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THE Mushroom JOURNAL

OFFICIAL JOURNAL OF THE MUSHROOM GROWERS' ASSOCIATION
AUGUST 2000 NUMBER 607 ISSN 0144-0551



Sylvan - Quality Production

INSIDE ■ MGA BOURNEMOUTH CONFERENCE
2000 DETAILS ■ LETTER TO THE EDITOR

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Mushroom Growers' Association
Editorial Board Geoff Ganney, Peter Flegg, Peter Howard, Richard Gaze.

Editor Peter Flegg.

Journal Administrator Melissa Nairn.

Administration, advertising and editorial office

2 St Pauls Street, Stamford, Lincs PE9 2BE.

Tel: 01780 766888.

Fax: 01780 766558.

MGA Council Chairman Dennis Watkins, Vice-chairman Adrian Sampson, Miles Middlebrook, Peter Woad, Robert Brown, James Rothwell, (Hon. Treasurer), Geoff Ganney, Jack Orr, Bryan Dyer, Frank Stewart-Wood, Peter Howard and David Walker.

Articles for consideration are welcome; also letters for publication which should make a point strongly and as briefly as possible. They may be faxed or posted and should be addressed to the Journal Administrator.

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THE Mushroom JOURNAL

August 2000

No 607

EDITORIAL

Moving with the times

Since the publication of the first MGA Bulletin in autumn 1945 there have been changes of size, style and even the name. It became the Mushroom Journal in April 1987. Each change has been in response to the differing circumstances within the mushroom industry, within the Association or in printing technology, in other words an effort to 'move with the times'.

For some months, long before the latest MGA Annual General Meeting, the Editorial Board has been considering ways of introducing some technological changes. A brief reference to this was made in the Journal Editorial for May 2000 and offered both financial and editorial benefits.

The introduction of in-house desktop publishing equipment could result in useful cost savings. As little as two to three thousand pounds needs to be invested and is likely to be recovered through savings in production costs within one or two years. Savings in production costs would, of course, continue in future years.

As well as saving money, other potential benefits would include greater flexibility in planning page layouts, a reduction in time and effort spent in proofreading along with greater accuracy and reliability. The MGA office staff would gain the opportunity to apply greater flair and imagination in presenting the Journal and be delighted to have much greater control over the whole production process with a much-improved chance of getting each issue out on time. Moreover, our printers would be happier with a new set-up.

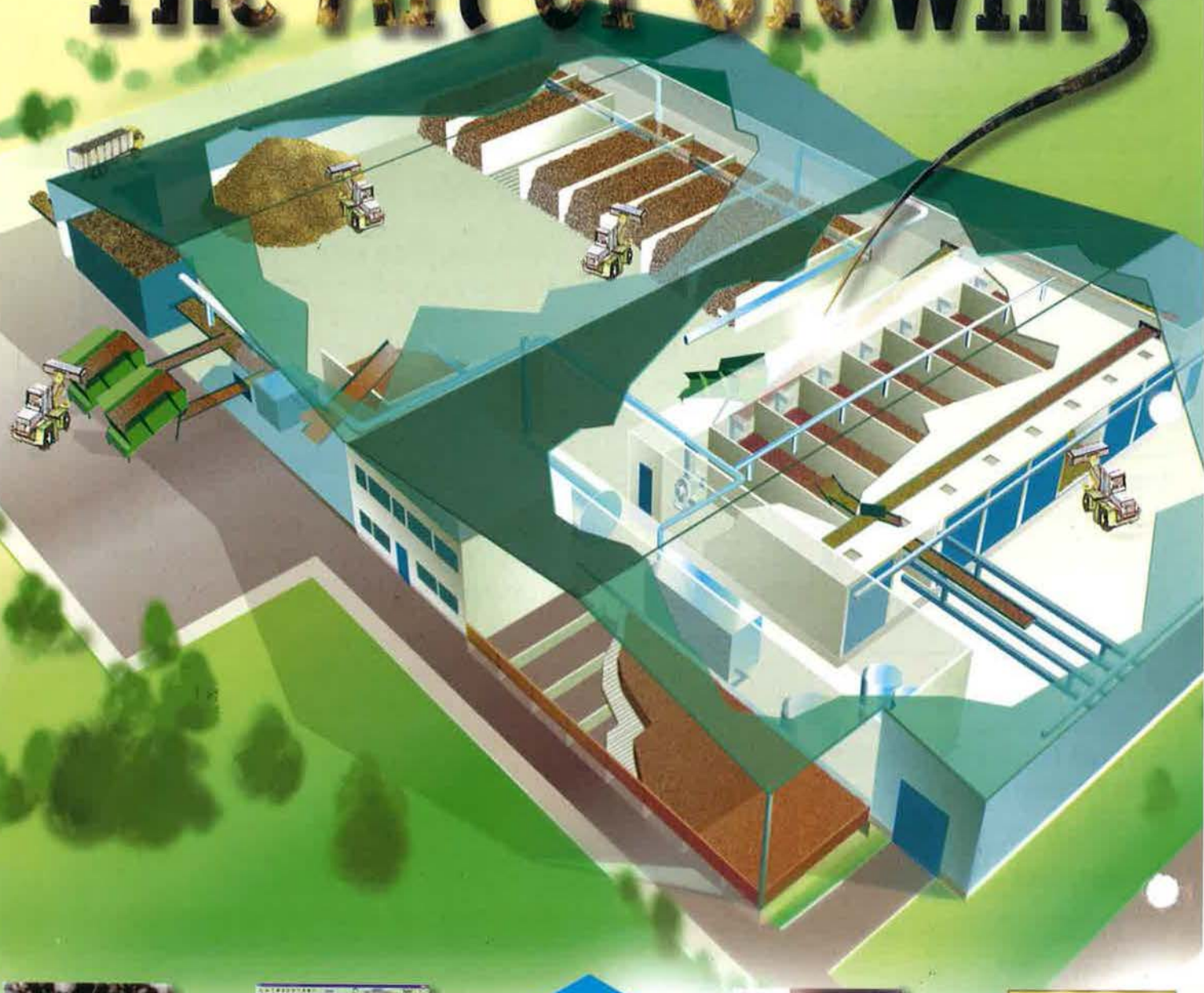
If those plans could be set in motion in the not-too-distant future, the Journal would be able to move forward into the Twenty-first Century with renewed confidence.

Looking a little further ahead we should be able to anticipate having an E-mail address for the MGA and a website.

'And about time too,' did we hear anyone say?

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**Sealed Air Corporation
announces
recommended cash offer for
Dolphin
Packaging plc**

On 28th June Sealed Air Corporation of the USA announced a recommended cash offer that its UK subsidiary is making in the United Kingdom for all the outstanding shares of Dolphin Packaging plc. Based on the cash offer price of £3.30 per Dolphin share, the offer has a value of approximately \$123 million (£79 million) at current exchange rates.

Dolphin's board of directors has unanimously recommended approval of the offer. The completion of the offer is subject to customary conditions, and the transaction is expected to be completed during the third quarter.

Dolphin, which is listed on the London Stock Exchange, is one of the leading UK producers of speciality plastic packaging products for modified atmosphere applications, home meal replacement and other centrally prepared fresh foods, with 1999 net sales of approximately \$82 million (£55 million). Dolphin also has operations in Ireland and the Netherlands. Dolphin's broad range of products includes fresh meat trays, food service items and prepared salad, fruit and vegetable containers as well as rigid containers for bulk distribution of products to food, medical and healthcare industries.

Sealed Air is a leading global manufacturer of a wide range of food, protective and speciality packaging materials and systems. To view the Company's latest financial news online via the Worldwide Web, visit <http://www.cfonews.com>.

OBITUARY

It is with deep regret that
we inform you of the death
on Thursday,
27th July 2000,
of Keith G.M. Pointing.

*Mr Pointing was
MGA Chairman
from 1968 to 1969.*

A funeral service took place
on 3rd August at
Semington Crematorium,
near Melksham, Wiltshire.

Our sincere condolences
go to his family and
close friends.



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Chairman's Notes

Growers tell me that July has been a good month for mushroom growing, with returns and demands in the UK better than they have been in recent months.

I made two visits to the MGA offices in Stamford in July to discuss day-to-day matters with the staff and to arrange for a change of date for the next MGA Management Committee meeting. The date has changed to **31st August 2000** and the venue will be Stamford. With the MGA Council meeting the following week (7th September) in London, it is hoped that issues and decisions will be fresh in the minds of those attending both, and that further discussions and final agreements can be made on important issues.

Whilst visiting the MGA office recently, I had the opportunity to look over the 2000 MGA Conference budgets and final details with Cecilia — it all seems to be well underway from an organisational point of view. I very much hope that everything will follow suit and that the Conference will be a successful and informative event. To ease the workload at the MGA, members are asked to book as early as possible for the Conference and also for accommodation at the Royal Bath Hotel, Bournemouth. Avoid disappointment... book early!

I have met with Vice-chairman, Adrian Sampson twice this month in London to discuss certain matters. Grower member, David Bird, attended one of those two meetings to discuss his offer of help in visiting non-members of the MGA, in an aim to encourage lapsed or non-members into membership. I hope

to report on the progress of this project at the next Management Committee meeting. Some new growers in the West of the country have also expressed interest in MGA membership.

The recent meeting in London between MGA Vice-chairman, Adrian Sampson, and myself ended with talk of Adrian's party on the Stewards Cup Day at Goodwood, which I understand he has had to suspend for a short period. This is an occasion I have enjoyed attending for the past five years. Adrian was due to attend the Cup Day in a 'quieter fashion' with his wife and a neighbouring mushroom grower. I gave Adrian a couple of 'tips' — and they both won!

I am delighted to announce that the new MGA Eastern Area chairman will be Graham Mann of Woodview Mushrooms in Wicklewood. I am sure you will join with me in wishing him well in the post.

That's all for now as I am preparing to travel to Canada tomorrow (9th August) for our summer holiday. Look after the country while I'm away!

Dennis Watkins
MGA Chairman



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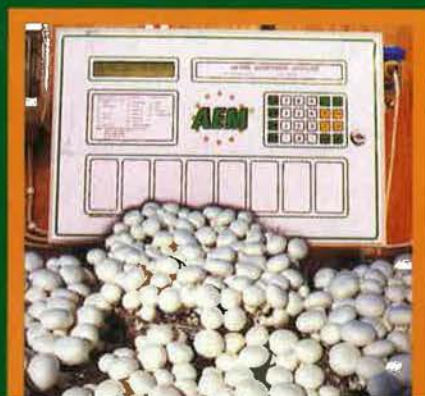
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Cotswold Views

By Peter Howard



17th July

Warmer night-time temperatures are definitely with us now and judging by the volume of 'phone calls a general shortage in product.

I'm told that farms over the water have shut down for the holiday period due to staff holidays. I suppose I'd better allow some of my staff a break but I don't think we'll stop cropping though.

18th July

With the shortfall of product in the market-place, prices are very high and with some growers taking advantage of this, there will be a further shortage elsewhere.

apt everything crossed that this will last long enough for us to take advantage with the extra compost coming through.

19th July

Ran around a lot looking very carefully at the crops coming through the system to ensure that we will have plenty of product available during the shortage.

Needed first-aid treatment after rubbing my hands together too much.

This year we've managed to match the cropping with sales' requirements pretty well — thank you Mr Owens, I owe you one.

20th July

Despite a few problems earlier in the month with the warm weather/timing issue, we're now cropping very much to the plan.

Steady cropping through the week has improved the grade mix considerably and with the holiday period fast approaching we must keep to this timing profile.

I think we'll be O.K.

21st July

If we spent as much time training people as I have to talking to training organisations and filling in their questionnaires I'd be much happier.

24th July

Just starting to crop off the increased compost throughput.

Everything has to be spot on now, with all hands to the pump. Warm weather, holidays, extra volumes and supplier base consolidation could all lead to a disaster — not here, though, if I have anything to do with it.

Tight management of all aspects is always critical but never more so, as now.

25th July

Waved Joan off to an effective management course for four days.

Let's see how they hope with "The Whirlwind"

It just leaves me to keep an eye on the packhouse which is a job I really enjoy — honest!

26th July

Lunch and an afternoon in the office spent with our insurance ➤

broker. With outstanding claims for broken fingers, knees and wrists the insurance premiums have risen considerably.

It's not going to get any better with solicitors able to advertise in the media.

Perhaps not so bad as employers have to tighten up their safety systems.

27th July

Once again the long trip to and from the customer's head office.

This time I am much the wiser and in theory should be much happier — what's the catch?

28th July

Relayed yesterday's good news to all the staff. It looks as though all the hard work, (and cost), has been worthwhile after all.

Anyway, new targets inject a massive amount of enthusiasm into everybody.

Now to keep the momentum going.

31st July

Finally allowed Jackie, our Harvesting Manager, to take a holiday.

I definitely do not relish the thought of managing the picking staff for a fortnight — they always seem to take advantage of me, and my pleasant, though portly, presence.

So glad that we have a very good deputy in Jim with Sean keeping an eye on things.

1st August

The only problem with having Jim supervising the harvesting is his broad Scottish accent.

The pickers seem to understand him but I am unable to make out one word of his half-hourly updates.

Decided to spend the next two weeks in the office — there must be some paperwork that needs my full time attention.

The waste basket has been filled with sand ready to bury my head in!

2nd August

We're presently going through a period of trials with pinning regimes.

With the farm having a tendency to over-pin, Sean's been

working on airing with mycelial growth high on the casing surface to see what pins we were actually going to get instead of the customary deep, mass pinning, giving us more mushroom rooms than we were expecting.

3rd August

Pulled on my wise old owl outfit to explain to Sean that there will be a limit as to how high you can get the mycelium before there will be no pins at all.

I know, I've done it and as a grower it's an experience that haunts you forever.

4th August

Nine thirty in the morning and a motorcycle pulls up outside the office with its rider clad in colour co-ordinated accessories.

Off comes the helmet — it's Martyn Dewhurst!

He tries to explain that his new mode of transport is required to avoid today's traffic problems.

I'm sure that's one reason but I know I'm jealous and want one myself and it's certainly not to get through the rush-hour. Made a note to stop dreaming and act my age.

7th August

Considerable drying out of the compost surface during spawn-running has made us look again at humidification. The present system doesn't appear to be sufficient to counteract the massive cooling requirement at this time of year.

The dry interface doesn't appear to cause problems in case-run but then again we do have a relatively long case to air period.

9th August

We thought at one time that lining the trays with plastic was helping the yield and quality. I'm sure it was once but it looks as though we've gone too far with the heavy watering and are now damaging the compost and mycelium at the bottom of the bed.

Too many waters in too short a time between first and second flush. Look again at the watering regime.

10th August

Jackie has 'phoned in to say she's in hospital with broken ribs and possibly a ruptured spleen, following a horse-riding accident.

I told her she shouldn't go on holiday!

14th August

Oops. The mycelium has got too high and some of the beds have "locked out" with no pins.

Fortunately the rest of the farm will make up for the lack of yield and at least now we know the limit of mycelial growth that this farm will allow.

The trend, though, to higher pinning has resulted in excellent quality and a very impressive piece weight.

15th August

Michael Wilkes here to discuss casing requirements but more importantly to take Sean and I to lunch.

Interesting conversation though comparing our casing change with us dropping chemical usage and the type of water added to the peat materials at mixing.

Just coincidence that our disease levels have dropped dramatically?

16th August

Malcolm Hensby popped in, looking as debonair as ever. A good time spent chatting, farm-walking and lunching.

We agreed that there is not enough conversation between growers, only if it is to take our minds of the daily pressures for a while. So much could be learnt from each other if only we would meet more regularly — a format for area meetings?

Flew out to Ireland to meet up with my good friend Sean.

17th August

Spent last night with Sean putting the world and a bottle of whisky to rights. Bit delicate but managed a couple of good farm visits to some growers with plenty of ambition and foresight.

Tried to dry out in a Belfast wine bar before the trip home. Ann Hobson showed me where she's opening her new beauty salon — "Tiger Lily's". She said there was a gap in the market for providing beauty treatment for men.

We've got a different name over here for places like that!

18th August

How on earth do we manage to underpin, (in theory), most of the rooms and almost not pin a first flush and then end up with one of the highest volume weeks for a very long time with the highest percentage of grade one ever?

Must try that again.

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The Problem Page

TRIALS AND TRIBULATIONS

A Topical Issue

By R H Gaze

Joys and Jubilations

This month finds me more than usually pensive. If you are in this business you develop a certain *sang froid* concerning constructive criticism. If you didn't, producing anything would become quite impossible. My formula for self-protection, to ward off clinical self-consciousness and a total loss of self-confidence, is to convince myself that no-one reads this anyway. Don't snigger and mutter unkind words, if you've got this far it proves someone does. I'm conscious, however, that self-protection of this sort and a damagingly thick skin aren't so very far apart. So to return to my present state of pensiveness let me explain the cause.

Having become accustomed to comments, wry and otherwise, concerning the contents of the Problem Page a recent comment took me by surprise. The person concerned wasn't bothered, apparently, by the contents. His suggestion related to the title. The nub of his criticism ran far deeper. In effect he said that life was depressing enough without being constantly reminded of problems. Perhaps we could think of a new title. One, specifically, that didn't include the words problem, trials or even tribulations. Bit of a cracker don't you think? Now perhaps you can appreciate why I'm somewhat pensive. How many more of you find this little column depressing? What an awful thought. If I were to change the title to 'Encouraging tips for improvement from an already excellent and accomplished situation', subtitled 'Joys and Jubilations' would that help? Perhaps I'm being gently asked to add a bit of 'spin'. The present political bad habits might have permeated down even to me.

Well I've thought about it. The pensiveness has evaporated. Being, under a miserable and irascible exterior, an optimistic kind of fellow I consider problems quite an acceptable sort of subject. The main thing that one has to watch is their recognition; they are the very devil if you don't know they're there; and how to overcome or circumvent them. That in a nutshell is I suppose what this column sets out to do. So having taken on board the suggestion I think I'm going to decline to change the title, with grateful thanks of course to the person concerned for what was, I'm quite sure, an intrinsically helpfully meant comment. Problems are only a problem if you don't resolve them and recognising they exist has to be the first step in so doing. And yes I do appreciate that for some people all this sounds like a pious load of manure but we can't alter the macro commercial environment and despair is a potent, natural selection process in a competitive world. The only trouble

being that it selects extinction. If you are beginning to suspect that the introductions to the Problem Page are expanding to the whole page and thus avoid the real subject, try not to be so cynical. It doesn't do any harm, now and again, to examine one's *raison d'être* nor to explore the merits of constructive criticism. One of these days the latter will hit a spot and things will change. Promise.

This Month's Problem

I hesitate, as always, to dive into the subject because like so many it sounds like a boring truism. Everyone pays lip service to it, says they do it quite adequately, so what about something more specific and particularly, more dramatic and exciting? What a build up or do I mean down and what's the ***** subject anyway for goodness sake? Hygiene. See. I told you. But be patient, there are I think some very helpful things to be said on the subject and it is, in my opinion, topical to a high degree.

Having just enjoyed a week in the USA I'm still pondering whether sanitation isn't an even worse word than hygiene in instilling false ideas of what it's all about. But maybe both are just names devoid of misleading implications. Both terms make me think of those advertisements for stuff you squirt down the lavatory. Kills all known germs the message goes. I always wonder who puts their hand down the lavatory, so who cares anyway?

There is I believe a bit of that sort of thinking in our industry. It's long been a bee in my bonnet that we sanitise the wrong places and overlook the important bits. Any list of hygiene measures that enumerates 48 items and covers two sides of paper is, if not missing the main points, certainly obscuring them. The aspect which interests me is the targeting of hygiene and there are some good examples of this currently I think. As with all generalisations they tend to get a bit weak in the detail but to try to make the point let me generalise about two or three topical disease problems which require as their essential elements different hygiene approaches. Namely *Dactylium*, *Verticillium* and Virus diseases.

Perhaps the most pertinent fact that leads me to this subject has been the unavoidable conclusion that control of all three relies essentially on adequate hygiene measures. If these are not in place control, or in the case of the fungal diseases good control, is impossible.





Dactylium

Dactylium

To pursue the fundamental concepts hygiene consists of various parts, beginning with exclusion. None of the parts is probably achievable so the normal approach is to assume only partial success and fall back to the next stage. So having attempted exclusion, the next main step is containment followed by elimination. Both of these once a disease is established become of course part of the exclusion measures. The circle is thus completed and round and round we go. My rather dismissive comments on the 2 pages of 48 measures do need some further comment. Probably all 48 are correct and to some extent valuable but some will be dramatically more important than others. To return to the first example, *Dactylium*.

Experience on the research unit at HRI indicates two important factors. The first being that despite all precautions the odd small outbreak of *Dactylium* will occur. Usually just one patch of Cobweb. The second was that despite massive introductions of *Dactylium* onto the unit for experimental purposes in all cases over several years these 'outbreaks' were totally confined to the houses purposely infected. These facts, together with the information to emerge from Bruce Adie's and Helen Grogan's recent work lead one to the basic ingredients of effective hygiene.

Because even on 'clean' farms, disease will occasionally occur the foundation of a good hygiene programme is good, timely scrutiny of all crops. If the first time you are aware of *Dactylium* is a second flush, heavily spotted, you have temporarily blown it. One is therefore making the assumption that it will breach your protective, exclusion processes. That is not of course to say that these should be relaxed quite the contrary. It is simply making the point that assuming they will fail will enable you to get on with the next phase of protection almost immediately and so avoid a damaging build-up.

Hopefully if your scrutiny is good you will have identified the initial outbreaks before they have been watered. Watering is now known to be a potent spore dispersal mechanism. As is plain salting. Tissue salting is extremely effective. Plain salting is not only ineffective in containing spores it actually is very efficient at dispersing them.

It could be argued that these two factors of rapid identification and effective containment are the basic essentials for *Dactylium* control. There is of course a danger when highlighting top priorities that one will somehow demean or degrade all the others. This isn't intended. Having reduced our list of measures from 48 to two I am not suggesting you ignore the other 46. Protection of casing materials, cropping house filtration, adequate cook-out and all the others are still worth doing but without effective scrutiny and containment they will be ineffective.

Why you might ask is this topical? Surely we have effective chemicals. Yes of course we have but without the measures described they are fighting an uphill and complicated battle. Depending on pathogen resistance some support can be achieved from both Bavisitin and Sporgon. Dorado offers now a viable alternative but most fungicides have a price either in straight finance or slight crop reduction and are infinitely more effective if good hygiene measures are in place.

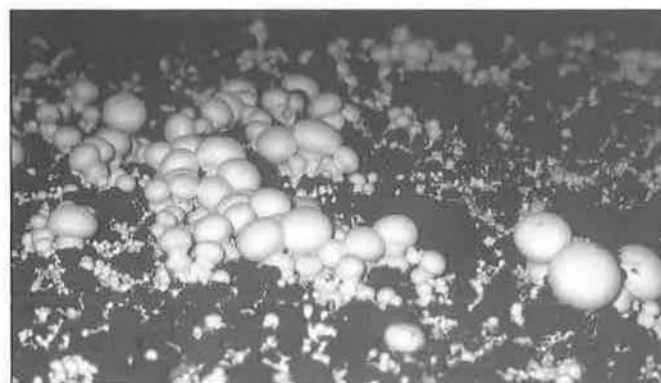


Verticillium

Verticillium

Although I've suggested that *Verticillium* is another example to illustrate the points I'm trying to make the essentials are similar. Perhaps one could go as far as saying that without good hygiene the ability to control this disease with chemicals alone is impossible. Work at HRI has demonstrated the varying resistance levels of *Verticillium* to Sporgon. Also that whilst the more sensitive strains are better controlled, the intrinsic vigour of these strains means the level of control is in effect the same and that control is only partial. Partial control of *Verticillium* is potentially no control at all — unless it is heavily supported by effective hygiene. Having said that the situation is not dramatically different to the one described for *Dactylium*. Perhaps one should take even greater precaution concerning exclusion in terms of casing protection and filtration but otherwise scrutiny and prompt containment are still the bedrock of control. In this instance of course spread is by touch, water splash, water splash onto the floors and thus into dust fraction, flies and it sometimes seems almost by magic. *Verticillium* could be the first homeopathic disease, it seems, to spread through the impenetrable barriers. In this case the topicality is obvious. Without good targeted hygiene you have no chance at all. More effective pesticides are being sought but as yet have not been found.

► page 15



Virus

PETER FLEGG INVESTIGATES



Mushroom Life after Harvest



Not a willing partner

Once a mushroom has been harvested a major concern is, having grown the mushroom fruit body to be of top quality, then to ensure that it reaches the ultimate customer retaining as many as possible of those properties which contribute to it being regarded of high quality. We must not expect the mushroom fruit body to be a willing partner in this enterprise.

Mushroom quality — the human standpoint

One good way of following the progress in recent years of studies on mushroom quality is to read the papers by Burton and his colleagues in successive volumes of *Mushroom Science* since 1989 (Nos. 12, 13, 14 and 15). Over the years, a multi-disciplined approach has been supported reflecting the idea that the 'science of mushroom quality' involves a range of subject areas including agronomy, physiology, biochemistry, biomechanics and molecular genetics.

In their most recent paper (*Mushroom Science* 15) they point out that accurate measurement of the main characteristics of mushroom quality, namely colour, texture, maturity and flavour, the very properties used by the consumer making a rapid assessment in supermarket or kitchen, depend for objective results mainly on laboratory-based techniques. More simplified and rapid techniques are needed so that they can be used on the farm, or at least in the packing shed. One such piece of equipment could be a bruisometer designed and built by HRI staff in collaboration with staff at Coventry University. This machine can deliver a controlled amount of bruising damage so that the ease with which individual mushrooms suffer bruising can be readily assessed.

A rather different objective

While the deteriorating quality of mushrooms after harvest can be measured, it must not be imagined that, having been picked, mushroom fruit bodies simply curl up and die and that such techniques as refrigeration and modified-atmosphere packaging serve only to slow down the dying process. If I may be excused for attributing to it a will of its own, the mushroom

fruit body has a mission. Its main purpose is to produce and release spores so that the species can continue.

We should not be surprised, then, if harvested mushrooms continue to grow. The cap expands, the stipe (stem) lengthens and the gills develop and produce spores. As the harvested mushroom has been separated from the mycelium in the compost and, with it, access to food and water, all supplies for further growth and development must be obtained from within.

Some of the changes going on inside a cut mushroom have been studied, for example, by Nichols and Hammond in 1975. Evidence of movement of both dry matter and water from stipe to cap and gills has been found by several research groups. To support this activity carbohydrates such as mannitol, trehalose and glycogen are broken down together with some soluble protein.

Some die, some live

Several papers in *Mushroom Science* 15 explore what is going on in cut mushrooms. Braaksma, pages 745-749, remarks that one of the most striking features of the harvested mushroom is how it seems to carry on as if still attached to the mycelium. This continued activity, while no doubt important to the mushroom, detracts rather from intentions to maintain quality. 'Negative quality indicators' is the phrase used.

Braaksma, by analysing a large number of cells in the various mushroom tissues, reports that, in the cap, cells enlarge about 5 to 6 times while the space in between the cells increases by about 10%. As the cut mushroom fruit body is self-contained as far as nutrition is concerned, it is concluded that about 20% of the cells will grow at the expense of the remainder which are broken down presumably to supply the where-with-all for the others carry on to growing.

Only a relatively few cells in the stipe remain alive possibly to operate as a transport system for resources to be moved towards the cap and gills. Seventy per cent of the respiratory capacity of the harvested mushroom is to found in the gills. Braaksma looks to future research to discover what growth substances are controlling the metabolic processes taking place in harvested mushrooms.

Water movement, polymer breakdown and genes

Beecher, Magan and Burton (Mushroom Science 15, 733-739) report on studies of water movement with mushrooms after harvest and the factors controlling it. Overall there is evidence for a flow of water from the lower stipe to the gills and peel tissue. A more complete understanding of the mechanisms involved may well require further study. Studies in gene expression in harvested mushrooms (Eastwood *et al.* Mushroom Science 15, 137-142) showed that some 19 genes or gene families have increased expression during the 48 hours after harvest and subsequent storage. That genes are involved in polymer breakdown is considered to be important. For the mushroom to continue its development towards spore production, proteins and polysaccharides have to be degraded so as to be made use of elsewhere. The regulation of genes involved in the undoing of the proteins and polysaccharides at one site for reassembly at another is taken to indicate that the process is a controlled one and not happening willy-nilly.

'Senescence' or 'stress'?

In their Mushroom Science 15 review of the state of the 'science of mushroom quality', Burton and colleagues drew attention to two ways of looking at the biology of harvested mushrooms.

One way is to regard the harvested mushroom as undergoing 'senescence' which includes the resource mobilization, translocation and continued morphogenesis already described. Another view is that the harvested mushroom is more properly considered as a 'stress condition'. After all it would not be 'natural' for a mushroom to be separated from its supporting mycelium while still in its prime. I 'investigated' life expectancy and death in mushrooms over a couple of years ago (Mushroom Journal No. 580, May 1998) but this is not a discussion I wish to enter. I shall await events.

The best length of stem?

One question I would like to follow up, though, is that relating to the optimum length of stem on harvested mushrooms. It seems clear enough that after harvest the structure of the lower stipe of the mushroom is systematically dismantled and the resulting nutrients and water transported towards the gills.

The stem becomes a reservoir of food and water for the rest of the fruit body. From the mushroom's point of view I would expect that the greater the amount of stipe left attached to the cap, the more resources there will be available to complete the job of spore production and dispersal.

Our interests as growers, salesmen or customers differ from that. Preservation of good quality is our aim.

So, would as short a stem as possible reduce the 'mischievous' a mushroom can get up to in affecting quality? Or would a nice long stem help to keep the mushroom alive and fresh? There are also other considerations. Cutting stems as short as possible can reduce the weight of crop going for sale. Incidentally, does anyone remember the days when one could market 'stems and pieces'?

Another consideration is that after harvest the stem can continue to elongate, sometimes causing damage to adjacent mushroom caps.

It could be that current practice has got it about right, but surely not everyone can be sending their mushrooms off with exactly the right amount of stem? How is that 'right' amount to be defined? Length or weight of stem? Will it depend on the size and stage of maturity of the mushroom?

I wonder if anyone will care to offer an opinion?

It seems to me that in our pursuit of top quality for harvested mushrooms, we may have to indulge, with the mushroom, in a little biological horse-trading. ■

PROBLEM PAGE — (continued...)

Continued from page 13

Virus

And then there is virus. The only control known is hygiene. In this case protecting young crops from the ones before. A lot has been said and written recently about virus control measures. They are the simplest of all, in theory at least. From phase II through to the end of phase III, traditionally, virus control has depended on the exclusion of mushroom spores and mycelial fragments. This includes starting with clean trays, shelves or phase III tunnels. Virus infection is of course by mycelial anastomosis.

The big question, having said traditionally, is whether this still applies or whether these vulnerable stages must be expanded to include casing materials, case running and cropping. However, that's probably a subject best dealt with as a separate item. May be next month.

Summary

This has turned out to be a longer issue than intended. The rationale behind the choice has been the growing conviction, as we unravel disease resistance profiles, pesticide behaviour

in casing and the biology of some of our current diseases, that hygiene for control of such diseases as *Dactylium*, *Verticillium* and Virus is not just a desirable adjunct to chemical control but an entirely essential element in control. In the case of virus the sole element.

Having reached such a conviction my old passion for hygiene targeting has been awakened from its slumbers. I have always been incredibly and genuinely impressed by the comprehensive measures outlined by advisers to the industry. One such memorable list I came across in Ireland. It included disinfecting the steering wheels of pickers' cars.

What I find less impressive and more concerning is the fact that these lists rarely prioritise any measures. What I've set out to do is to suggest that we consider carefully what will have most effect and to sort that out first. You can disinfect the steering wheels till the cows come home if you are still missing bubble in the first flush. Maximum effect for minimum input is not a bad motto. So I agree hygiene is a boring issue but it is essential, it is topical and it's got little to do with polishing the taps. ■

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Recycling Used Mushroom Substrate (Spent Mushroom Compost) as a Soil Improver

By Susie Holmes and Selwyn Richardson, ADAS

Fresh mushroom production of 1,000 lbs/week generates about 160 to 170 cubic metres of fresh spent mushroom compost per year which has to be disposed of. Spent mushroom compost, more appropriately called "used mushroom substrate" (UMS), has long been used as a soil improver by the landscaping industry. But how big is the market and how important a player is UMS? Here, Susie Holmes and Selwyn Richardson of ADAS discuss the results of an industry survey.

For permission to publish this article based on an industry survey, our thanks go to the authors Susie Holmes and Selwyn Richardson of ADAS Boxworth, Cambridge.

What is a Soil Improver?

The term "soil improver" includes true soil improvers, which are organic materials incorporated into the soil to improve its fertility/structure, tree planting composts (where localised improvement in the soil is needed), surface mulches (used to suppress weeds and conserve soil moisture) and specialist products such as turf dressings.

True soil improvers are materials which are added to improve a soil's physical condition, either by improving soil structure and/or increasing water holding capacity. To achieve this they should have a high organic matter content. pH and nutrient content are relatively unimportant although some soil improvers, such as farmyard manure, do supply plant significant nutrients in addition to their benefits to the physical nature of the soil. There should ideally be a wide range of particle sizes from dust up to about 25 mm.

Tree planting composts are a specialist form of soil improver used where localised improvement of the soil is needed. Again the main component is organic matter but a significant nutrient content is also desirable, and particle size should be slightly smaller.

Turf dressings are similar in properties to tree planting composts, but a lower organic matter content can be tolerated. The most stringent requirement is a fine particle size.

Much chipped bark is used as a surface mulch but UMS is less suitable because it degrades too quickly and will support weed growth so does not control weeds in the same way as a bulk mulch would.

Background

Over the four year period 1996 to 1999 ADAS, assisted by Aspinwall & Company, carried out a study of the use of peat and alternatives as soil improvers and growing media in the UK. The research was funded by the Department of the Environment, Transport and the Regions (DETR) who advise planners and developers on the need for peat extraction and in particular seek to maintain a balance between nature conservation and peat extraction interests. Used mushroom substrate is one of the alternatives to peat included in the study. A very small quantity of UMS is used in growing media formulation but, more significantly, it is used as a major alternative soil improver to peat. It is better than peat for this purpose in some respects as it supplies some nutrients as well as improving soil structure. If UMS is used in a growing medium it has to be diluted with low nutrient material to lower the salt levels to acceptable levels for container-grown plants; it also has a pH which is rather high for many plant species unless this can be modified by dilution with a low pH material.

How the Information was Collected

For peat and alternatives such as bark and cocoa shell, the thirty major commercial producers of soil improvers and growing media were contacted. All supplied data in confidence on their sales to professional growers, amateur gardeners, local authorities and private sector landscapers. In addition to this producers of composted green waste were ➤

also included because of the increase in composting due to incentives not to land-fill green-waste. The number of landfill operators, local authorities and other organisations composting green waste (e.g. tree and shrub prunings, lawn trimmings) increased markedly over the four years and for 1999 a total of sixty producers were contacted.

Because of the large number of mushroom growers in the UK and Northern Ireland, it was not practical to carry out an exhaustive survey of all the growers about the uses made of UMS. Instead an informal survey was made at the beginning of 1999 to ascertain use in 1998. The assistance of the MGA and HRI Mushroom Research Unit was readily obtained. In due course 34 growers were identified to include most of the very large scale growers, a proportion of medium scale growers and a significant number of small scale growers since their disposal routes might be different from others. A wide geographical spread across the UK was also obtained.

Seven growers were visited to collect supply data and to discuss in detail the issues involved in order to obtain a full understanding of UMS disposal. This face-to-face approach was considered essential to enable extrapolation to the wider industry from the producers contacted. All the growers visited were extremely co-operative over supplying information on what they did with their UMS.

The remaining 27 growers were contacted by letter and telephone to obtain supply data to the three end markets of interest, amateur gardeners, local authorities and private sector landscapers. *It must be noted that supply to agriculture and to*

landfill site improvement was deliberately omitted since only the markets where peat has traditionally been used were of interest.

Whereas most growers were personally able to provide accurate information, a number of growers, notably the large scale producers, had their UMS removed by contractors and had no knowledge of the end use. Subsequently, fourteen third parties, mainly haulage companies and horticultural suppliers were contacted and all willingly supplied information.

The Findings

Accurate information was obtained from a major part of the industry. Since each producer also disclosed approximate fresh mushroom production data, it was possible to make a reliable extrapolation of the results to the entire industry.

The soil improver market is very seasonal, lasting from n February to the end of May with a smaller peak of activity from September to November. Because of this, calculations based on fresh UMS overestimate supply since much product is temporarily stored during slack market activity and in this time volume reduction can be up to 50%. After making necessary and reasonable adjustments, the following best estimate of the volume of UMS actually supplied to the consumer by the entire mushroom industry is:

Table 1. Annual Supply of UMS as Soil Improver in the UK. (cubic metres)

Amateur Gardeners	Local Authorities	Professional Landscapers	Total
77,500	14,000	190,500	282,000

Making allowances for change in weight during the production process, the density of UMS and subsequent volume loss during storage and maturation, it can be calculated that approximately 900,000 cubic metres is available for disposal in the UK each year. Thus the supply of 282,000 cubic metres to these three markets represents about a third of the total produced. Most of the remainder goes to agriculture.

It was apparent that there is significant regional variation in supply with the majority in Scotland and Northern Ireland going to agriculture rather than the markets of interest to this study.

The landscaping sector is dominant, accounting for 68% of

the total used. Amateur gardeners used 27% and opinion is that more than half of this is obtained from small scale producers at the roadside. Direct supply to local authorities has dwindled in recent years because of the introduction of competitive tendering.

So How Big is the Market?

For comparison, the supply of peat and the main alternatives as soil improvers in 1999 was found from the full survey to be (cubic metres):

Table 2. Total Supply of Materials as Soil Improvers to the Three End Markets in the UK. (cubic metres)

Bark	1,087,900
Used mushroom substrate	282,000
Composted waste	216,300
Peat	145,000
Cocoa shell	28,300
Wood waste	20,800
Others	51,600
Total	1,831,900

Bark is the dominant material, accounting for 60% of the total market of 1.8 million cubic metres per year. UMS is second, currently occupying 15% of the market. The use of peat as a soil improver has fallen slowly over the years. The amount of composted green waste used increases each year and as this material continues to be produced at ever more sites, with potential for lower transport costs, it will pose the main threat to the use of UMS as a soil improver in the future.

UMS however has some advantages over composted green waste in being generally more consistent in quality and a 'known' material to horticulturists. Organisations such as the National Trust are interested in using UMS as a soil improver in their gardens, particularly that from organic producers. Grow-

ers of organic vegetables would also be interested in organic UMS and this is a sector that is increasing. With more active marketing of the product some mushroom growers have been supplying large volumes of UMS to such customers. One producer in our study commented that it would help if UMS could be supplied to large gardens/landscapers in semi-bulk bags, such as the ones used for aggregates. Better promotion of the product as a horticultural soil improver would undoubtedly help.

The authors would like to take this opportunity to warmly thank the 34 mushroom growers and 14 supporting companies who kindly supplied data. Also particular thanks for assistance and encouragement from the MGA, Richard Gaze and Ralph Noble. ■

***Look out for the full MGA 2000
Conference Programme on pages 24 & 25
and Conference Booking Form
enclosed in this issue***

SINDEN AWARD 2001

CALL FOR NOMINATIONS

The Sinden Award may be conferred each year, at the discretion of the MGA Council, in recognition of an outstanding contribution to the Mushroom Industry worldwide and to the Mushroom Growers' Association, with particular, but not exclusive, reference to research, development or advisory work (whether undertaken within a research establishment, on a commercial farm or elsewhere).

Nominations for the 2001 Award are now invited. The Award is open to anyone involved in the Mushroom Industry worldwide and there is no age limit, but no individual may nominate himself/herself.

All nominations for consideration should be in English and should be made to the MGA Senior Administrator by 29th December 2000 at the latest, accompanied by a paper of not more than 200 words in length, giving biographical details of the nominee and outlining the reason for the nomination.

The recipient of the Award may be invited to give the Sinden Lecture at the ensuing M.G.A. Annual Conference and/or to submit a relevant article for publication in the Mushroom Journal, as appropriate, at the discretion of Council.

OBITUARY

Peter Stanley-Evans

Shackleford Mushrooms Ltd
(MGA Chairman 1960-1961)

Due to a number of unfortunate oversights, an obituary to Peter Stanley-Evans has never appeared in the Mushroom Journal. Given his standing in the industry we would like to take this opportunity of putting the record straight. Sadly, Peter passed away earlier this year on 14th February. He was one of the few remaining individuals of a group, who can best be described as the "old school" of mushroom growers.

After taking a degree in Horticulture at Wye College, where he first came across a crop of mushrooms, he joined up to fight for his country during World War II. There followed a most distinguished war career, in which he served in tanks in the Queen's Own Hussars, mostly in North Africa. It was on leave in Egypt that he met Barbie, who was to become his future wife.

It was in 1945 that they came home and, like many others of his generation, decided that some form of market gardening was the way forward. He put up glasshouses in his father's back garden and proceeded to grow carnations, chrysanthemums and tomatoes. The words "Dutch lights" were often mentioned in conversation during later years, as were stories of having to light hundreds of candles to protect chrysanthemums, whenever severe frosts were forecast! He then decided his site was not entirely suitable for growing flowers, so he introduced mushrooms into the glasshouses. It soon became apparent from an economic point of view, that this was the way to go and on condition that they concentrated exclusively on mushrooms, his son, David, joined him in the business.

All of a sudden a whole new vocabulary sprang up - fish boxes, army beds, Atkinson spreaders, and braziers for pasteurisation. For the first time in his life, he started to make some serious money, most of which was ploughed back into the business. Aided and abetted by David, yields were raised from 2-3lb per sq. ft. to 8-9lb, which became the norm, mainly as a result of the deep tray system, which they had pioneered. Peter also spotted a niche for the large open mushroom and to this day Shackleford Mushrooms is synonymous with the breakfast flat.

Peter's enthusiasm and abounding energy were vast - he served on a number of committees and had a long association with the research side of our industry and was closely involved with GCRI as it was then known. He became Chairman of the Mushroom Growers' Association in 1960/1 and was a Life Honorary Member of the MGA. In 1986 he won the Sinden Award.

His great antidote to growing mushrooms was his fishing. Whenever he travelled, he either took a rod with him or was always able to borrow one, should the opportunity to cast a fly ever present itself. In later years he acquired a share of a boat on the river Itchen and his river management and skill with his rod were of the highest order. His fishing was a great source of comfort to him at difficult periods of his life, when firstly he had to cope with the tragedy of the illnesses and loss of both his children and then, more recently, looking after his wife Barbie during her long protracted battle with Parkinson's disease. No husband could have been more devoted in nursing her than he - typical of the man he was. Peter was himself looked after by his brother Mike during his last months and thanks to him his final days were as comfortable as they could have been at home.

As far as Shackleford Mushrooms is concerned, Peter's passing away is the end of an era. None of his grandchildren are involved in the business and so the name Stanley-Evans will rely on reputation and memories for survival. "The old man", as he was affectionately known, has left a void never to be filled.



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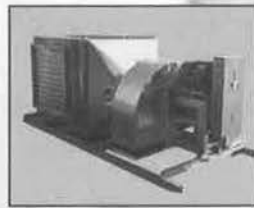
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Cropping Records — are they worth the effort?

Peter Flegg has been asking around for some views and thanks the following who took time to give him their thoughts.

*Grahame Brown, Kanes Foods Ltd., Worcestershire,
Trevor Denham, Blue Prince Mushrooms, Surrey,
Ruth Hanmer, Baron Jackson Welsh Mushrooms, Wales,
Neil Paton, Halfland Mushrooms Ltd., Scotland,
Jack and Angie Symonds, Elf Mushrooms, Suffolk, and
Henry Wood and Sons, West Yorkshire.*

There was a time when somebody would walk into each cropping house at least twice a day, and faithfully write down on a prepared sheet of paper such things as air temperatures, compost bed temperatures, relative humidities, fan settings and perhaps the carbon dioxide concentration in the air. Also on this sheet would go times and amounts of waterings, if not the amount then whether 'light', 'medium' or whatever, together with records of disease and control measures taken.

Nowadays, with automatic monitoring and computer recording with printout facilities, one might think things would be completely different. Well things are not. Without exception all the contributors have someone visit each house at least twice daily to keep the records up to date. Not all, of course, have computerised facilities or even a distant recording system, but even those who have all the 'mod cons' are still also collecting their records in the old, well-tried way. Most seem still to be using the rather fragile mercury-in-glass thermometers in addition to more modern sensors.

'I love my maximum — minimum thermometers' said one, 'so useful to tell you whether something happened during the night'.

Why still 'live in the past'?

So, why not leave it to the computerised monitoring and recording system if you have one? One, half-jokingly, replied 'We don't trust the computer'. Well, that is fair enough, computer systems have been known to crash. A more serious reason is that manual recording of the cropping house conditions at least twice a day imposes a discipline on growers. For a short time each day somebody is actually thinking about what is going on in the house while actually in it and looking at the crop. Otherwise there would be a temptation to rely on the data readily to hand on a chart or a screen and not to go out into the cold and rain and visit the crop — armchair growing!

The practice also provides a double check on the computer readings.

As well as keeping records of environmental conditions and cropping practice details, all contributors maintain records of daily harvests, sometimes with a note of the grades harvested. Most also keep details of the performance of each individual picker.

Immediate value — high

When it came to discussing the use of records agreement was unanimous that, for the day-to-day management of the crop, records were essential. Ensuring that environmental conditions were kept within the required limits and watering had been carried out at the correct times were obviously dependent on the proper upkeep of records. Where appropriate, they also allow management to be sure that the correct intervals between pesticide application and harvest had been kept.

At the end of cropping, without exception, the final crop yield is recorded and makes a ready check on the general performance of the farm. Comparison with records for recent crops and for those of the same time last year are then readily made.

Records of picking rates are obviously of immediate value for calculating pay and for spotting poor performance.

Opinions on subsequent value vary

Once the crop in question has become used, compost and all the relevant records filed away, then opinions on the subsequent value of those records showed considerable variation. Summarising, the variation ranged from 'an invaluable management tool' to 'well, I suppose we should make more use of them'.

Several growers pointed out that certain records were legally required to establish that the farm had practised 'due diligence' and so acted as a form of defence should their product quality be called into question.

An aid to trouble-shooting?

A possible use of past records that came readily to mind, with most growers responding, was as a means of solving a cropping problem. Despite that, not many examples of their successful use in that way came to mind.

One grower said that when it came to seeking the cause of a problem resorting to past records came 'pretty low on the list'. 'They never seem to answer the question and often cause confusion!' Another remarked that 'you keep all those records and wonder why, yet, on checking back and you find that the information you want is not there, you feel cheated and ask, why isn't it there?'

A few positive results from checking past records were remembered. One grower felt able to correlate crop yields with changes in straw and casing quality and had been able to track down a suspected loss of cropping area due to the way the plastic covering of their compost blocks had been managed. Yet another recalled being able to relate persistent poor yields to excessive temperature levels during spawn run.

More than one grower felt slightly guilty about not making the most of their records. A typical comment was, 'We keep lots of records, but can never find the time to look at them — like buying video tapes and never getting round to watching them'.

Aids to staff training and management

More than one farm found the records were useful in staff training and management. The records could be used both as a training tool and to highlight individual training needs. On at least one farm each picker's mean picking rate was posted on the notice board. This allowed the picking staff to be aware of how well they were performing relative to their peers and, hopefully, led to improvements.

As a management tool, the records were discussed at regular meetings helping to show up areas of cropping practice, which needed attention.

While other farms may do it, only one grower mentioned carrying out regular staff audits using a scoring system to record the capabilities (or otherwise) of each staff member.

Customer surveys

In addition to keeping cropping and staff performance records, some growers also kept records of replies to customer surveys. The surveys asked customers for their views on such things as the farm product, and how they were treated by farm staff — on the phone and on visits to the farm.

One grower made a point of asking customers if they knew how to store mushrooms correctly. Most replied that they did. The next question on the survey form asked the customer how they actually stored the mushrooms. This revealed those customers who required some guidance and, when given, perhaps helped to reduce complaints about product quality.

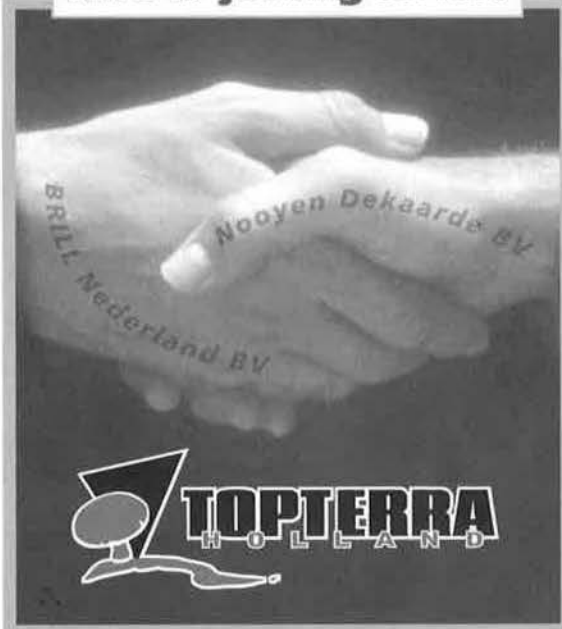
So, is it all worth it?


Accepting that taking crop records is a repetitive job, often the item being recorded is mostly what you'd expect it to be, and that there is now a considerable statutory element to a lot of the records needed, not once during our conversations were words such as 'boring', 'time-wasting' or 'red tape' ever used. Taking and keeping records seemed to be accepted as part of the job of growing mushrooms. Much of the record taking was regarded as essential and many felt that those records ought to prove useful at some later date.

If anything, most growers appeared to carry feelings of regret or guilt at not being able to find the time to make better use of their records. This, despite when they had tried, the results were not an outstanding success. Some felt a degree of reassurance in having the records in store and certainly no one reported ever having thrown any away.

So, the answer to the question ... whether record keeping is worthwhile must be a resounding 'Yes'.



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Letters

Write to the Editor, Mushroom Journal, 2 St Pauls Street, Stamford, Lincolnshire PE9 2BE

TO THE EDITOR

27th July 2000

Dear Sir

I am sad to be leaving the mushroom industry after thirty years of hard work, satisfaction and not a few sleepless nights. I thought it might be useful to quickly outline the problems we have encountered recently in case they can provide a cautionary note to others.

For many years we thrived on a combination of loyal staff, loyal customers and large number of small sheds which provided a continuous supply of fresh mushrooms. We were attentive to hygiene and had no serious problems although we had no filtration and only rudimentary air-conditioning due to the prohibitive cost of equipping so many small units. We have even re-invested a considerable amount in building a new shelf farm to increase our efficiency and continuity.

In about 1990 we could see that we would never be big enough to supply supermarkets and so headed for the niche markets. We began to grow more large flats and started on oysters and other exotics. At the same time we kept supplying our longstanding wholesale and catering customers with cups and buttons.

Our troubles began as, with so many other farms, when the market prices began to fall while costs continued to rise. Our customers, however loyal, could not bring themselves to pay us more when they could buy so much more cheaply in the markets. Our long-serving employees still needed an annual wage increase. The old tray farm became uneconomic and had to be closed down. With only the shelf farm on a weekly fill the reliable team of pickers was made to appear inflexible due to the no longer continuous flow of mushrooms. It was impossible to obtain any extra pickers in our area, which has virtually no unemployment. The customers complained once a week about the lack of freshness.

Consequently we were not operating at our optimum fill and began to fall short of mushrooms. This was exacerbated in the last year or so by the appearance of the patch syndrome.

In the end we had no choice but to close before the finances ran out.

Before I finish I would like to make a comment or two about our Mushroom Growers' Association. When things were going well in the not so distant past in the U.K. membership numbered several hundred. There was time and energy and eloquence aplenty for vigorous open debate of strongly held views.

However, the Association has recently been through a torrid time on which we will not dwell. It has emerged with, on the plus side, a brave and sincere Chairman in Dennis Watkins and a dedicated secretariat which has had a lot to put up with.

Meanwhile on the minus side, we have

a management structure, which now appears to be top heavy.

The over-riding need now is to concentrate on providing positive member services at a reasonable cost. Most of our members are struggling to survive and while I have some time to share I have offered, with Dennis's agreement, to contact as many members and non-members as I can in the South of the country to try and establish how we can deliver those services. I would be grateful for any positive suggestions.

Yours faithfully
David Bird
Buckinghamshire

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BOURNEMOUTH 2000

26th - 28th October 2000

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Welcome to Bournemouth

'One of the liveliest places in Britain' is how *The Times* newspaper recently described Bournemouth, the location for this year's Conference. Wrapped around attractive gardens and just a short walk from the Conference venue, the Royal Bath Hotel, the vibrant and cosmopolitan town centre buzzes with activity all year round.

For decades, people have visited Bournemouth for therapeutic purposes and, for the new millennium, it's retail therapy! — in the many elegant shops. For culture vultures, there are many sites of historical interest, including the award-winning Russell-Cotes Art Gallery and Museum situated next door to the Hotel.

The Conference Hotel, the Royal Bath Hotel, is very proud of being the only hotel to have maintained its five star rating since the system was introduced nearly a century ago. Nestling in its own secluded grounds, with excellent views across the sandy bay, this classically-styled hotel is very much one of a kind, with service and friendliness its watchwords. The Royal Bath Leisure Club's indoor swimming pool, spa and beauty therapy will afford delegates the opportunity for revival and relaxation.

Conference Programme

Registration

Thursday, 26th October	- 09.00 - 17.00
Friday, 27th October	- 08.30 - 12.00

Lecture Programme

Friday, 27th October
De Vere Suite, Royal Bath Hotel

MORNING

Chairman's Opening Address

Dennis Watkins, Chairman of the MGA

2000 SINDEN LECTURE

'The Longest "Problem Page" ever — an exercise in egotism'

Presented by Richard Gaze, formerly of Horticulture Research International

'Added Value'

Speaker: Nigel Taylor, Category Purchasing Manager, Geest plc

AFTERNOON

'The Future of Organics'

Speakers: Harold Linfield, formerly of Chesswood Produce Ltd

Rob Haward, Horticulture Development Officer, Soil Association

RICHARD DENNY

A presentation will be made by Richard Denny, one of the country's top motivational speakers.

Growers' Surgery

Delegates will have the opportunity to discuss, informally and on a one-to-one basis, any growing problems they may have. The Growers' Surgery will be manned by mushroom scientists from HRI, during the Lecture breaks.

Farm Walks

Saturday, 28th October

A busy day of Farm Walks, encompassing visits to two sites, has been made possible for you by kind permission of Martyn Dewhurst, Managing Director of **Tunnel Tech Ltd**, and the John Lewis Partnership, who own **Leckford Mushrooms Ltd**. The programme of visits will begin at Tunnel Tech Ltd, where delegates will walk round the site which produces 700 tonnes of phase I compost per week, 600 tonnes of which are filled into the phase II tunnels. A Farm Walk at Leckford Mushrooms, with its 15 growing rooms and output of 22,000 kgs per week, follows. The visits will be rounded off with lunch at Leckford Mushrooms.

For those who wish it, coach transport will be provided to the Farm Walks and back to the Hotel.

Conference Social Programme

Thursday, 26th October

Golf Tournament. The Golf Tournament will be held at Canford Magna Golf Complex, approximately 20 minutes' drive from Bournemouth. The challenging 6,496 yd course of undulating grassland features a good combination of par 3, 4 and par 5 holes.

First tee-off is at 10 a.m.

Coffee will be served on arrival and a buffet lunch from 2 p.m. Please bring your handicap certificate or letter of introduction.

Thursday, 26th October (evening)

De Vere Suite, Royal Bath Hotel

Hosted drinks

Thursday evening begins with drinks, kindly hosted by the Mushroom Allied Trades' Association.

The evening continues with the...

Chairman's Reception and Buffet, when delegates will be entertained by a 'roving' caricaturist — and a Race Night provides the final act of entertainment for the evening.

Friday, 27th October

Accompanying Partners' Outing

A morning guided tour of the medieval and quite special Salisbury Cathedral has been arranged for the Partners' Outing. Partners will return to the Hotel in time for lunch. The afternoon has been left free for you to enjoy the Hotel's extensive leisure facilities or to take a breath of sea air.

Conference Banquet

The Royal Bath Hotel's Garden Restaurant will be the setting for the Conference Banquet. Following last year's much enjoyed evening, we have, again, an after-dinner speaker and, to cap the evening, there will be dancing until 1.00 a.m., to the band 'Tequila'.

(Dress optional — black tie or lounge suits).

Getting to the Conference

By Road Bournemouth is 104 miles from central London, 142 miles from Birmingham and 230 miles from Manchester.

Improved road links include the M40 and the Newbury by-pass.

By Rail There are direct and cross country routes from most large towns. The Royal Bath Hotel is only a five-minute drive from Bournemouth rail interchange.

By Air Ryanair operates daily flights from Dublin to Bournemouth and Gill Airways fly direct to Bournemouth from Edinburgh and Glasgow.

Southampton Airport is a 25-minute drive and Bournemouth is also easily reached from Heathrow Airport.

Car Parking

Valet parking is available in the Hotel's 70-space, covered car park at the rate of £8.50 per night (inc VAT), on a first-come, first-served basis.

Alternative parking exists adjacent to the Hotel.

To make your Conference booking:*

Simply complete the Conference Booking Form enclosed in this issue and send it, with your payment, to:

Mushroom Growers' Association
2 St Pauls Street, Stamford, Lincs PE9 2BE
by 6th October 2000.

Note lower delegate fees for 2000!



Bookings at the Royal Bath Hotel

Rooms at the Conference Hotel are filling up fast. To secure your accommodation, contact the Hotel now! (Please see May 2000 Journal for booking details and rates.)

We look forward to meeting you again in Bournemouth.

Cecilia Timewell

The 26th Anniversary Annual Golf Match

for the Hensby Challenge Trophy on Thursday,
8th June 2000 at the Links Golf Club, Newmarket

They say that the fun things in life are worth waiting for and I'll go along with that as, after ten years at the MGA, I finally had the opportunity to attend the annual golf match between the Mushroom Growers and the Allied Trades, which took place at the Links Golf Club, Newmarket, on Thursday 8th June 2000.

As a non-golfer, I was not quite sure what to expect, but set off armed with camera and an expectancy of champagne, expertly dispensed by Gloria Woodcock and Angela Alderton at the 11th tee, during the afternoon's play! I certainly did not expect such a glorious, warm day, even though it was June. So, all was set for a fine day's golf.

MGA Chairman, Dennis Watkins, having 'defected' to the suppliers' team last year, was back (quite rightly) playing for the Growers, despite Paul Maxwell's publicly-announced 'life-long' ban last year, imposed for playing, and winning, for the opposition!

The 10 teams were unevenly balanced, due to a last minute withdrawal, which gave Barry Woodcock (Allied Trades) the opportunity to turn in a bravura solo performance in his match against Paul Maxwell and Eamonn Watkins.

Despite having started the day with a badly sprained finger, Barry won by eight and seven, the biggest winning margin of the day. His win, which clinched the match for the Allied Trades, prompted Ferd Hensby to remark 'You should damage your finger more often, Barry'.

Match Results:

Mushroom Growers	Result	Allied Trades	Score
Paul Maxwell 8 Eamonn Watkins 28	Lost to	Barry Woodcock 14	8/7
Michael Dye 8 David Mann 20	Lost to	Sandy McGregor 8 Brian Annis 20	5/4
Jon Fuller 9 Dennis Watkins 28	Lost to	Paul Ellis 6 Jean Marsh 28	3/2
Jerry Rolls 10 Chris House 15	Halved with	Chris Pitcher 10 Graham Knights 17	=
Chris Neville 10 Yoli Dye 20	Beat	Andrew Morton 12 David Boyce 21	6/4
Brian Webster 24 Kyriakos Ntjortis 24	Beat	Graham Panter 14 David Petts 28	7/6
Graham Mann 15 Godfrey Edwards 17	Lost to	Alan Malin 16 Bill Marsh 17	2/1
Bill Punton 15 Billy Mann 24	Beat	Martyn Dewhurst 16 Bryn Leaker 18	1 UP
Tim Beevor 17 Andrew Lake 18	Beat	Peter Lynch 17 Jason Allum 19	1 UP
Chris Tyacke 19 Felix Snell 26	Lost to	Dennis Howard 17 David Wright 24	2/1

MUSHROOM

GROWERS 4 1/2 ALLIED TRADES 5 1/2

Tally of matches to date: Mushroom Growers 14, Allied Trades 12

Event Sponsors: AEM b.v, Agricultural Supply Company (Fairford) Ltd, Autec Ltd, CC Imports, Gough Packaging Ltd, Growing Designs Ltd, Harte Peat Ltd, Hensby (Blue Prince) Composts Ltd, LMB (Baz-Roll) Services, Mushroom Advice & Analysis, Shepherds Grove Ltd, Sylvan Spawn Ltd, Traymaster Ltd, Tunnel Tech Ltd and Waveney Mushrooms Ltd



Barry Woodcock manages to miss the bottle of champagne at the 11th tee

In the evening, following a most convivial and tasty dinner, Paul Maxwell and Barry Woodcock, who have been running the event for 15 years, paid tribute to Sylvia and Ferd Hensby, who instituted the Challenge Trophy and wished Ferd and Sylvia a speedy recovery from their recent car accident.

The presentation of prizes was then accomplished, despite much witty repartee between Paul and Barry, who, in conclusion,

thanked the 15 sponsoring companies and everyone who attended.

Yes, it was a very enjoyable initiation.

Cecilia Timewell



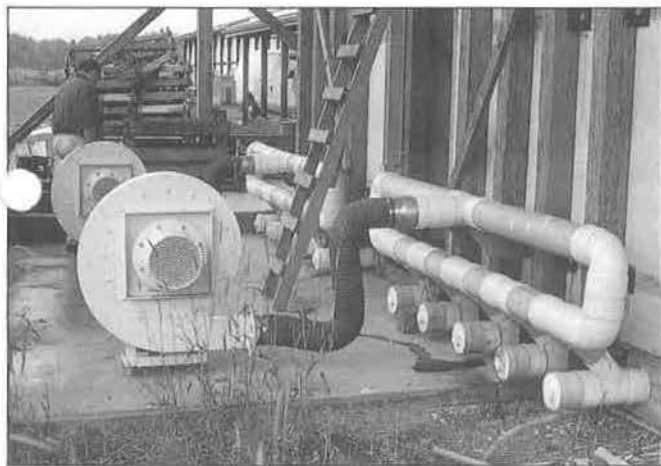
Aerated Bunker Composting in Pennsylvania

By Ralph Noble, HRI Wellesbourne

During June, I attended the 42nd Penn State Mushroom Short Course at the Nittany Lion Inn State College, Pennsylvania. This was followed by a two-day visit to the mushroom growing centre of the world (at least according to the Americans!) Kennett Square, Pennsylvania.

Penn State Mushroom Short Course

During the Short Course, there were three presentations on Phase I bunker composting. David Beyer of Penn State University outlined the main advantages of aerated bunker composting, such as reduced odours and composting times, as well as the latest developments in North America. Luke Klunder of Gicom described the latest developments in Europe. John Pecchia, also of Penn State, presented his work on the use of reduced poultry manure formulations in decreasing odour levels. During the Short Course, a visit was made to the Mushroom Training and Development Farm (MTDF). Here there were two 20-tonne bunkers, aerated with spigot floors and controlled with a Fancor computer. Air samples were drawn from the compost for oxygen analysis, first through ammonia scrubbers to avoid damage to the sensors. The tunnels could be enclosed by doors but there was no biofiltration of the exhaust.



Aeration system at the back of the aerated Phase I tunnels at the MTDF test facility, Penn State University

Laurel Valley Mushrooms

I travelled with my host, Prof. Ken Lomax of Delaware University, from State College to Kennett Square through the Amish villages of Lancaster County. The first visit was to Laurel Valley Mushrooms, a company producing around 4000 tonnes of Phase I compost weekly. Mr Glen Cote showed us around the site, which produces compost using conventional windrows as well as in two new 850 tonne aerated bunkers, which started production in January. The same ingredients are used

for both composting systems: wheat straw, horse stable bedding, hay, poultry manure and gypsum. Cotton seed hulls are added at 2 tonnes/100 tonnes compost. Straw and hay are initially pre-wetted with recycled water in a dip-pit for 10 minutes. The wheat straw is gradually replacing the hay inclusion since this has improved compost quality. Rye straw was found to be too tough to compost. **There are few restrictions concerning the ingredients of organic mushroom compost in the US**, other than inorganic nitrogen sources, such as urea, must not be used.

Aerated bunkers

The bunkers, 30m long, were constructed by Double T and have a high pressure spigot floor aeration system. Aeration is controlled with a timer: 3 minutes on, 7 minutes off. There are 3 temperature probes and an oxygen sensor probe in each tunnel. Minimum oxygen levels during composting are 8%. All the aeration nozzles are cleaned before refilling; without cleaning, about 30% of the nozzles become blocked after two months' use.

The aerated bunker composting regime consists of a 4 - 5 day pre-wet in stacks (temperatures reach 60°C) and 8 days in the tunnel (mixed at intervals of 2, 3 and 3 days) (temperatures reach 81°C). The tunnels have facilities for overhead conveyor filling but are currently filled with front-end loaders.

Windrow composting

For windrow composting, dipped straw and hay are mixed with horse manure and pre-wetted in stacks for 12 days. Half of the compost supplements are added to the pre-wet stacks, the other half are added during the 9-day windrow composting period. All the compost is pasteurised on the farms in shelves. Both the windrow and aerated bunker composts have similar analyses: at filling, moisture 73%, nitrogen 2% of dry matter and ammonium nitrogen 0.3% of dry matter; at spawning, moisture 68%, nitrogen 2.5% of dry matter, ash 29% of dry matter.

So far, the bunkers have performed better than the windrows in the winter (mushroom yields 36 and 32 kg/m²) but worse in the spring (mushroom yields 36 and 39 kg/m²). Due to the reduction in odours and more consistent performance, the plan is to move composting completely into bunkers and a further seven bunkers are being constructed. ➤



Aeration system at the back of the aerated Phase I tunnels at the MTD test facility, Penn State University

Hy-Tech

We were guided around the composting site by Mr Buster Needham. Hy-Tech produces around 2400 tonnes of compost weekly, which is sold to farms for pasteurisation in shelves. Most of this compost is still produced in windrows although the site has a test aerated bunker which has been in operation for 18 months. A further two, 850 tonne aerated bunkers have just been constructed. The bunkers, 37m long, were built by a local constructor with an Australian spigot floor aeration system. The bunkers are of concrete construction, with a rubber layer sandwich to reduce rust from humidity and ammonia. They have a 0.8m fall from back to front to allow drainage of run-off water. The tunnels are controlled with a Fancom system; the plan is to use the same aeration regime as in the test facility: 3 minutes on/5 minutes off with compost temperatures up to 60°C, the off-time is increased to 10 minutes with higher temperatures. The fans had a capacity of 338 m³/h at a back pressure of 5.5 kPa and a power rating of 35.5 kW (Ken assured me that my decimal point was in the right place!). Each tunnel has 8 temperature sensors and one oxygen probe.

Ingredients for both the windrow and bunker composts are the same: wheat straw, horse manure, hay, poultry manure, cocoa shells, cotton seed hulls, corn cobs and gypsum, but less poultry manure is used for the bunker composts. Straw bales are pre-wetted in a vacuum wetting line, which has been in use since 1994, except during freezing winter conditions when a conventional mechanical wetting and blending line is used (see Mushroom Journal, December 1998, p9 for a



Aerated bunkers at Laurel Valley Mushrooms



Pre-wet stacks at Laurel Valley Mushrooms

picture of the system). The total pre-wetting time in stacks is 7 days, by which time the moisture content is 68%. The bunker composts are composted for 5 days (emptied, wetted and remixed after 2 days). The conventional compost is turned in windrows for 13 days, after which time the material looks very dark and degraded compared with UK composts.

Mushroom yields from the windrow and test bunker composts have been the same, although odour levels from the aerated system are much lower. A further three aerated bunkers will be constructed so that production will gradually switch from windrows to bunkers.

Many thanks to Ken Lomax for arranging my visit and to David Beyer for inviting me to a most interesting, instructive and enjoyable Mushroom Short Course event. ■



Front and back of the aerated bunkers at Hy-Tech

Looking back.....

This month we look back to MGA Bulletin Number 183, March 1965. The Editorial that month, written by Winston Alderton, Editor and Secretary at that time, read as follows:

RUDDERLESS

One of the worst things that can happen to any organisation, be it large or small, is for that organisation to appear rudderless, both to its members and to outsiders.

What any organisation needs in order to flourish and, indeed, in order to survive, is for that organisation to have a sense of purpose and to be seen to be so motivated.

I am the last person to suggest that the MGA lacks purpose but I would be neglecting my responsibilities if I did not suggest that the boat is rocking, albeit only slightly.

Events over the past year or two would seem to have mesmerised quite a number of growers and to have galvanised some others, although the latter, quite understandably, are much more immediately concerned with their own affairs than with the affairs of the Association. This attitude — and surely we have all experienced it in our personal affairs at one time or another — may offer the immediate personal solution although it more often

than not reflects the perfectly reasonable desire to either maintain or improve income and ignores, quite deliberately and again understandably, the problems which affect an industry as a whole.

The mushroom production industry in the U.K. is both buoyant and relatively prosperous but no more prosperous than other sections of the home horticultural industry, which applies itself to its problems as do mushroom growers. The maintenance of this position is the prime concern — some may say the only real concern — of the official Association.

Tapping windows with sponges and tiptoeing through beds of tulips, as general principles are insufficient. Much stronger action is needed from time to time and it is the individual grower and better still, a collection of growers, who *must* supply it. It is the field of voluntary co-operation, in research, in marketing and in publicity, where the drive is most needed.

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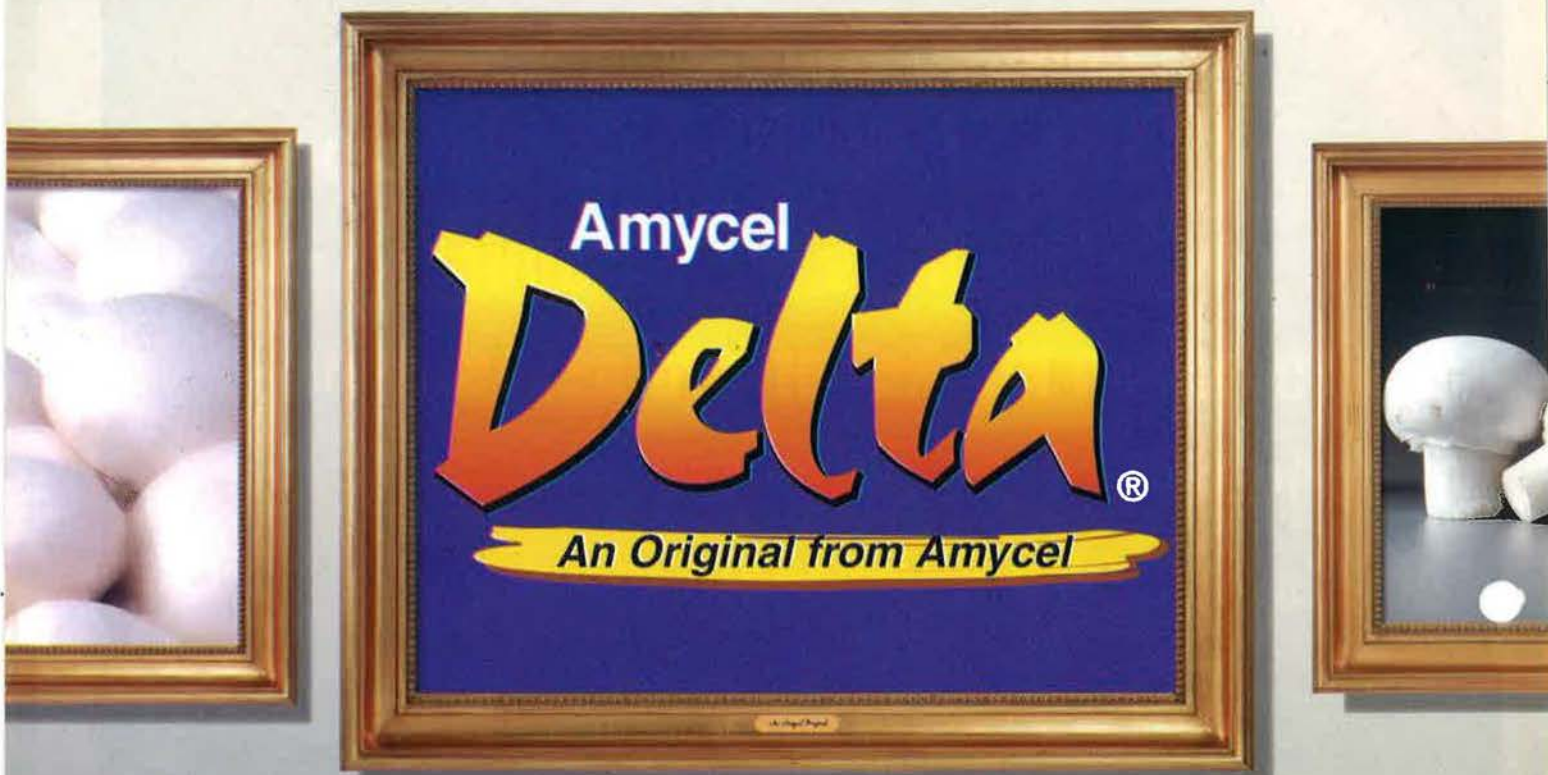


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