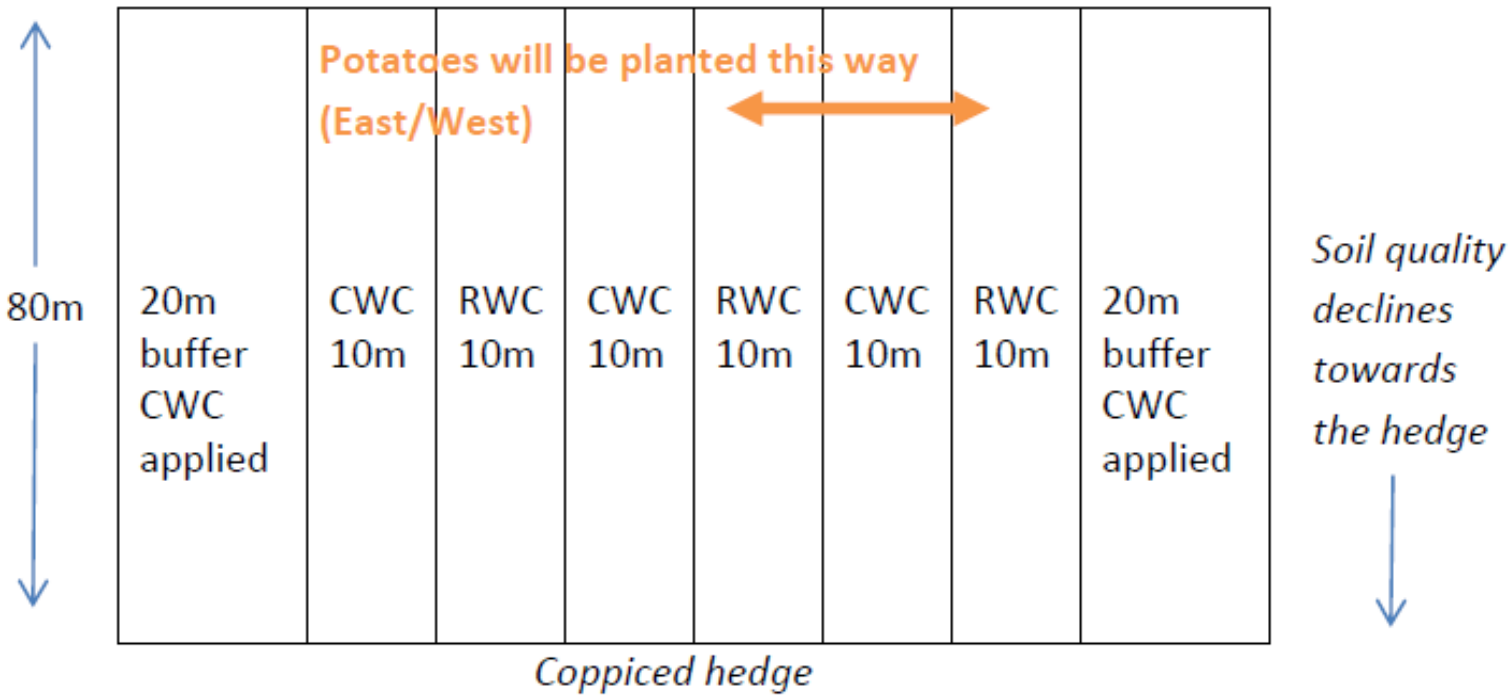
2017 Trial design

- Block total 0.8ha
- Material applied in winter 2017 to an established green manure
- Application rate: 7.5l/ sqm or **60cum/ha**



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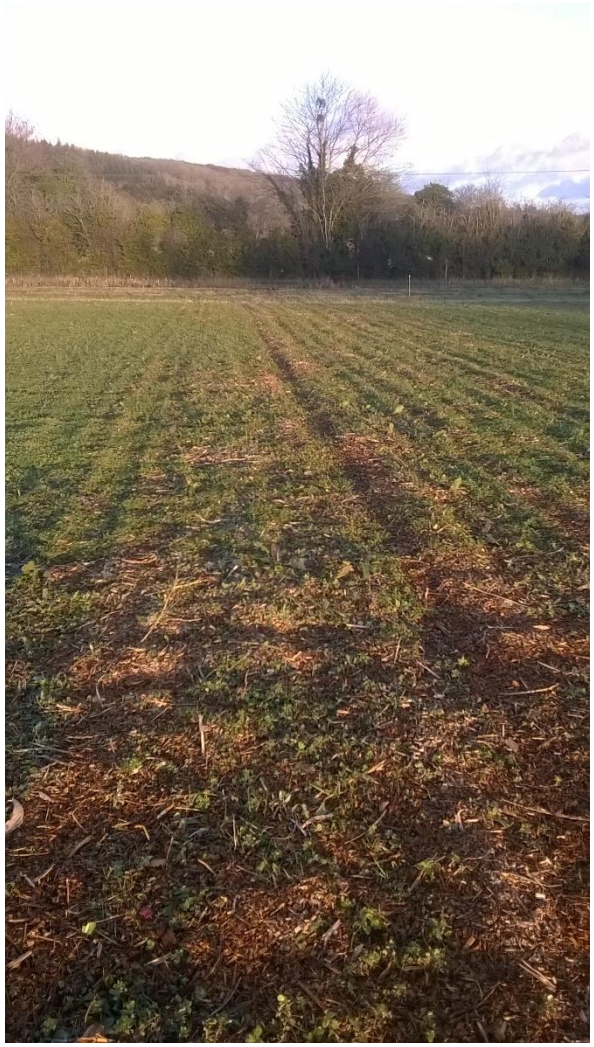
2018 Trial Design



- Material chipped and spread Jan 2018 onto established green manure
- Rate = 4litre/ sqm or **40cum/ha**
- Chip from coppice of mixed trees mostly maple and wild plum planted in 2005
- Design:
    - Compost 20m
    - Ramial woodchip 10m
    - Nothing 10m
    - Compost 20m
    - Ramial woodchip 10m
    - Nothing 10m
    - Compost 20m
    - Ramial woodchip 10m
    - Nothing 10m

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Other Trials:

Wakelyns: Hazel, poplar and willow SRC chipped & ready to be spread on green manure, in addition to mixed hedge material from BTS
Aiming for application rate of c.15 t/ha or **60cum/ha**

Down Farm: Mixed coppiced hedge material vs green waste compost
Application rate of 60t/ha or **240 cum/ha**
Conventional arable going into spring barley in March 2018

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Analysis

- Initial substrate analysis (woodchip and woodchip compost)
- NRM Soil Health Test (spring)
- Biomass cuts of green manure/ cereal yields (late summer)
- Bacteria and Fungal counts (late summer)
- Plant tissue analysis (late summer)
- Mycorrhiza root colonisation (late summer)

In addition the group will jointly evaluate and trial methods to monitor N levels

Other parameters such as application rates, time and method of application will also be monitored

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Initial substrate analysis Tolly's 2017

	Fresh woodchip	Composted woodchip
pH	5.75	6.2
Density (kg/m3)	226.5	219
Dry Matter (%)	86.65	60
Dry Density (kg/m3)	196.1	131.4
Chloride (mg/l)	25.45	30
Phosphorus (mg/l)	42.75	53.5
Potassium (mg/l)	119.15	166.9
Magnesium (mg/l)	1.6	2.7
Calcium (mg/l)	4.85	9.4
Sodium (mg/l)	7.15	7.6
Total Soluble N (mg/l)	13.5	11.4
Sulphate (mg/l)	12.4	27.6
Boron (mg/l)	0.17	0.19
Copper (mg/l)	0.015	0.02
Manganese (mg/l)	0.13	0.08
Zinc (mg/l)	0.06	0.15
Iron (mg/l)	0.235	0.23

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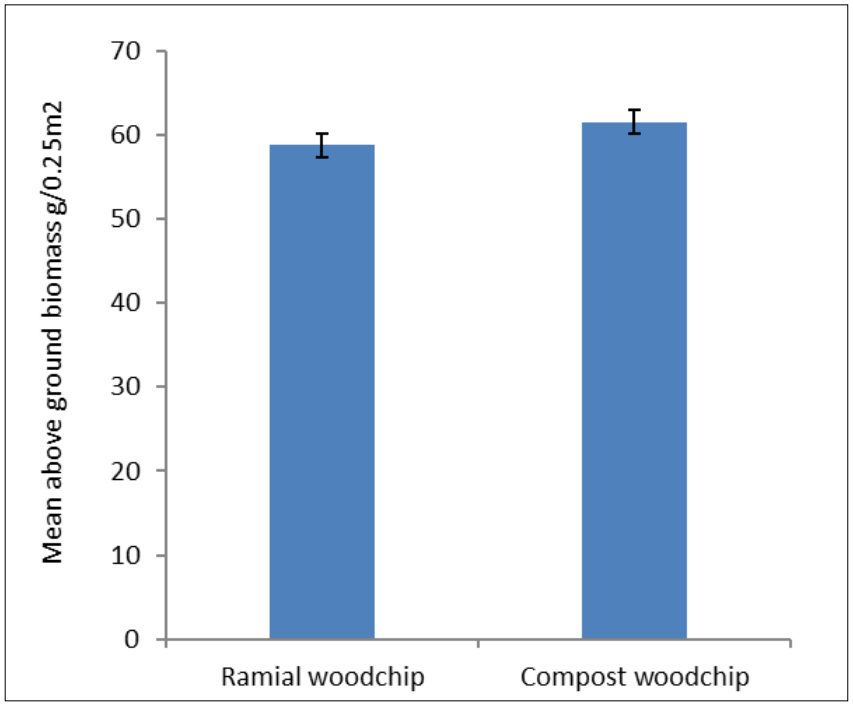
Biomass cuts Tolly's 2017

Above ground biomass:
6 x 0.25m quadrats per split replicate (top and bottom of the field) = 18 cuts per treatment



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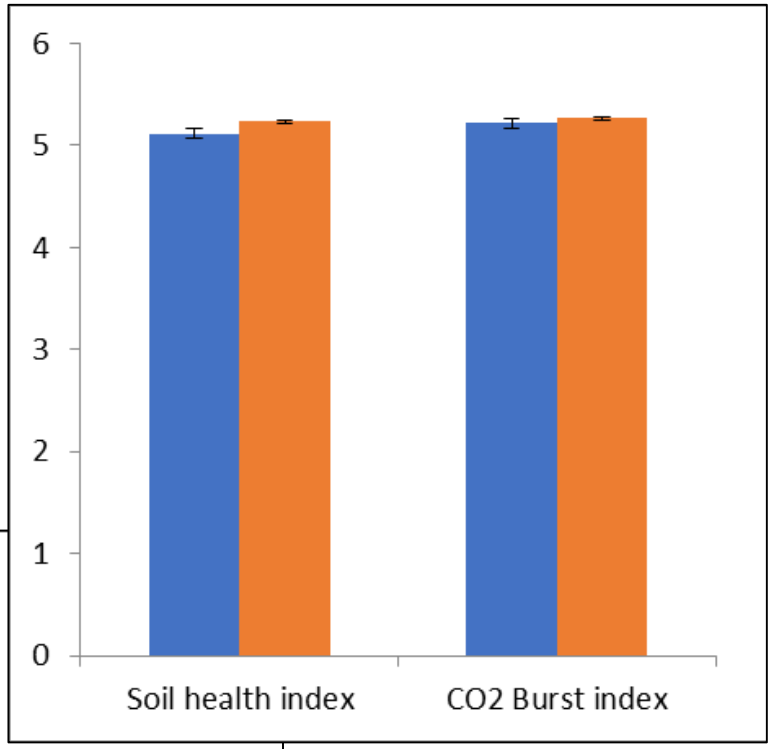
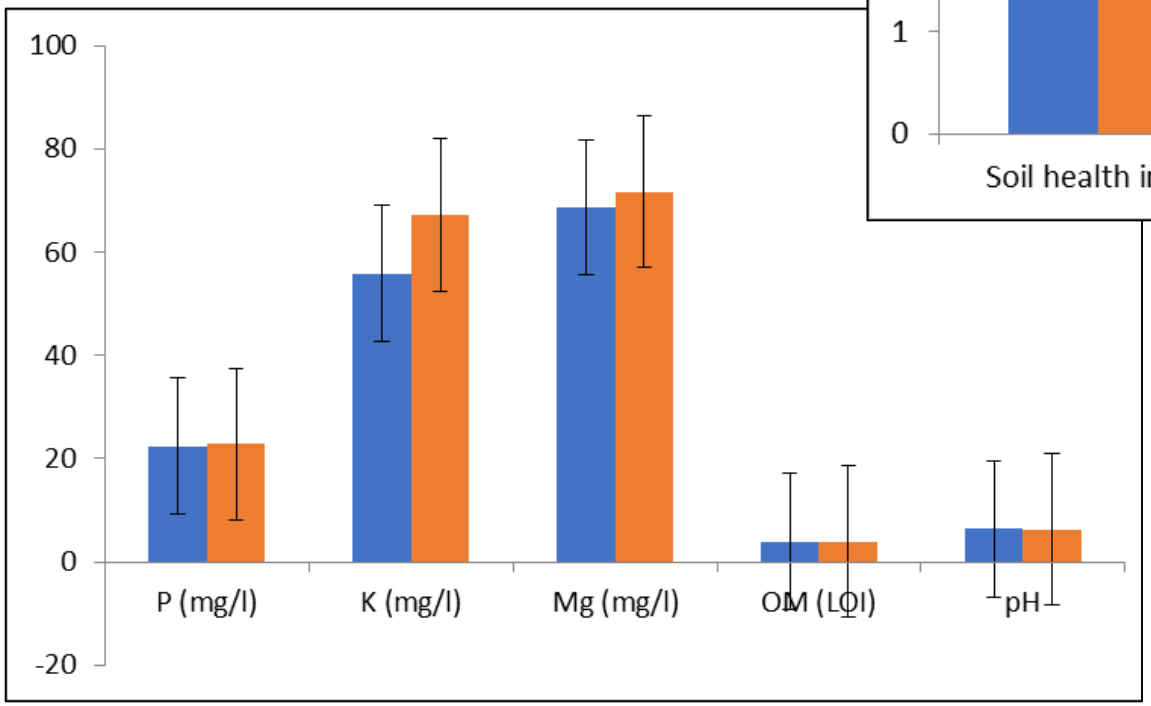
2017 Results: soil health

NRM soil health test:
20 cores to 15cm taken per split replicate, combined and composite sample taken





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References:

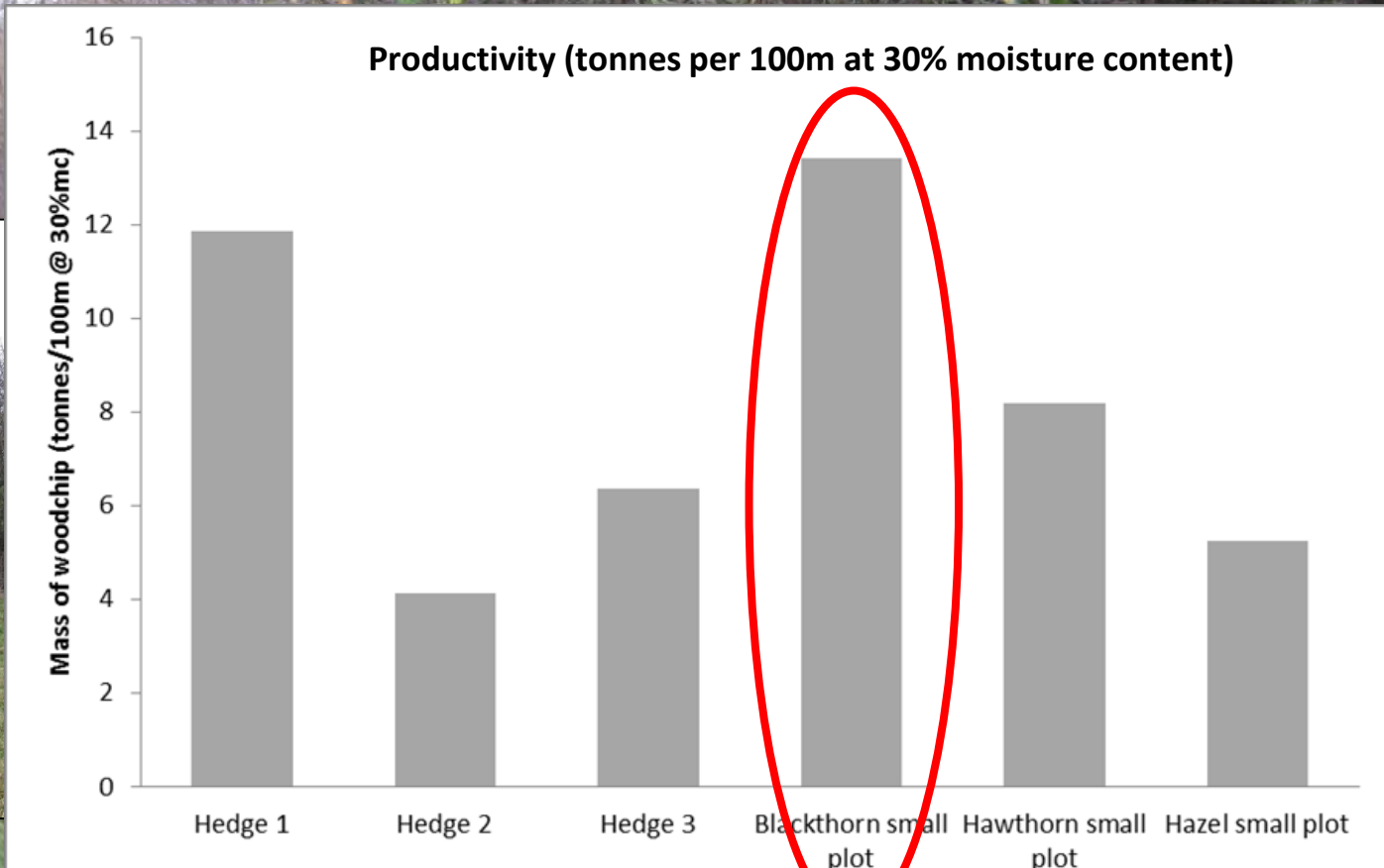
- Caron C. Lemieux G. and Lachance L. (1998) Regenerating soils with ramial chipped wood. Publication no. 83, Dept of Wood and Forestry Science, Quebec (https://www.dirtdoctor.com/organic-research-page/Regenerating-Soils-with-Ramial-Chipped-Wood_vq4462.htm)
- Free, G.R. (1971) Soil Management for Vegetable Production on Honeoye Soil with Special Reference to the Use of Hardwood. Plant Sciences Agronomy

Woodchip for Fuel

Hedges

8.2 tonnes average biomass production per 100m hedge (30% MC)

(range 4-13 tonnes)



Trials demonstrated that hedgerow woodchip can meet Industry wood fuel standard. Saleable on the open market

Fuel + Method	Pence per Kwh
Hedgerow woodchip	**1.6 – 4.2****
Bought in woodchip	3.4*
Seasoned wood	5.6*
Wood pellets	6.7*
Mains gas	5.4*
Heating oil	2.8*
LPG (bulk)	6.0*
Electricity	16.6*

* Figures taken from Nottingham Energy Partnership, 2016
** Depends on which harvesting method
(does not include transport, cost as self supplying)

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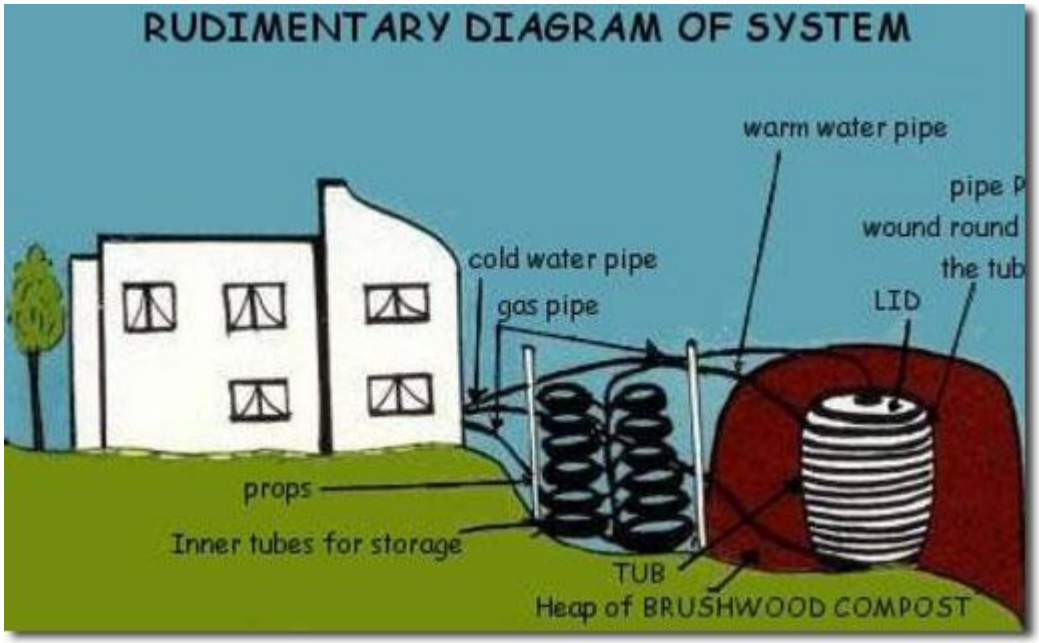
Jean Pain Woodchip for heat

French innovator of a compost based bio-energy system.

Produced 100% of energy needs from composting shredded brush wood, heating water to 60 deg C and enough methane to run an electricity generator, cooking elements, and power his truck.



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Buxor: Jean Pain method in action in Southern France

Scrub clearance –
Material chipped –

- Animal bedding
- Compost for heat

c.100cum windrows over pipes, water heated as chip composts.

Insect larvae grown in composting woodchip – high protein feed for pigs (replacing grain)

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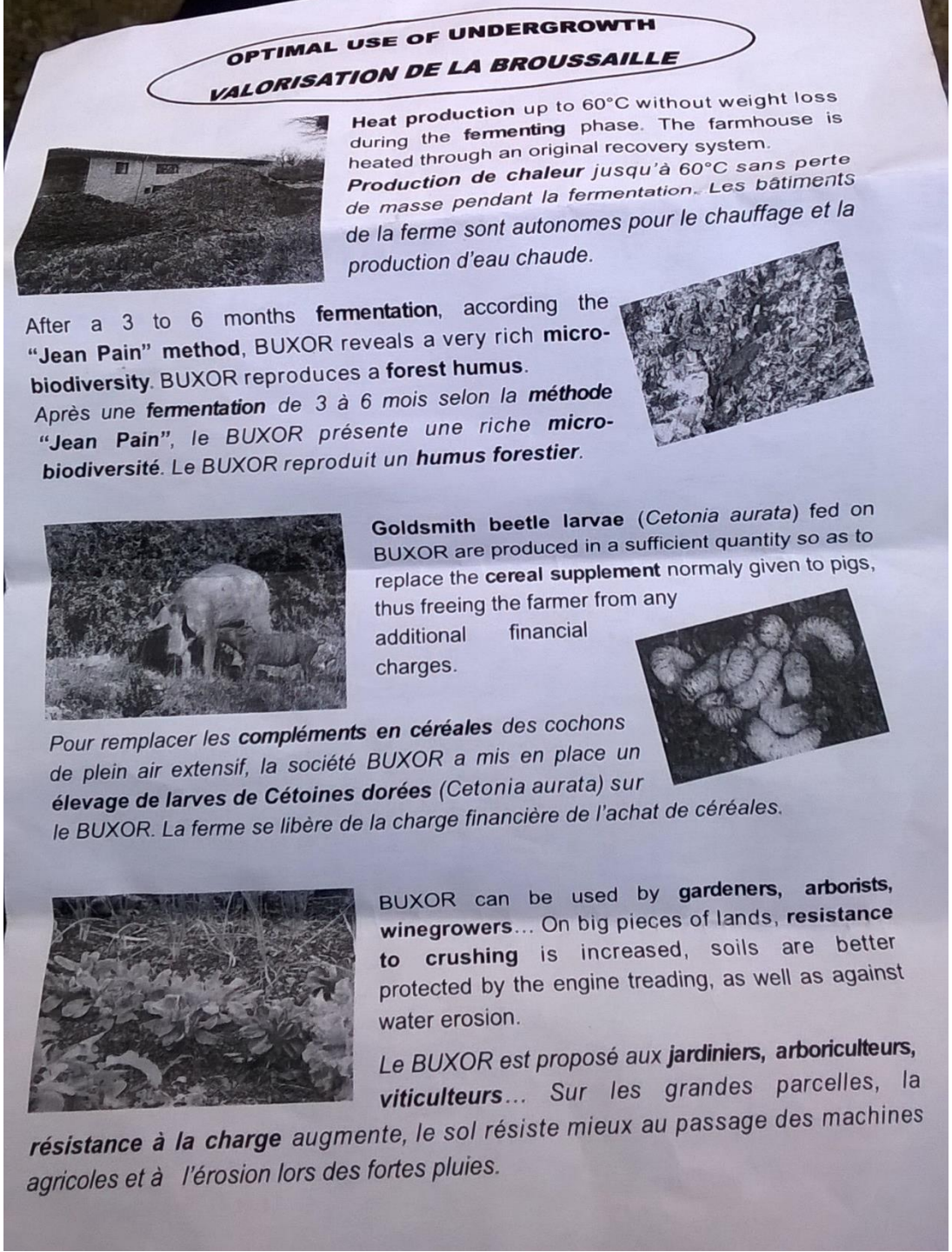

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