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► To cite this version:

Régis R. Tournebize, Jorge J. Sierra, François Bussière, Jean-Pierre Cinna, Denis Cornet, et al.. Controlling weeds in yam crops : advantages of different mulching methods. Journ'iames 2012, Institut National de Recherche Agronomique (INRA). UR Agrosystèmes tropicaux (1321).; Chambre d'Agriculture de la Guadeloupe. Baie-Mahault (Guadeloupe), FRA., Sep 2012, Petit-Bourg ; Petit-Canal (Guadeloupe), France. pp.27. hal-02745824

HAL Id: hal-02745824

<https://hal.inrae.fr/hal-02745824v1>

Submitted on 3 Jun 2020

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Controlling weeds in yam crops : advantages of different mulching methods

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1. Issue and aims

Because of the lack of homologated molecules, weed control in yam crops is done by hand. This way to control weeds is time consuming (between 250 and 750 hours of work by ha), hard and often difficult to plan because of climate conditions that do not always allow work be done in a timely fashion. Mulching is thus an interesting alternative to hand control to prevent competition between yams and weeds. It is traditionally worked out with sugar cane crop residue, plastic film or even craft paper, the latest being a new technical innovation that we thought of and evaluated in Guadeloupe. We present here our first comparative experimental results, some of which were directly experienced by yam producers.

2. Description and results

Experiments on paper and plastic covers (from 2009 to 2011) were done in INRA Duclos and in fields from Lycée Agricole, both with irrigation and fertilization. Indeed, mulching techniques need drop a drop irrigation and fertilization be set up prior to mulching plots. We measured out weeding time, total weed biomass, yam upcoming rate and yield.

Plastic mulch is characterized by a decrease in plant emergence due to scalding and a consequently significant decrease in yield (**Table 1**). Moreover, plastic films need to be collected back at the end of crop cycle to conform to legislation, which increases the cost of use.

With paper mulch, emergence rates are similar to those of crops without mulch and weeded by hand. In the first assays, mulching had occurred by hand, and further fixing with crossing threads was sometimes needed (**Picture 1**). These steps required about 15 work days per ha. Labor balance was nevertheless still positive, because it allowed reducing weeding time by 60% (i.e. by about 18 to 55 days). Yield with paper mulch was equal to or even sometimes greater than traditional cropping system (by up to 40% in situations with low fertilizing). This increase in yield results from the lower competition for nutrients when fewer weeds are growing.

Paper mulch duration span is proportional to rains (**Figure 1**) but was always sufficient to control weed development (**Picture 2**). Paper may need maintenance in order to replace torn parts. At the time of harvest, the paper incorporated to the soil is degrading very fast and our chemical analyses demonstrate that there is no polluting with kraft paper, which can thus be left in place or buried without affecting soil quality.

Currently the cost of paper mulch is about 4000 € per ha, thus between cost of plastic film and biodegrading film (1000 € and 7000 €, respectively). It could even beneficiate from Agro-environmental measures that could go up to 900 €/ha.

Last, sugar cane leaves mulching also demonstrate very high protecting qualities against weeds, with an even lower setting time (10 hours/ha), though with a lower duration time. Experiments with sugar cane leaves bales are under prospect (Agricultural Chamber). Technical and economic analysis will allow us to a more complete evaluation of this mulching method by the end of the year.

3. Limits and perspectives

Some issues still need special investigation before we may conclude on the economics of natural mulching. Our IGNAMARGE software, as explained elsewhere in this booklet, would take into account analysis of the different mulching strategies in the diversity of producers situations once correctly calibrated. Finally, the study of mechanization for paper mulching is carefully considered (with EPLEFPA).

4. To learn more...

Tournebize R, 2011. Mulch papier ; Antilles Agricole 26 : 44-45.
Tournebize R, 2011. Mulch papier. Fiche Transfaire
<http://transfaire.antilles.inra.fr/spip.php?article86>.



Table1 : Emergence rate, labour time and yield for 2009 experiment at Lycée Agricole.

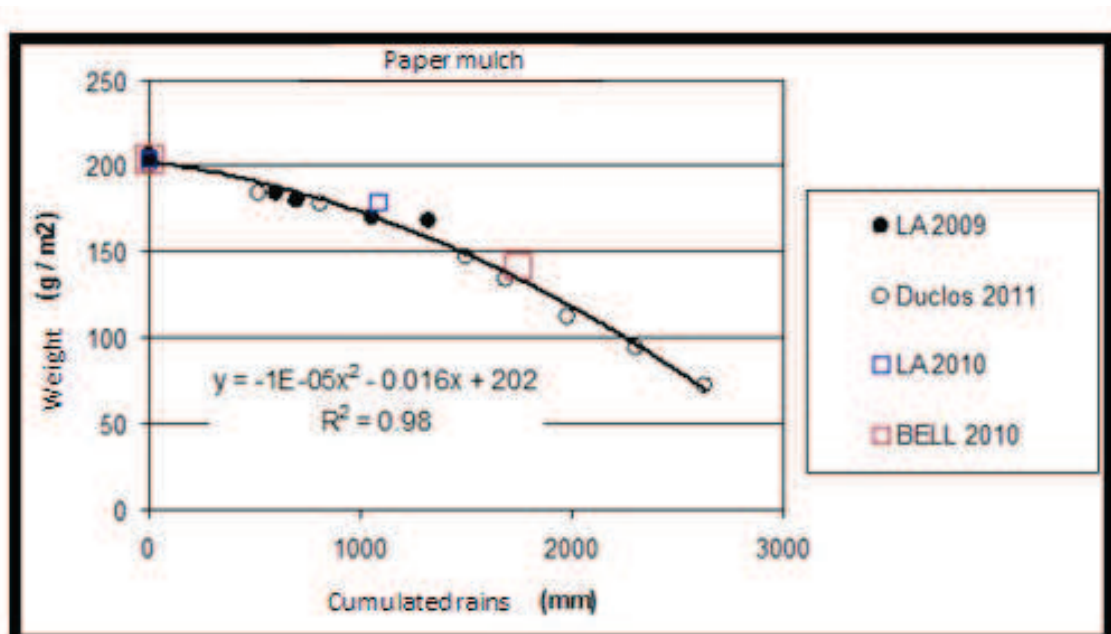
Mulch type	Without mulch	Without mulch	Plastic mulch
Emergence rate	95%	95%	69%
Weeding time (J/ha)	60	24	20
Yield (T/ha)	9	10.2	6.2

Picture 1 : Left: paper mulch prior to planting

Picture 2 : Right: mulch state at harvest



Figure 1 : Evolution of paper biomass as a function of cumulated rains.



Journ'ïames 2012

Technical day on yam

September, 25 - INRA Duclos, Petit-Bourg

October, 2 - CFPPA Petit-Canal

Proceedings

