THE Mushroom JOURNAL

OFFICIAL JOURNAL OF THE MUSHROOM GROWERS' ASSOCIATION
MAY 1992 NUMBER 509 ISSN 0144-0551

INSIDE

SPECIAL RESEARCH FEATURE ■ HRI NEWS

LET'S KEEP IT SIMPLE – NEW SERIES

Somycel STRAINS

		MILLETT	RYE	PELLET
AGARICUS				
— SMOOTH WHITE			*Somycel 521*	***Somycel 521P****
		Somycel 191		
	Bitorquis	***Horst K26****		
	Hybrid	*Horst U3*	*Horst U3 SS*	***Horst U3P****
	Hybrid	*Somycel 112*	*Somycel 512*	***Somycel 512P****
— WHITE			*Somycel 611*	
	Hybrid	*Horst U1*	*Horst U1 SS*	***Horst U1P****
	Hybrid	*Somycel 209*	*Somycel 609*	*Somycel 609P*
	Hybrid	*Somycel 205*	*Somycel 605*	***Somycel 605P****
	Hybrid	*Somycel 208*	*Somycel 608*	***Somycel 608P****
— CREAM		*Somycel 344*		
			Somycel 765	
— BROWN			*Somycel 856*	***Somycel 856P****
PLEUROTUS	*Ostreatus*	***Inra 3001****		
	Ostreatus	***Somycel 3004****		
	Pulmonarious	*Somycel 3014*		
	Pulmonarious	***Somycel 3015****		
	Colombinus	*Somycel 3030*		
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	Eryngii	***Somycel 3058****		
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	Sporeless Hybrid	***Somycel 3200****		
	Sporeless Hybrid	***Inra 3300****		
PHOLIOTA AEGERITA		***Somycel 4021****		
COPRINUS COMATUS		***Somycel 4030****		
LENTINUS EDODES (SHII-TA-KE)		*Somycel 4055*		
		Somycel 4065*		
LEPISTA NUDA		***Somycel 4101****		

***ON FIRM ORDER**

Somycel

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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 Editor.

THE Mushroom JOURNAL

May 1992 **No 509**

EDITORIAL

The commercial value of research

What's it worth? That is dependent upon firstly the facts that have been found and secondly the translation of the newly acquired data into practice and therefore a need of the final recipient to be able to understand the interpreter.

The need for faith that some new concept is workable in practice, is as important as its theory. Behind the scenes, one has to trust the science and if the qualifications are missing, disaster could ensue with immense cost.

What's it worth? Nothing to many of us if it is too long term. Science for science sake doesn't cut much ice for those struggling to keep heads above water. In all fairness, the Government recognised this when considering the lines of approach needing to be taken, and in the past, set up committees involving mushroom growers, at regular intervals, to keep them on the straight and narrow. Several publications ensued and illustrated the difficulty in prioritisation.

To commission long term research one must look ahead, and to assess whether it is of any value one must look back.

Newcomers assume the status quo as a simple fact of life. They are wrong – they hadn't shovelled by hand to achieve 1lb/ft^2 over 15 weeks, or seen crops disappear in front of their eyes attacked by virus, or seen their mushrooms through a cloud of fly. They assume peat based casing, or non-horse based compost without batting an eyelid.

It is of inestimable commercial value to use spawn, so greatly refined over the years, formed through International interaction, within which the UK played a great part.

Unsolved 'La France', 'Virus' problems depending upon age or background can lead to quick bankruptcy, as too can any other unresearched competitor.

New threats invade the Industry. Of course we want a 'greener' world, less polluted by natural pollutants. The price of failure to research will be counted when one buys failproof systems that just have a few teething problems left.

What's it called – a mega bite?

INSIDE

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WORLD OF MUSHROOMS

At the ceremony (left to right) Mark O'Connor (sales & marketing manager), Mel O'Rourke (managing director), Commissioner Ray McSharry and Tom Quinn, director (NSAI).

When **International Spawn Laboratory**, County Meath, received the S/ISO 9002 award, Mr McSharry, the European Commissioner for Agriculture and Rural Development said that the award was a unique recognition of the excellence achieved by the company and paid a particular tribute to all those involved.

The XI Congress of European Mycologists on the uses – including culinary – of fungi will be hosted by the Royal Botanic Gardens, Kew from 7-11 September 1992.

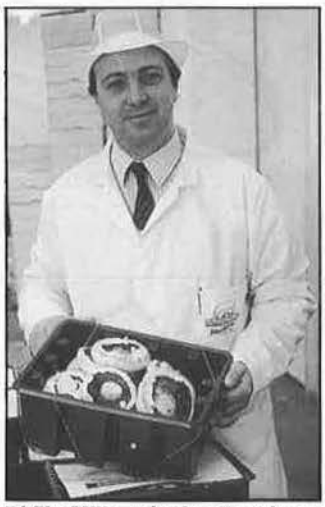
This is the first time that this important international meeting, under the auspices of the International Mycological Association and supported by the International Union of Biological Sciences, has been held in England.

Hull businessman becomes Chairman of BUFCA

Guy Roberts, Managing Director of Guy Roberts Ltd of Gillett Street, Hull, has just been made Chairman of BUFCA – the British Urethane Foam Contractors Association.

Guy Roberts Ltd is one of the country's leading experts in agricultural insulation systems, using spray-on urethane foam to insulate almost any agricultural building, from cool and cold stores to piggeries, broiler houses, turkey rearing houses and mushroom houses.

Mark Miller, who was director of technical affairs for L. F. Lambert Spawn Company from 1978 to 1988 has rejoined the mushroom spawn maker. After four years conducting research in the Entomology Department at the University of Delaware, Miller says he is "ready to re-enter the exciting world of commercial spawn production". L. F. Lambert Spawn Company is the oldest US producer of multiple varieties of spawn for mushroom cultivation and production. The company is headquartered in Chester County and produces spawn for mushroom growers throughout Pennsylvania, the US, Canada and throughout the world.



Philip Mills, who has just been appointed James A Gooding Ltd's new quality controller.

In our April Directory we printed an incorrect address for ADCO. It should be: Stretton House, Derby Road, Stretton, Burton-on-Trent, Staffs DE13 0DW.

DIRECTOR'S NOTES

Ken James

AN issue dealing particularly with research, may appear to be remote from many growers, but our leader writer this month has rightly identified some of the dangers of ignoring – or giving too low a priority – to research.

The MGA is very pleased that we have contributions from HRI this month for we have tried unsuccessfully for several years for their scientists to make a regular contribution to the Journal. Even more valuable will be the continuity provided by the bi-monthly visit to HRI of our technical consultant Peter Flegg. He will write regular notes on the progress of work at HRI and we hope that he will generate a better understanding of the ways in which growers and research workers need to relate more effectively.

Paul Middlebrook, chairman of the HDC mushroom panel, comments on some of the projects being carried out with British growers levies. The work on diseases and the short term project on flush quality are particularly relevant to members – whether they have three, or one hundred and thirty three houses.

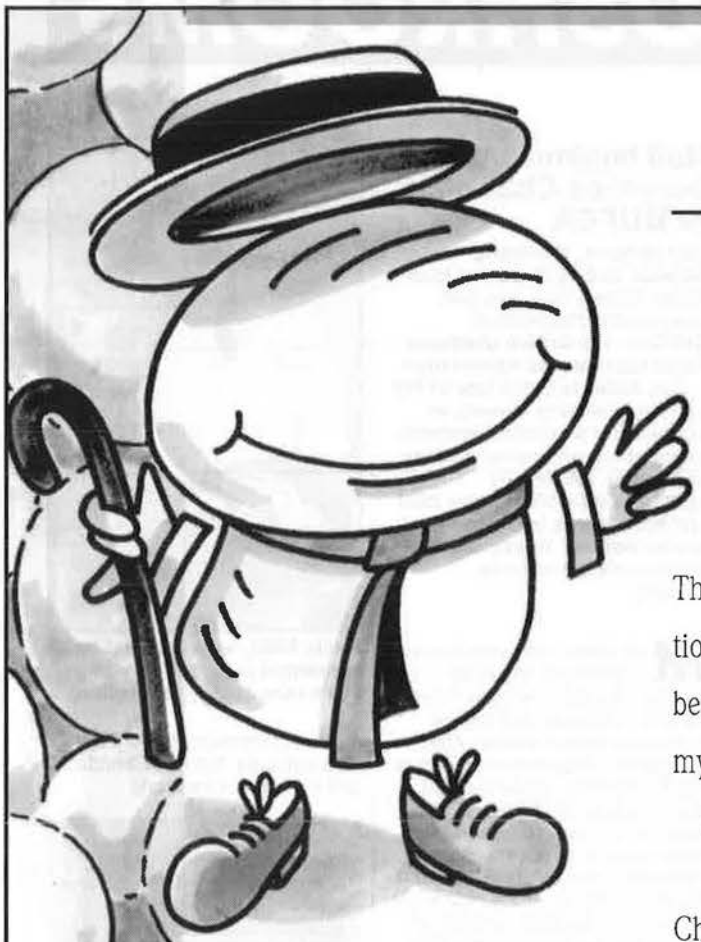
All of us are, quite correctly, seeking value for money, whether it be from the MGA, or from research. Sometimes it will be a combination of many factors which ensure that profits are made. Both the MGA and research work only result in profits if members use them.

The visits in Holland during the Open Days showed how easy it is to spend vast sums of money on meeting the ever increasing demands of environmental regulations. All of the cost is eventually met by growers – you. The pressure to meet these requirements also gives opportunities for growers in Ireland, Holland and other EC partners, to assess how they should be working together.

Because these notes are being written prior to the Annual General Meeting, I cannot assess whether the members will support the work of the Association, in meeting the many demands of the 1990s. Having worked with growers all over the world in the past 30 or so years, I hope that the MGA will be imaginative enough – and efficient enough – to help members in all sectors of the industry to realise their potential for profit. However we view the work of the MGA, it must stand up to the test of, "Does it justify me paying my subscription?" Whether it be in setting the base of pure research, or adding excitement to food on the plate, I hope that at staff and member level, we can meet that test, with plenty to spare.

As always, it is the members who decide; but we must provide the stimulation for action.

Ken I James



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Dr Robin Szmidt has been appointed business services manager for The Scottish Horticultural Advisory Service (HAS). HAS provides advice and development services to a range of clients in production and environmental horticulture, and is involved in national and international consultancy and R&D, including HDC projects.

AGM report

Major issues raised at the AGM will be the subject of a special report in the Journal next month. Meanwhile here are pictures of some personalities present.

Bryan Dyer – Chairman of the Working Party Committee.

Incoming Chairman and outgoing Chairman.

Geoff Ganney presenting Dr Fred Hayes with his decanter.

Miles Warnick joking again with Frank Stewart-Wood, Mike Barton, Adrian Sampson and Victoria Lloyd-Davies.

Three firsts for mushroom training

The **first** National Vocational Qualification for Mushroom Growing (Level 1) award ceremony took place on Thursday, 19th March, at Chesswood Produce Ltd., when Miles Warnick, managing director, made the presentation to two members of his staff at Thakeham, Sussex.

Trainee growers, Mark Seymour and Garry Platt are **first** in the country to receive the NVQ for Level One Mushroom Growing.

It is the **first** recognised and accredited national qualification in mushroom growing and forms the basis of a formal training programme which can be used industry-wide. It is expected that this programme will help to attract high calibre entrants into the mushroom industry.

Miles Warnick congratulated the trainees on their success, and thanked all who had contributed to the launch of the scheme, particularly the Mushroom Growers' Association Education and Training Committee, who together with Brinsbury College and the Agricultural Training Board have been responsible for planning and producing the course. He said that the Award represented encouragement for other trainees within the company. A fully structured, positive and dynamic programme of training and education is a vital part of Chesswood's commitment to total quality management.

This group of familiar faces was after the presentation: Back row – Hugh Barton (Winterpick Mushrooms); Gerry Rump; Richard Gaze; George Pointing; Mike Rowland; Ken James. Front row – Peter Flegg; Mark Seymour; Garry Platt; three guesses!!

Geoff Ganney's GROWING PAINS

1 March

'Do we spawn this compost, Boss, or toss it away?' Not a pleasant question! None of us today can afford such a loss or even have the daunting thought of a gap in production and sales a few weeks ahead. 'Well, you know, in the past, Boss, we have just wasted the spawn, casing and labour just to get a few mushrooms.' Maybe that was so, but in those days we were not adding casing mycelium supplementation, and that will make a big difference. OK, well, give it a heavy dose of gypsum, extra spawn top dressing and run a small amount of air during spawn growing. The decision was made. The results we await.

3 March

Talking with Barrie Hughes, who related (and has subsequently written) the recent story of exactly the same problem we've just experienced. This tells me it is not only **not new**, but is obviously being experienced by other growers at the present time. Barrie related in writing his account of a 'loss-cutting exercise', which he has most kindly allowed me to include in this issue.

He says: In a moment of relative calm – a rare event on our farm these days – I was sitting in my office, a redundant growing shed measuring 12ft x 15ft, reflecting on a difficult crop, and thought that some of your readers might be able to extract some value from our recent experience. Failing that, they could at least smile and think smugly to themselves, 'that could never happen on my farm'. You will notice that I said 'some of your readers', because I get the impression that, in these difficult times, those who have made mistakes are no longer readers of the Journal!

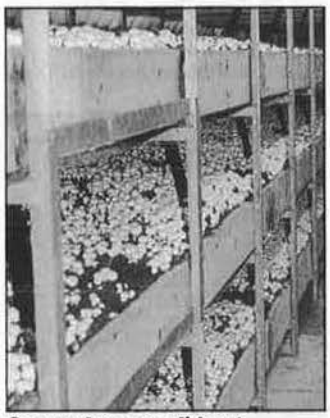
We crop in shelves, single zone, casing with pellets, and cropping six flushes on average – more, I suspect, than most. To allow us to miss a crop at Christmas, we miss out casing three weeks before Christmas and then do not fill in Christmas week. For things to sort themselves out, this means we spawn-run longer and at a lower temperature either side of Christmas and finally get back to normal when casing the shed that is filled in New Year week.

Last year we filled a shed on 6th November: after much longer than normal peak heat trying to clear ammonia, we eventually started to spawn on the 18th. As soon as the machine was through the first shelf, we realised we could smell ammonia. It was far too late to heat it up again, so we finished spawning, said our prayers and waited to see what would happen.

You, sitting in your armchair, have already guessed – **disaster** – moulds of all sorts, green and yellow and pink and white! There seemed to be two alternatives: either we could throw out and refill in Christmas week, or we could try to ride our luck. No one seemed to want to fill in Christmas week, so...

After 'teeming and lading' (an accountant's expression meaning selling new stock before old, or more often cooking the books) for several weeks, we eventually prepared to case on 6th January. The day before casing we had another scare. I walked into the shed and found the floor covered in gypsum. As soon as I found our grower I nailed him. "What is this crazy idea?" He was as stunned as I was. We looked more closely and discovered to our amazement that the gypsum was moving!!

What an incredible sight! The beds, the sideboards, the frames, were all covered in an army of mites yomping like marines away from the compost and onto the floor. What a waste of casing, and what were we going to do about letting down customers in three weeks' time? The bays at the extreme ends of the shed had a plausible spawn run, so we persevered, even though 75% of the beds were like a jungle built for mite and eelworm to explore. I can't really tell you why we bothered to add pellets; probably to ensure that we



So mushrooms did get produced!

maintained the pattern of flushing (i.e. a first flush every week).

We aired up as normal. To my utter amazement the mites had **totally** disappeared and an acceptable first flush was picked on time from an even covering of the beds. The second flush was, if anything, an improvement on the first. We only allowed it one more flush which was not so impressive, particularly from the point of view of quality, as many of the mushrooms were rather rubbery. So that was that. We had never expected 3lb a square foot, or all but, from such an appalling start, but I assure you the photo with this article is a genuine photo of the second flush.

A further point of possible interest: at the time we were using two spawns in one shed in a successful attempt to spread the picking more evenly over the week. Surprisingly, we had no problems with one spawn being ready to air up before the other. With this particular crop, however, the U3 type strain was of noticeably poorer quality than usual, especially on the third flush, whereas the mid-range hybrid, despite the poor compost, produced a similar yield to the U3 type but of a much higher quality, standard throughout the crop.

To summarise: the end results of retaining the crop were:
1) we were able to maintain our throughput without any embarrassing shortages for customers;
2) we only had a marginal problem as regards keeping our pickers occupied;
3) there were no carryover problems that we were aware of. No, even the pepper mite appears to have taken a long holiday!

4 March

First flush mushrooms opening too quickly and the need to increase casing moisture levels is essential. Just seems impossible to get enough water into the casing layer prior to airing. We have managed on occasions to reach 50 litres per sq metre without very much run-through to the compost. Have to also look at casing depth, particularly with the supplemented crops on the Woodhurst farms.

5 March

Cap spotting on some second flushes gives every appearance of a *Trichoderma* infection, yet the severity, colour and depth of indentation makes one feel it is something else. Took some samples and sent these for analysis and identification. Probably have disappeared by the time we find out what it is. Have in the past found sometimes this type of outbreak comes back from the laboratory as being a *Pseudomonas* type bacteria. But these days it is rare to find bacterial problems in our crops. **Shouldn't have said that!!**

6 March

Appears to be far more variation in nitrogen levels in the deep-litter chicken manure that is coming in at the present and we need to have room to miss loads. Yes, we have always experienced variation, but not levels of 3%, and it is quite puzzling to know why. Not storing any chicken manure longer than a week means it is impossible to batch-adjust, mix, and so even out some variations.

7 March

Spawn distribution through the compost is still variable which, with early casing, is leading to uneven casing growth. Investigation revealed excessively worn metal fingers on the spinner, which

just might be affecting the degree of mixing. As we use the same unit for supplement mixing it is for sure a target area for some rapid improvements – I suppose – as the line is nearly 20 years old and is somewhat 'clapped out'.

11 March

Wages board award 4% to take the basic wage to £134.60 and no doubt this will be across the craftsmen grades, overtime and other hidden goodies. How do we find this money? It has reached the situation where only an increase in mushroom prices will result in a balancing of costs against returns.

Dutch Trip

It had been several years since visiting the Dutch Mushroom open days and even then the sheer size, ingenuity and gross amounts of money were totally mind-bending. It has been even longer since venturing on an MGA-organised visit, and earlier memories of these were even more mind-bending!! Was I in good enough condition to come through this venture with some sanity and totally unscathed? The only security was to take Pamela along as well.

All arrangements flowed to perfection; the MGA group of nearly 30 were gently orchestrated by Tim Cripps and Chairman Jim Dumbreck will be well pleased with the whole outcome of the trip and may by now have forgotten the words of Frans Ratz concerning over 200 million guilders being invested at the CNC for the production of fully-grown compost.

Mushroom Money seemed to sprout out of the compost. Well at least the horizontal driving rain at the CNC farm walk gave a chance to talk John Bradfield back into the MGA which, coupled with Ken Drinkwater's return a week earlier, gave much pleasure.

The exhibition was far larger, far more extravagant, far more expensively biased and far more complicated in mushroom conception than previous memories recalled, and the real clarity of thought was to see proposals for picking lines and alloy tray farm designs in Holland. For the last 10 years, so I am being told at meetings, in print and by all, trays are dead. Having years ago, at the ADAS Harrogate, given opinions on tray-growing it is intriguing to listen to recent thinking.

As Richard Gaze whispered across a large Dutch gin: 'You have to remember, Geoff, things change!' After several hours of walking, talking and drinking it occurred to me the best thing about all of this was meeting so many, many friends once again. People from all continents. Going back to my earliest recollections in 1965 of the first visit to Holland, Jan Gerrits took us round a three-roomed research centre and we had a mushroom lunch with Pieter Bels. Now we go to the modern research centre by bus (several) loads and hear about work on rapid, smell-free, high-yielding compost. Someone said: **'But it don't quite work as yet!'** But it will.

We must thank Bram Van Nieuwenhuijzen for all his assistance in helping the MGA staff plan this excellent trip. The social events were of particular note, with the Friday evening at Het Groen Woode an extremely warm and friendly affair. I'm sure Lou Somerfield got me into some sort of trouble, but at least we managed the coach at 7am to depart back to England. Many thanks to Marion, we will miss you.

18 March

We are still alive. Brian Carol, Chairman of the Australian MGA, telephones to give us best regards and, by all accounts, his group have had a great time in Holland. Sounded as though they have managed to buy enough equipment for a few farms on the way!! Brian tells me the AMGA Chairman now does two years, "not like the easy year that you guys in the UK have!!"

19 March

Recent virus tests revealed a few 35mm particles of number 4 mushroom virus. Hygiene purge immediately instituted, coupled with a thorough survey of the cooking-out procedures. All appears up to standard in terms of temperature and time. Check to ensure that repaired trays are being fed back into the cook-out, as are newly-made trays. Growing flats for specialist customers has increased, and we will certainly review this technique. Funny, when all is going right, how basics in mushroom production can become abused in the search to satisfy the customers. Rarely do such errors go unpunished. Took more samples, hopefully to come back negative. Really wish more was understood about this mushroom virus problem, and I must remember to get this into the conference surgery sessions in September.

20 March

How many pickers should be in a team and how much should a supervisor have to control? Probably depends on farm lay-out and the number of varieties of packs on the go at the same time; not to mention the quality of the supervisor. Motivation, accountability and a good lot of commonsense probably meet most requirements. But it is the nature of the mushroom business that it is not possible to generate these necessary requirements every day. Even the **Boss** can't do this.

21 March

Have come to the conclusion that these new heat pumps at Marigold are now going quite well, having taken six months to get the problems out of the system. Mind you, we have even convinced ourselves, after several years of growing on the farm totally controlled by heat pumps, that we no longer understand how to operate them. In the final analysis we have far too many experts and a massive lack of growing sense.

22 March

Farm drainage, either from washing down or heavy rainfall, is giving rise to more concern as to where all the water eventually goes! Certainly at the Marigold site, where the water-table is virtually a single spit down, easy access to a river would be fatal. We don't use chemicals but there are still organic residues. At present, soaking through the soil base from a large catchment pit seems to work, but what would you do if you had to design a unit or new site?

25 March

It is intriguing how mushrooms are expected to grow to exactly the right shape, size and colour to meet a particular specification. Someone will have to tell these mushrooms about this!! But it is a continuing fact of life that mushroom buyers are for ever attempting to stimulate their sales by variety of produce on the store's shelf. We should be grateful. If only the mushrooms would oblige.

26 March

Still thinking equipment, and in particular tunnels, from all the things seen on the Dutch trip. There are so many questions that become difficult to answer due to the variety of equipment (ideas) available through the trade. Who is right? In making a 10-year investment it is little consolation to be told after 18 months: 'If you had only asked us', or 'Why didn't you do this', or 'Well, we never said it would do that'. And you have all heard the rest...

27 March

Andrew Swatton from ADAS tells me there is an exhibition of mushroom stamps at the National Museum in Cardiff. We are looking at it today, Andrew, and, as you rightly say, it is a magnificent collection. Although not large in stamp terms, the numerous new issues that are continually appearing will, over the coming years, build into a formidable collection. The variety of colours and designs are excellent. Yes, there are two bland UK fungi stamps. Would you expect otherwise?

NEWS FROM HRI

Peter Flegg reporting

With my copy of the Horticulture Research International Annual Report for 1990-91 came two HRI Newsletters, Issue 1 of December 1991 and Issue 2, February 1992.

On the front of Issue 1 is the headline 'Somycel to market HRI mushroom' and the brief report accompanying it explains how the Agricultural Genetics Company (AGC) has signed an agreement with Somycel for marketing the so-called hot strain AGC W20. This strain, as described in an article in the Journal (September 1991), looks like the common white mushroom but crops best at 28-30°C and so is ideal for growing in the tropics. The Newsletter report claims that the mushroom has 'a more intense white colour, is resistant to bruising and has an improved shelf life'.

It could travel long distances satisfactorily?

In the first issue of the HRI Newsletter HRI Chief Executive Professor Chris Payne welcomes readers with the positive news that HRI is now a year old. The building programme is gathering momentum and supported by an announcement from MAFF that they are providing further restructuring funds. This, it is believed, shows the Government's strong support for HRI.

The second issue contains no further news on the mushroom front, but reports on the work of the newly established Commercial and Marketing Department of HRI.

This emphasises that HRI is now a business working in the field of contract research, development and consultancy. A doubling of contract income from £2.8m currently to over £6m over the next 5 years is projected. It declares that HRI needs to increase the proportion of its industry-funded 'near-market' work and lessen its dependence on government funding.

HRI – Now a private company

The Annual Report is a 100-page, glossy, colourful and well produced affair. It gives an insight into the work and workings of HRI which is now a private company limited by guarantee. Clearly set out on the opening pages are the HRI's mission "To serve our customers through excellence in cost-effective scientific research and developments in horticulture".

Also set out are its four "general aims" and five "general objectives".

The bulk of the report is devoted to giving a flavour of the work being undertaken through many brief accounts well supported by coloured photographs and diagrams.

From the statistics provided in the report, total funding for the year ending on March 31st 1991 was over £20m. The greater proportion of this came from MAFF, AFRC and DES. Of the expenditure, field vegetables absorbed just over £5m, basic science around £4.3m, greenhouse crops £2.2m and mushrooms £657,300.

Scientists on the board?

Along with the staff list and an impressive number of publications towards the end of the report is an imposing list of HRI staff associated with Universities. There are Honorary visiting professors, readers, lecturers and research fellows.

The first of HRI's general aims is "to meet the particular needs of the UK horticulture industry, and the policy requirements of government". Shall we one day see staff members associated with the horticultural industry? As members of company boards?

LET'S KEEP IT SIMPLE

A new monthly feature for the smaller grower

No. 1 The casing layer

by Peter Flegg

Why case anyway?

We had better get this straight right from the start. The casing layer performs several useful jobs. It provides a supply of water to the mushrooms and it protects the compost from drying out. Also, it can give some physical support to the mushrooms, but the main job of the casing layer is to stimulate and promote the production of mushroom fruit bodies.

It is possible to produce mushrooms on uncased compost – but not very many.

So what makes good casing?

Mushrooms contain over 90% water and, although some of that water comes from the compost, the casing layer must be able to hold a good reserve of water.

It is also important that the casing should stand up to a lot of watering, day after day, without disintegrating into a soggy mess which is too solid and dense to let air through.

Peat is a common ingredient of casing mixes these days and is usually acid. The casing should be neither too acid nor too alkaline so chalk (carbonate of lime) is used to neutralise the acidity of the peat. Chalk is not strongly alkaline and even if more chalk is mixed in than is needed, it should be quite safe. It is safer to have more chalk than is needed to neutralise the acidity of the peat than too little. This is not so if some other kinds of lime are used. Too much hydrated lime, for example, could cause poor fruiting and low yields.

The ratio of peat to chalk is not critical. More or less equal quantities by weight will do, but once you've settled on a mix try to keep to it. A typical mixture might be 1200 litres of peat to 200 kg of chalk, plus 200 litres of water. Thorough mixing is most important and if you mix by machine, you'll know the dangers of over-mixing.

Whatever materials you use they should be free from pests and disease, stored under clean conditions and consistent in quality from batch to batch. If they are not, complain and, if necessary, change to another supplier. Mushroom growing is difficult enough without having to cope with avoidable changes in the quality of materials. It's no good one batch of peat being coarse and lumpy and the next fine and powdery. With casing, the mix and the management are both important and you cannot learn to manage a casing that is forever changing its characteristics.

Watch the pennies – but with caution

Good housekeeping is always important on any farm and not least on a small farm. Do not, however, be too easily tempted to go for the cheaper casing material, especially if the quality is likely to vary.

A saving of 25% on the cost of casing materials may seem very tempting in these hard times, but consider this.

Casing costs are probably, give or take, about 4% of total costs. A 25% drop in casing costs will result in a reduction in total costs of 1%. That is, your total production costs will be 99% of what they were before! Fine, but if the new casing leads to as little as a 2% drop in yield (or income from reduced quality) for example, a drop from 5lb to 4.9lb/sq ft, you are out of pocket. Perhaps not worth the risk?

It is better to stay with the casing you have. Learn how to manage it throughout the changing conditions of the seasons and, then, base changes in your casing mix on your experience.

Now casing management, but that is another story.

MGA CONFERENCE

Cambridge, 17-19 September

PROGRAMME

Thursday 17 September

GOLF MATCH – The Links Golf Club, Newmarket, tee off 1.30pm.

CHAIRMAN'S RECEPTION AND INFORMAL SOCIAL EVENING – Garden House Hotel

Friday 18 September

LECTURES – Mill Lane Lecture Rooms. Lunch – Garden House Hotel

LECTURES (continued) – Mill Lane Lecture Rooms

LADIES' OUTING – Visit of local interest, to be arranged

BANQUET – King's College, Cambridge, entertainment by King's choral singers

Saturday 19 September

FARM WALK – Chesswood Produce Ltd, Shepherds Grove. (By kind permission of Miles Warnick)

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Crop Management and Harvesting *Team Leaders* Harold Linfield, Paul Middlebrook

Pests and Diseases *Team Leader* Richard Gaze

Casing and Supplementation *Team Leader* Peter Flegg

LECTURE PROGRAMME

- **Chairman's Opening Address** – Geoff Ganney
- **"Can You Handle the Product?"** – Tim Haynes
- **"A Mushroom Adviser's Year"** – Dick Rucklidge
- **"3 Steps to Heaven – Growing by Numbers"** – Miles Middlebrook
- **"I Have Had That Problem"** – Peter Munns
- **"Is There a Doctor in the House?"** – Dr John Fletcher
- **"Speed with Quality"** – Bob Pinkerton
- **"Sinden Award Lecture"** – *****

Full details of the speakers and further information about the lectures will be published in a later issue. WATCH THIS SPACE!

1992

MUSHROOM ALLIED TRADES ASSOCIATION

MGA/MATA

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For more information and membership application form, contact:-
B. D. Woodcock, MATA Secretary, c/o Agrisystems-Traymaster Ltd.,
New Road, Catfield, **Great Yarmouth,** Norfolk, England, NR29 5BQ

SPONSORSHIP

There will be an opportunity for companies to sponsor aspects of this year's Conference. Examples of sponsorship opportunities are given below. If your company is interested in sponsoring one of the Conference activities, please contact Cecilia Timewell for further details.

It may also be possible to arrange full or joint sponsorship of a major activity such as delegate lunch, banquet, transportation costs, ladies' outing, etc.

Event	Sponsorship cost
Thursday evening musical entertainment	£250
Friday evening musical entertainment	£250
Table decoration and flowers	£150
Chairman's Reception drinks	£200
Conference Programmes	£150
Delegate Packs	£400
Ladies Gifts	£300
Name Badges	£100
Banquet Wine (Top Table)	£200

In this month's issue we concentrate on Research and one of the biggest problems is highlighted in this first contribution.

No spikka da lingo!

Peter Flegg on grower-scientist communication

First bus passenger: Is this Wembley?
Second bus passenger: No, Thursday.
First bus passenger: Are you? So am I, let's get off and go and get a drink.

Wrong wavelength?

Before most international congresses the organising committee has to wrestle with the question "should we have simultaneous translation of the presentations?"

It is not too difficult, if rather expensive, to find interpreters who can translate English to French, French to German and German to English. I suspect, however, that poor communication in the field of research and development, as on the bus, can often be a result of words said in one language not being understood by those speaking the same language.

Mushroom research, paying for it, receiving the benefits, topics for study, has been a contentious issue for decades. It was in the early days of the MGA, when research was paid for, on an individual voluntary basis, entirely or mostly by the industry. It continued to be so when control and funding was largely in government hands and it still is now that growers are again paying (albeit compulsorily) at least in part.

A major reason for this contention is surely lack of understanding resulting from inadequate and poor communication between the parties concerned.

Grower needs and expectations

Mushroom growers and their representatives must be clear on what they require from research.

Science is not an all-purpose tool to remedy all ills and the level of expenditure is not always related to results. The discovery of penicillin may be said to have come pretty cheaply, its development into a useful medicinal tool was probably rather more expensive. Despite many years of effort and expenditure on research, the common cold is still with use. "Whisky, hot lemon and bed" is probably among the better ways of alleviating the symptoms even today.

It is also important that growers are clear on their expectations from a particular research project.

Although, since retiring from GCRI, I have until now kept out of the R&D scene, I have always been surprised that mushroom growers have not recruited more experienced mushroom research scientists to help with project selection and evaluation. In these days of "grant chasing" by research organisations, there may be a temptation to "gild the lily" a bit when spelling out the possible benefits arising from a particular project in order to secure the money.

On the growers' side there is a need to be sure that their objectives are clear. They should not be too vague, such as "making the compost process more efficient" nor too precise. By their very nature committees tend to reach "safe" decisions in order not to be too vulnerable should adverse criticism be subsequently levelled. The disadvantage of a business-like, clear but limited practical objective is that, given the facilities and competent work it is very likely to be achieved, that and only that. Unless some flexibility is allowed to the research workers, imaginative and unexpected discoveries, possibly of major significance will be missed. Penicillin is unlikely to have been discovered by committee-directed work.

Area Meetings – a sounding board

Assessing R&D needs should be a continuing process. Many years ago the MGA Research sub-committee produced a Red Book, later followed by a Blue Book, outlining the MGA R&D needs and priorities. Unfortunately my copy was left at GCRI when I retired. I wonder how the old Red and Blue books read today? Has anyone still got a copy? Probably much is relevant and some outdated. To ensure that needs are continually under review by all sectors of the industry there should perhaps be a regular, but not too frequent, session on R&D requirements at MGA Area Meetings.

It is also worth growers giving a little thought to what is likely to happen when a successful outcome to a research project is reached. It does not follow that a problem solved will lead to an easy untroubled future. Will a pest problem overcome lead to damaging over-production? If a new product results, who gets the benefit? the royalties? the profits? Some of these questions could sometimes best be settled before the project is started.

Make the message easy to grasp

The growers I have spoken to recently about research and development have been generally satisfied with the present arrangements. Some have said they would like a little more information and a typical comment has been along the lines of "not spent too much time thinking about it, I've been too busy trying to stay in business".

Now this represents a challenge to scientists and others to explain what they are about. For an audience having less than half an ear tuned in, the message must be clear, accurate and easy to understand. Scientists need to get over what is being attempted, the difficulties and what results it is reasonable to expect. The disappointment arising from too high expectations could lead to rejection and there is always somebody else in the offing full of honeyed words looking for research grant money.

For greater confidence all round, I think there is a need not only for scientists to be getting their message across, but also to be seen to have more contact with the industry. It should not be left to the select few to visit farms and attend growers' meetings. From time to time all the scientists concerned should be more exposed to the mushroom farm environment, hear the grower's day to day problems and discuss his needs for the future. It is all to do with improved credibility, confidence and flexibility of approach. I am thinking of those research projects, the results of which bear little relation to the stated objective. That sort of thing can be very rewarding, but often only when someone has the background knowledge and inspiration to see how a piece of information, an idea, an unexpected result, can be made use of in quite a different context.

No rewards for the grower-friendly scientist

There can be no argument that any research project of value must be

founded on good science. In my day a scientist's prospects of promotion depended largely on his or her output of good sound scientific papers subject to scrutiny by peers and betters. The need now for good science is no less paramount. No one should argue with that. However, I was surprised to learn that, although the world of mushroom R&D has changed, the basis for scientist's promotion is still much the same.

Surely, now that HRI is a private company with a need to obtain research contracts from the horticultural industry, there is room for some acknowledgement of those members of staff who usefully associate themselves with one or other branches of commercial horticulture? Such a change would assure practical commercial horticulturalists that actually helping them is truly one of the aims of HRI.

Loud and clear

Whatever the pros and cons of it all, hopefully, we have some good news for those growers who would like to be better informed about mushroom R&D in the UK. In this and the coming issues of the Journal senior staff members at HRI Littlehampton are explaining both the restructuring programme which will lead to the successful transfer of the work in progress at Littlehampton to Wellesbourne and the areas of specialist knowledge and expertise which form the basis of their mushroom research projects funded by MAFF, AFRC, and contracts placed by HDC and others.

As for explaining the "whys" and "wherefores" of mushroom work in hand, I shall be conducting regular interviews hoping to get over the message "loud and clear"!

Growers benefit from HDC levy

by Paul Middlebrook

Research and development

The projects being funded by the Mushroom panel of the HDC are very relevant to current needs of growers and hopefully there will be some practical end results.

They include: work on indoor composting, spent compost, pest and diseases, compost moulds, biological control and quality.

I thought it might be useful to mention some individually and explain the reasons why we have agreed to support them and what we hope to gain from them.

Controlled environmental composting

This project was started in October 1990 and it is anticipated it will take 3 years to achieve usable results. When we agreed to fund this work the pressures from the environmental lobbies were seen to be beginning and we felt that they would increase over the next few years. This is now proving to be true.

Consideration was given to the work that was already being carried out in Holland but we felt their methods on large compost complexes would not necessarily be the way the British growers would want to go. So far the work in Holland and Italy, which has been seen by panel members, does not provide a solution to environmental difficulties and it appears not to produce the yields and the quality anticipated.

We also felt that we should look at composting that could still be carried out on the small, medium and large mushroom farm as it is currently being done.

Temperature ranges and composting times are being looked at and at the end of the project we would hope we will have suitable methods which will satisfy the technical, economical and environmental requirements within each grower/composter's area. I believe it is important for all people who are currently composting in the conventional way to be aware of the work that is being done. They must however be quite clear that there are no answers yet. Therefore if pressure is brought to bear by their local environmental officers to make changes, it should be made clear to them that we as an industry are aware of a need to change and we are spending a considerable amount of our research funding on looking for solutions which will satisfy environmental requirements.

Spent compost uses

With the awareness now being placed on the use of our natural resources and the use of peat being strongly opposed we have agreed to fund a two year project with the Scottish Agricultural College at Auchincruive on the use of spent compost as a casing material. This project will also examine its other possible uses in horticulture as a peat substitute.

If we find we still need to use peat it could be that we, as an industry, might be looked on more favourably if we can be seen to produce an end product which can replace peat in other horticultural sectors.

Other types of *Agaricus*

With the widespread growing of *Agaricus bisporus* throughout the world, we were encouraged to fund a project put to us for the development of another mushroom strain which would have better taste and keeping qualities than the one currently in use.

If this project is successful it will help to make our industry more competitive in the future with a spawn which can be sold to other parts of the world, thus recovering income which can go towards our industry's research and development costs in the future.

Control of flies with predatory mites

The reduction of available chemicals for the control of pests and diseases meant

that we were happy to agree to fund a project that would mean control without chemicals.

This method of controlling flies has already been used successfully in greenhouses, and we see this as a start to more work of this type in the future.

Control of cecid by phase determining pheromones

This is another biological control project we are hoping to fund. It will be a three year project which we hope will help the industry to eliminate, or at least reduce dramatically, the effects of cecids. Although all growers do not have problems with cecids at present, those who have will be happy to find a method of removing them.

Post harvest handling for improved quality

This project seeks to improve the real quality and presentation of mushrooms. Strict temperature control throughout – even on retail shelves – and reduced bruising, has dramatic results; especially in reducing weight loss. Proper handling virtually eliminates flush differences and when the final report on this project is available, it could have significant messages for growers, wholesalers and retailers.

Summary

The interesting point of most of the projects that this industry is currently funding is that they are all looking in the right direction as far as the environment is concerned.

Because of legislation and pressure groups, many industries are finding that the way they have run their businesses up to now will not be acceptable in the future. I wonder if they are progressing with their research and development as well as our industry is.

HRI's mushroom R & D moves forward

Dr Ron Fraser, Head of Horticulture Research International's Littlehampton Station, describes the background to the current programme of research and development on mushrooms, and how the challenges set by the restructuring of HRI are being met.

The last five years have been marked by three fundamental changes in the structure and funding of horticultural R & D in this country. As a result of a review of Government policy on R & D support, MAFF withdrew its funding of 'near market' research, leaving the industry to fund these aspects through the HDC and AFRC. The research efforts on the former ADAS Experimental Horticultural Stations were combined with the former AFRC Institute of Horticultural Research, to form a new organisation, Horticulture Research International, which is now the principal contractor for government-funded horticultural R & D in England and Wales. Finally, HRI announced a restructuring programme which will involve the closure of the Littlehampton site, and the transfer of the Littlehampton science to a new centre of excellence at Wellesbourne, in Warwickshire. All three changes have had or will have profound implications for mushroom R & D; in this article I will give an update on progress, and indicate how our plans for the future are developing.

Financial support for mushroom research and development

Research is just like any business: it depends on earnings, and maintaining the cash-flow depends on giving the customers what they want. The recent changes in Government funding can be seen as a move by this 'customer' to define more clearly why it should commission R & D.

We receive funds from two main Government sources; commissioned research from MAFF and Science Budget funds from the Agricultural and Food Research Council. These latter funds are for fundamental research on how mushrooms work down at the molecular nuts-and-bolts level. This is the basic knowledge which underpins all other R & D; the research has to be judged first by scientific quality and level of innovation, second by how it can be implemented.

MAFF now funds strategic research in support of Government policy. This includes underpinning the viability of the horticultural industry, and 'public interest' work. MAFF Policy Divisions now have their own R & D budgets. For mushrooms, strategic research is supported by the Horticultural Policy Division (including work on controlled environment composting), while the Pesticides Safety Division supports 'public interest' work on reduction of pesticide usage.

The mushroom industry itself has of course been supporting R & D since the positive vote to join the HDC, and this is welcomed by HRI for a number of reasons. Obviously, the industry support goes some way to plugging the gap left by the withdrawal of MAFF support for near market work. A less obvious but perhaps greater benefit of the industry funding is the way in which it helps to stabilise Government support. R & D has to cover a spectrum from fundamental, to very applied. This ensures that advances in knowledge at the cutting edge of fundamental science can be transferred quickly into use by the industry, with beneficial effects on competitiveness and profitability. Government is keen to see this rapid technology transfer, but is likely only to support the strategic research if it is satisfied that the industry will continue to support the near market work which provides the essential link to practical application of results.

In money terms, in the 1991/92 financial year, the HDC provided a valued contribution of more than £120,000 to HRI. This supported industry-related work, for example on controlled environment composting and alternative *Agaricus* species. The Government funding was almost £0.25 million from the AFRC, and almost £0.75 million from MAFF: clearly a beneficial gearing ratio for the industry.

With additional support from other commercial customers such as the Agricultural Genetics Company, and individ-

ual sources within the mushroom industry, the overall funding of HRI mushroom R & D looks healthy. But it is essential for the future to maintain the balance and diversity of funding from all sources, to secure the total sum on which the viability of the whole R & D effort depends.

Integration of the R & D effort

This section can be rather short: mushroom R & D led the way for horticulture in bringing the ex-EHS and ex-AFRC work together. With the closure of the Lea Valley EHS, and the transfer of the science posts currently occupied by Dr Ralph Noble and Dr Helen Grogan to Littlehampton, we achieved the main elements of a fully-integrated R & D programme, with everyone working together on one site. The benefits are now obvious for mushroom research; it is a pleasure to report that a similar spirit of co-operation and increased efficiency is apparent elsewhere in HRI as research from the two parent groups is drawn together.

The integration of mushroom research at Littlehampton also benefits from the on-site location of the National Mushroom Specialist, Richard Gaze, and from a close working relationship with the remaining ADAS mushroom R & D carried out principally by Dr John Fletcher at Wye and Littlehampton.

The move to Wellesbourne

The move to a centre of excellence for horticultural R & D at Wellesbourne, by transfer of the entire scientific programme from Littlehampton, plus the basic science programme from East Malling, should create a major force in world terms. There are implications for the whole of horticulture, but here I want to explain how mushroom R & D will fit into the overall picture.

The restructuring has been spoken about for a long time. But the full financial support required from Government was only secured in Chancellor Lamont's Autumn Statement in late 1991: a sum of £25 million was earmarked for the first three years of the project. This has to encompass building a major new laboratory, glasshouses and other facilities at Wellesbourne, refurbishment of the existing buildings, and developments at other HRI sites. Clearly, the whole project is an immense undertaking: it is certainly occupying a large proportion of my time at present, and will do so for the next few years.

What of mushrooms, you ask? Plans are well advanced for the construction of the new mushroom unit at Wellesbourne. This is a complex task: quite a few people build mushroom farms these days, but precious few have the challenge of building from scratch a mushroom R & D facility – which will have to serve the needs of the industry and its underpinning science for the next 50 years. Indeed, the task we have set our architects and professional consultants is probably unique; certainly interesting. With the half-century timescale, it requires careful planning.

The Project Team includes our architects (Ainsworth Davey Partnership, a firm with extensive experience of designing scientific and controlled-environment buildings), consultant engineers to advise on services and infrastructure, quantity surveyors to tell us how much each feature is going to cost, project management consultants (who help us to ensure that the MAFF money available for restructuring in each financial year is spent wisely), HRI scientists (the end-users of the facility), and HRI technical staff, who have valuable expertise in aspects of environmental control and servicing of scientific experiments in the existing Littlehampton Mushroom Unit. We also benefit from the advice of the mushroom industry on modern production methods – which our research must relate to – and we are grateful to have the active co-operation of Paul Middlebrook in this respect. The Project Team has already had the benefit of a visit to Whitley Bridge to see – for those new to the industry – the current status of production facilities.

The new mushroom research facility at Wellesbourne must be predominantly a *research and development* facility, and not a *mushroom production* facility. Its needs therefore will be rather different from those of the modern mushroom farm, but the results obtained have to be proved and made ready for transfer directly to the mushroom industry.

The unit will therefore have some cropping houses which are as close as possible to those used by the industry, but the needs of research and development will have to be paramount. Thus there will be an emphasis on 'mini' cropping chambers, where environmental conditions can be varied over a wide range, with a number of different treatments being applied in each experiment. There will be a smaller number of 'midi' cropping houses where growing conditions can be evaluated on a larger scale, and finally, some 'maxi' cropping houses where systems can be evaluated and demonstrated on a scale which relates directly to that used by the industry.

What about the timescale? Construction of the Mushroom Unit at Wellesbourne is being given high priority amongst the multitude of individual projects. As I have mentioned, the Project Team now has its teeth firmly into the problems, and detailed design is underway. Outline planning permission has been obtained for the broad-brush development of the Wellesbourne site, but each individual project such as the mushroom unit will have to be the subject of detailed planning permission. The Project Management Consultants inform us that the 'first sod' for the construction of the Wellesbourne Mushroom Unit should be cut in the fourth quarter of 1992.

In terms of planning the transfer of the scientific programme, it is vital to appreciate the importance of maintaining the momentum of the work, and to ensure that when the programme is moved to Wellesbourne, it goes when all facilities necessary to sustain it are in place. Before we can transfer the Mushroom R & D team to Wellesbourne, we need the completion of highly-serviced new research laboratories, as most of the mushroom team are laboratory based. There will have to be a considerable investment in new infrastructure to service the new mushroom unit, such as the transfer from oil to gas as principal energy source. The new laboratory is scheduled for completion in 1994, by which time the new Mushroom Unit should also be commissioned.

All of these timescales are set by architects, builders and planners, not to mention those who hold the purse-strings. But, as mushroom growers are well aware, micro-organisms are important. A vital ingredient in the planning of the development of the Wellesbourne site is that the local water authority will not allow us to move significant numbers of new staff on to the site until the Wellesbourne village sewage treatment works is upgraded! This work is scheduled for spring 1994. We certainly look forward to showing the new mushroom unit and laboratories to the world's mushroom community on the occasion of the 1995 International Mushroom Congress in Oxford.

The future

I hope that the mushroom industry will continue its support for our R & D programme: this support is particularly important while the programme is undergoing radical change. The transfer to Wellesbourne must be managed in a way that will maintain the research momentum. In the meantime the existing research programme and facilities at Littlehampton are well able to respond to the requirements of mushroom growers, as shown by the recent successful Mushroom Subject Day there.

We welcome a continuing dialogue with the mushroom industry on the design of the Wellesbourne facility, and their understanding of the complexities of this planning process. I believe that we have the opportunity to create the finest facility for mushroom R & D in the world: the job needs careful planning if it is to give the scientists and the industry what they wish from it.

Future issues of the Journal will contain articles by Professor Jim Lynch and Dr Tim Elliott about the HRI mushroom R & D team, and about interesting new developments in the programme.

MGA SEARCHES FOR IDEAL MUSHROOM BAR SNACK

This spring, the Mushroom Growers' Association ran a successful competition with the Morning Advertiser, Britain's leading daily newspaper for publicans, in search of the best mushroom bar snack. Publicans were asked to submit a recipe using fresh mushrooms. The competition which ran in three issues of the Morning Advertiser during the first two weeks in March attracted a very high standard of entry.

The winner, barbara Woznicki from Oldham, Lancashire, won first prize, a catering microwave, for her mushroom croute recipe. The recipe will be put on the menu of the six pubs which she runs in Cheshire. The two runners-up, Alison Housam of the Shepherd's Rest, Wanborough, Swindon and Lynne White of the Admiral Nelson, Little Braunston, Daventry, won sets of microwave dishes for their recipes for Winter Mushrooms and Mushroom Roast.

Following the success of the competition, the MGA took a stand at the Pub Club and Leisure Show in London in April. The three winners were invited by the MGA to visit the show and receive their prizes.

12,000 publicans visited the three-day exhibition and those who visited the MGA stand were given a free copy of Pub Grub With Mushrooms recipe booklet and invited to complete a questionnaire on the purchasing of fresh mushrooms. This survey gives the MGA valuable information on the types of mushrooms bought for the pub and club trade, the frequency of purchase, the quantity of mushrooms purchased at any one time, and the type of supplier. In addition, the questionnaire covered menu planning and favourite mushroom dishes.

Ken James, Director of the MGA, and a member of the judging panel for the competition, said: "We believe this whole promotion has been a great success. It began as a competition in the Morning Advertiser and we developed it to our advantage. We took stand space at the Pub Club and Leisure Show, we invited the winners to attend to achieve publicity; we used the exhibition stand to talk directly with publicans and the results of our questionnaire are currently being evaluated. We want to meet the demands of the pub trade."

Complying with the Act

By Mike Bridgwater, ATB

The Food Safety Act will impinge on mushroom growers in five main ways.

1. Food must not be unfit for human consumption.

2. Food must not have been rendered injurious to health.

3. Food for sale must not be contaminated with chemicals or potentially harmful organisms.

4. Food must be of a nature, substance or quality demanded by the purchaser.

5. Food must not be falsely or misleadingly presented.

The Act allows the Minister to make regulations about food hygiene.

The first will require all food premises which supply food to the public to be registered. This register will include mushroom producers and the regulation is expected to become law in 1992.

The other regulation of main concern to mushroom producers will be the one which requires food handlers to be trained to satisfactory standards. It is anticipated that every producer will have to train some, if not all, their staff in food hygiene.

The detail of this training regulation is not yet known but, at the very least, managers and supervisors will have to be trained in aspects of food hygiene.

It is probable that inspectors will also look for training of pickers as well, but this could be done in-house by managers or supervisors who have completed an intermediate level hygiene course and have acquired training skills, from, for example, the ATB instructional techniques course. This would be the best option for smaller units, especially if basic hygiene training has to be given before allowing new pickers into the houses. Local ATBs will be able to give advice to mushroom producers on the training available.

However, it is true to claim that if producers are already supplying the multiple stores they will probably be already complying with many of the requirements of the Food Act.

The Food Safety Act talks about high risk situations. The mushroom is not normally considered a high risk food – it is relatively damp, has a low sugar content and a fairly tender outer skin. However, picking and packing by hand are high risk processes as people come into close contact with each and every mushroom. Simple rules to prevent food poisoning bacteria getting onto your mushrooms should be followed:

a. Sickness; anyone with diarrhoea or vomiting should not work. They should see a doctor who must be informed that they work with food. He will then keep them off work until they are no longer infectious.

b. Cuts, sores and flaking or suppurating skin conditions should be covered with a clean dressing.

c. Protective clothing should be worn. This is to protect the food not the worker. Overalls without pockets or buttons, rubber gloves and hair (and beard) coverings which enclose the hair completely, to prevent it dropping into the food, are required. Trilbies and baseball caps are not very good as they don't prevent this.

d. Personal hygiene must include effective hand washing after eating, smoking, going to the toilet and also after blowing or picking the nose or scratching the skin or hair. This means adequate washing facilities with hot water and soap provided at the point of access to picking or packing areas. If this involves installing new fitments, it would be as well to consider knee or foot operated taps. Give some thought to drying the hands too, ordinary hand towels will not do, roller towels or, better still, hot air driers.

Contamination can also come from tools and utensils. Make sure knives, buckets and working surfaces can be effectively cleaned. Packing equipment must be kept hygienic, avoid excess oil and grease and crop or compost residues. Are picking frames and trolleys kept clean?

The Food Safety Act includes a section on the defence of due diligence. This expects a person accused of an offence to prove that they took all precautions a diligent person would be expected to take to prevent problems occurring. To succeed in this defence, first of all the steps must have been followed and recorded so that due diligence can be seen to have been taken. Records of training, instructions given and actions taken must be available. It is total quality management.

If you have any doubts, get in touch with your local Environmental Health Officer who will advise you on whether you have a problem.

Further information on courses concerned with Food Safety Training can be obtained from the ATB, Head Office, Stoneleigh Park Pavilion, National Agricultural Centre, Kenilworth, Warwickshire CV8 2UG.

The MGA open learning module 7 part 4, dealing with the Food Safety Act, is available to MGA members only from the ATB at a cost of £10.

The National Institute of Fresh Produce is also running a series of courses at various venues around the country on this topic, called Food Safety First. For further details and booking forms please contact the NIFP, 440 Market Towers, 1 Nine Elms Lane, London SW8 5NN.

A very useful publication called "Practical Food Hygiene" is available from Cromer Publications Ltd, Cromer House, London Road, Kingston Upon Thames, Surrey.

The Sinden Lecture Part 1

by Gerard Derks

A high-yielding, modern compost that simplifies the indoor system

Gerard Derks receiving the MGA Sinden Award from Chairman Jim Dumbreck at the 1991 Glasgow Conference.

Over many years I have had the possibility to know and to appreciate the MGA and British mushroom growers and I admire your way of working, the system of your organisation, the level of seriousness and social behaviour of all of you.

Therefore I consider the MGA as the number one mushroom growers' organisation in the world.

When the MGA and the growers of this organisation decided to give me the 1991 Sinden Award I can only be proud and grateful for the honour.

Mr Chairman, I would like to thank you from the bottom of my heart for this honour and above all for the friendship I have always experienced in the UK. I sincerely hope that our good relationship will continue for many years.

It is 17 years ago now that I gave my paper at the MGA Conference in Brighton under the title "3 Phase 1 and consequent developments". The paper explained the system of fermentation, pasteurisation and incubation in tunnels which had been developed in Italy by Messrs Francescutti and Giordani in the years 1968-1970 and at the time of my paper it had been in commercial operation for three years.

In the second part of the same paper I indicated the consequences of the use of tunnel-pasteurised and/or incubated compost resulting in filling beds or trays with incubated compost combined with simultaneous casing. In my slides I showed a prototype of the, now well-known, "head-filling machine".

Ten years later – in 1983 – I had the pleasure of giving another paper, practically on the same argument and again at an MGA Conference at Brighton, on which occasion – to my own great astonishment – I had to confirm that in a short period of only ten years the system had convinced a great part of the mushroom growers and was adopted by then worldwide.

In the meantime we had abandoned in Italy fermentation in the tunnels. Not because of the fact that there were technical problems involved – as a Dutch speaker wanted to make his auditorium believe at the 1989 Verona mushroom fair – but simply because of the fact that fermentation can be done cheaper in the open air rather than in a closed (tunnel) building.

In the same period, however, our research and our experiments went on especially in the direction of improving the quality and the productivity of our compost and at the same time in the direction of producing a more economic compost.

Huge savings

After several years of experiments and practical trials Mr Francescutti at his Agrifung plant succeeded by the middle of 1988 in producing an excellent compost, saving just over 30% on raw materials and giving an increase in production of at least 10%, compared with the traditional system.

Initially – in 1988 – only 20% of the compost was produced according to this new system, but this percentage was increased gradually every month until May 1989, when 100% of the compost was produced according to the system. It is important to realise at this point that Mr Francescutti produces almost 60% of all custom compost in Italy.

Ten compost-turners were sent to the "old people's home" and the compost – yard is completely empty, ready to receive various types of aircraft that feel like making a landing in an abandoned compost yard.

We have never been looking for creating an indoor-composting system. Our aims were to increase the productivity of our compost and to decrease the cost of production. However, all of a sudden we realised, almost to our surprise, that we had received a "gift from heaven" or a "premium" or whatever you like to call it; for the system is ideal for realising, at a very low cost, an optimal indoor composting system.

The dimensions of the area for preparing the raw materials are so limited that enclosing this area is a rather cheap affair.

The operation speed is so high that the materials enter this building and leave it again in a continuous flow, practically occupying no space inside the building.

To filter the outgoing air in this small building is a problem that has already been resolved several years ago.

So far then the headlines of this paper of which I am going into more detail in the next part of my lecture. I have, however, to make one reservation as far as these details are concerned.

I can give you the information about the results we obtain with this system, but for obvious reasons we cannot explain the particular technical tricks involved during the whole process.

Most important

The first important thing is to have the proper tunnel construction. All over the world people have copied our original Italian tunnels. We can only say that they are all very poor copies.

In an Italian tunnel you can fill the compost very unevenly, or you can even leave a part of the tunnel floor space uncovered. However, all the compost inside the tunnels will receive the same amount of air. This ideal floor system of the tunnel is very important to obtain secure results in the process I am describing in this paper. Due to the same floor system there is no need at all for isolating the tunnel walls.

A very consistent isolation of the ceiling is always necessary. The tunnels

described above are very suitable for phase 1, phase 2 and incubation, as has been proven for over 20 years now at the Agrifung installations in Italy.

Once we dispose of the tunnels we can start preparing the compost for this new technique.

First step

The first step is cutting the straw as shown on the next slides. At the same time the straw, before, during and after cutting, is continuously watered.

From the cutting machine the straw goes on a screw conveyor receiving more water.

Then by means of a big hopper, a mixture of chicken manure and gypsum, which has been prepared separately, is added. The next conveyor ensures the thorough mixing of all materials.

The mixture so prepared then drops on a concrete floor and is transported by means of a frontloader to the tunnel-filling machine/or line.

In 3-4 days fermentation is finished. Thanks to the combined floor-and-wall construction system the material is at this point almost always free from nematodes larvae and eggs.

If we have environment problems we can easily filter the air that is leaving the tunnel. This has been done on many farms before and does not create any particular problems. Coming back for a moment to the closed building for mixing the compost: in a building with a floor space of 25m by 22m, which is 550m^2, we can prepare daily something like 100 tons of compost, or in other words 500 tons per week, ready for fermentation in the tunnel.

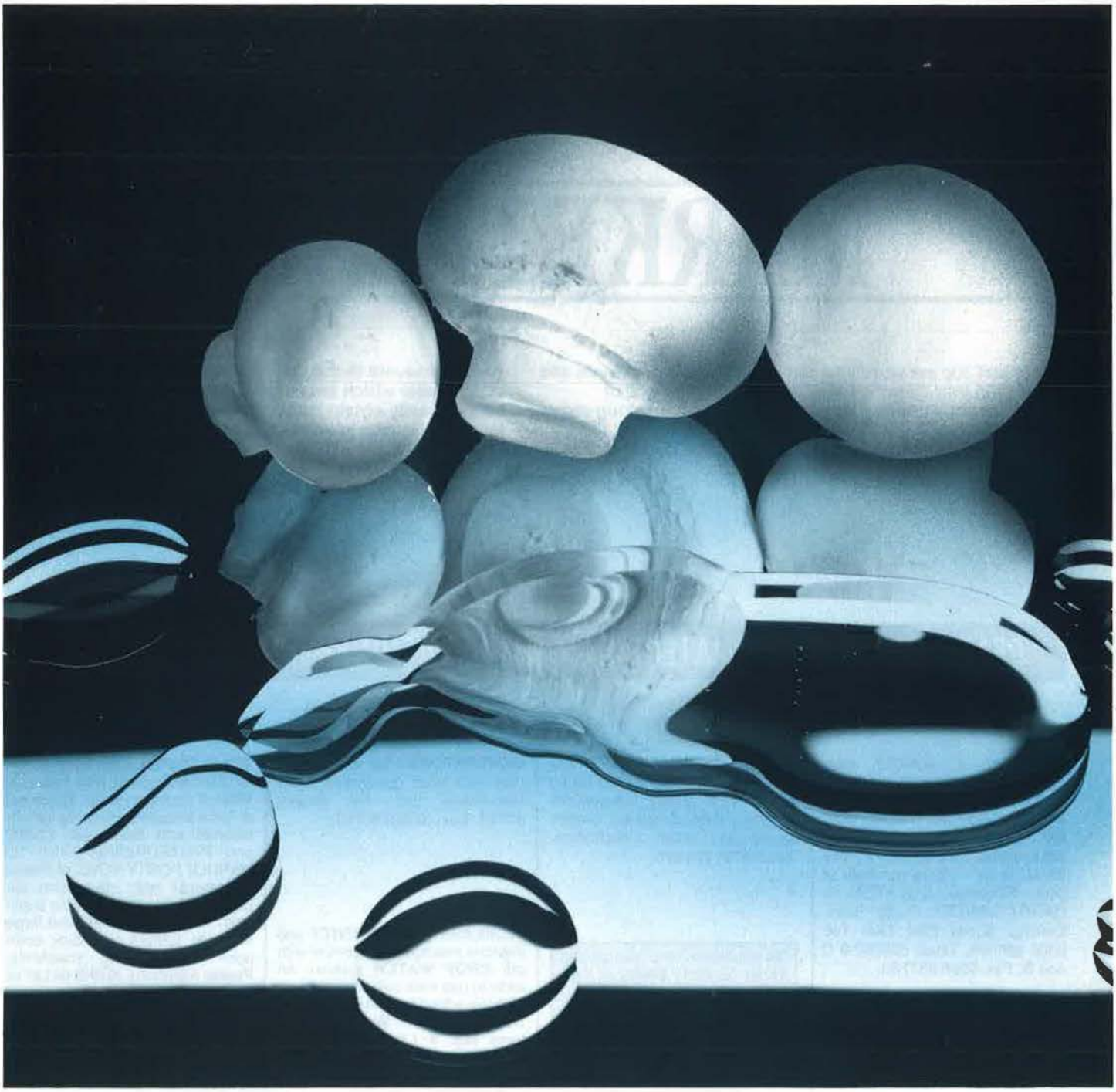
The tunnels are built immediately next to the mixing area. To produce 500 tons of fermented compost/week we will need three tunnels of 25 x 4m. The total surface area of these three tunnels is 300m^2 and they can do two cycles each a week.

Adding these 300m^2 to the above mentioned 550m^2 for the mixing area and adding another 250m^2 for technical equipment (filtration, etc) we have a complete fermentation area of 1100m^2 for producing 500 tons/week. To produce 1000 tons/week the total area has to be increased by about 50-60%.

You will realise that at the moment of preparing the mixture all the material is cold, so the release of odours is already at a very low level which facilitates the possibilities for filtering.

Once the fermentation in the tunnel is completed the compost is moved into another tunnel for pasteurisation. This is mainly done in order to have a further possibility of mixing the material and to get a higher uniformity of the moisture in the mixture. On big farms it has a second advantage: the tunnels for fermentation can be of a much simpler construction than those for pasteurisaton, especially as far as the air-conditioning equipment is concerned.

To be continued in the next issue of Mushroom Journal.



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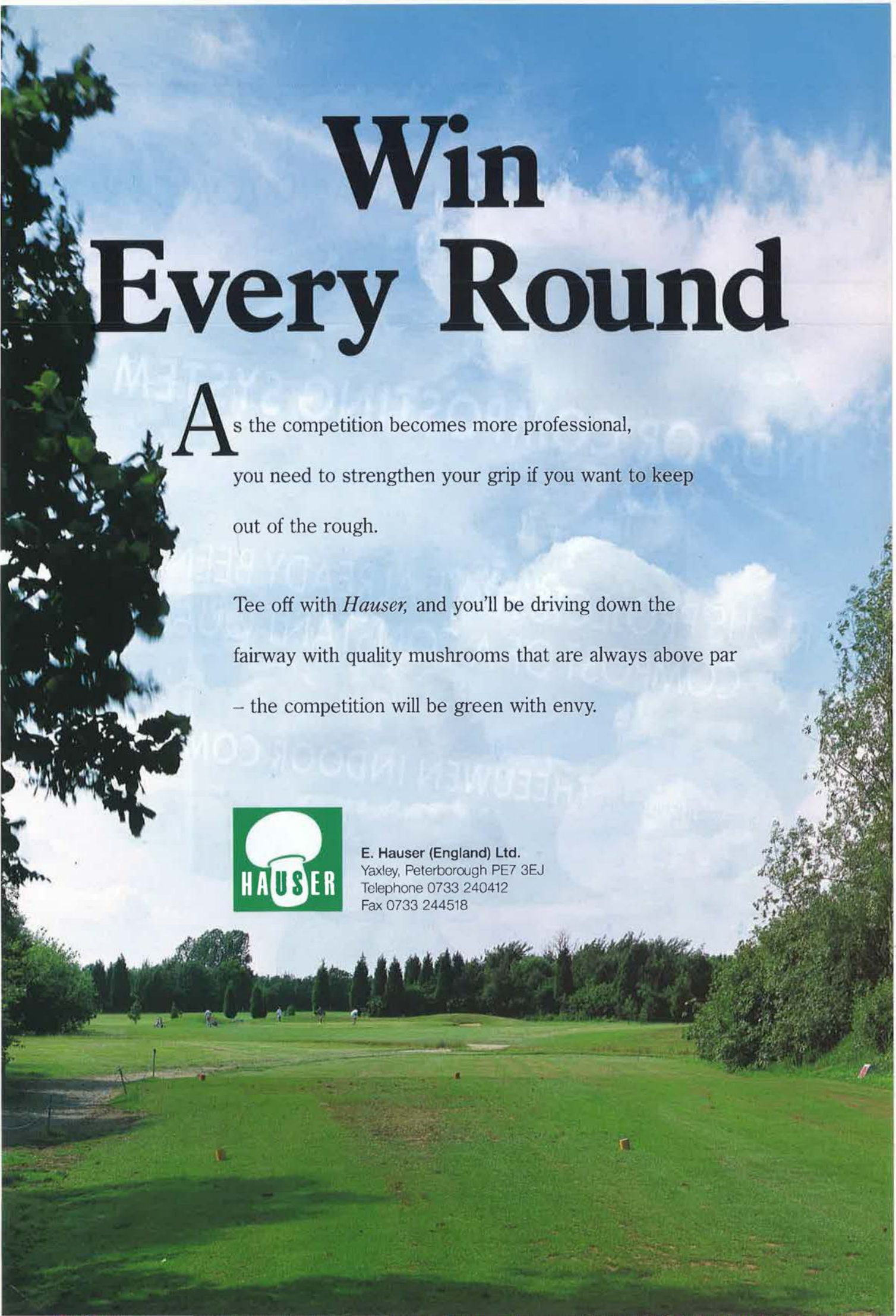
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