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Moist mulch application in speciality crops

Mulching is an ancient practice, the specific effects of which are appreciated and have been proven many times. Mulching is mainly used in fruit production, viticulture, landscape gardening and in speciality crops in organic farming. The polyethylene and polyvinylchloride sheeting used for horticultural crops have, in the meantime, started to cause substantial disposal problems. Environmentally-friendly alternatives are therefore increasingly sought. The new type of moist mulch presented here could be one answer.

Nowadays, agricultural and horticultural enterprises growing speciality crops face two special challenges:

- high labour costs or scarcity of labour for the necessary mechanical crop care where a chemical-free production method has been chosen, and
- expensive special herbicides and strong pressure on producer prices where conventional production methods are used.

A new type of moist mulch technique which offers savings in labour and improvement in product quality is interesting for both types of enterprise.

In experimental cooperation with the Further Education Institute (FH) Weihenstephan/Triesdorf and the manufacturer, the company Holzspäne Bleininger, Vilsbiburg, a new type of wood fibre product was developed. It is to be marketed under the name TERRAfit.

Reflecting nature, this comprises the technological amalgamation of the weed-smothering effect of a moist cowpat with the interwoven fibre construction of a wasp nest.

Target of the development was the production of a fine-fibrous natural material which, first of all, is able to be applied on the ground and which, after absorbing moisture while on the ground, forms an interwoven strong and load-bearing fibre matting comprising the following completely new properties and effects:

- formation of a fine-pored gas and rain permeable covering layer
- development of an airspace between ground surface and mulch cover as the result of shrinkage processes
- optimum tilth production in dark, moist conditions under the cover
- dependable weed suppression for most types of weeds during the whole vegetation period if possible, or at least during the susceptible young phase of crop plant growth
- the possibility of planning at laying the length of the protective effect through variation of the thickness of the cover and/or the proportion of organic “adhesives”
- addition of additive materials oriented on the particular role of the mulch (e.g. aroma substances to keep slugs and snails away or organic nitrogen fertiliser to avoid N-locking)
- reduction in evaporation which, even with us, is increasingly a matter of economic importance.

In that no synthetic material is used for its components, this moist mulch also fulfils the strict requirements of organic cultivation guaranteeing, in other words, a weed control and plant production free of residues with a material representing an ideal feed reserve for rainworms, protecting the soil from physical and chemical damage from atmospheric components and playing a role in the protection of the valuable humus reserve.

The product

Mulch based on wood is already known in the form of bark mulch, bark humus and wood chips. In the case of the moist mulch being looked at here we have, however, a real innovation. In this case, untreated timber residues are processed into fibres in a patented special screw extruder. During this, the material experiences strong frictional pressure with heat production which encourages

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Fig. 1: Moist mulch in fruit-growing

the reduction of tannic acid. Subsequently, according to a recipe belonging to the company, a selection of supplemental materials and adhesive is added, upon which the specific advantages of the moist mulch are primarily based. The final moist mulch doesn't emerge, however, until the products are moistened and the resultant swelling and adhesive effect leads to a typical fibre intermeshing.

The application

For an economical application of the mulch it is first advisable to hoe the ground to produce a weed-free, loose and level surface. On top of this comes a 2 cm deep layer of mulch which then must be thoroughly wetted. When the weather forecast can be accurately judged, this can be done naturally. Otherwise, irrigation must be arranged or the material can be brought out and spread in an already-moistened state. The required technology for this is either already known or has been developed by the manufacturer. Where one uses a commercially-available packet of the substance to mulch small areas, the wetting can then take place before spreading – in a wheelbarrow for instance. The resultant air and rain permeable intermeshing creates the requirements for an optimum soil tilth and sufficient weed suppression effect (*fig. 1*) so that up until the end of the vegetation period no more work needs to be done. Before the next seedtime comes around the material will have either been already worked into the soil by rainworms or be already

so decomposed that new drilling can begin without any additional work.

Trial results

Educational and Research Institute, Auweiler

According to trial report [1]: "In the variety trial (with lettuce – note from ed.) the mulch system Hoffmann was also tested. As already shown in autumn of last year, and also in greenhouse spring trials, this organic mulch proved itself in that there was an apparent notable reduction in lettuce rot on the head base and, through this, the proportion of marketable ware increased, the heads were in total heavier, and income per m² was thus substantially increased. The mulch covers gives a slight ground insulation through which large fluctuations between day and night ground temperature and of ground moisture were avoided."

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The effect of moist mulch impregnated with a specific scent substance on the feed choice behaviour of slugs was tested in trials. Subsequently, it was officially confirmed by an evaluator [2]: "It could be definitely observed in all sets of trials that the plants surrounded by the garden and vegetable mulch from the Blieninger company were only attacked by slugs when no other plants were available. It was shown here that it was unimportant whether or not the other plants were not mulched or were surrounded by conventional mulch. Even grasses and meadow herbs were definitely preferred compared to the salad plants surrounded by the garden mulch....."

Diploma thesis

In work for a diploma thesis [3] electrochemical parameters were measured where celeriac had moist mulch applied. A large number of investigations have already established that the redox potential is a good way of

measuring the degree of stress with vegetables. Subsequently this work established that: "The redox potential difference between the trial plots 'with moist mulch' and 'without moist mulch' represented 33.79 mV with a margin of possible error of 0%. The total yield difference was 63%, and this could be attributed especially to the more intensive rooting systems in the mulched plots." Thus the positive effect of the moist mulch is also proven here.

Research project

In a research project "The market introduction of wood-based substrates" the moist mulch was also investigated at the "Chair for Vegetable Cultivation, Growth Physiology and Quality Research" at Munich Technical University [4]. A concluding report wherein the positive effects already observed in practice on soil, water household and market value should be confirmed, is expected in spring 2000.

Literature

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