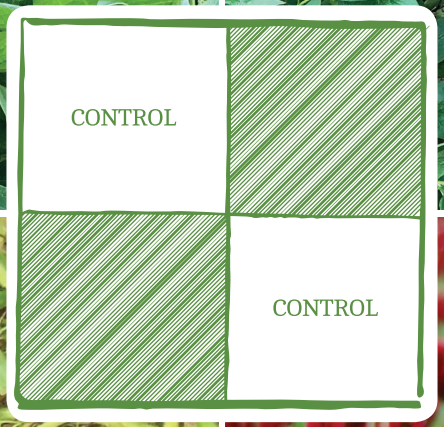

The Garden Organic Members' Experiments Programme

Celebrating 60 years of Citizen Science in Organic Horticulture

Garden Organic in association with the Centre for Agroecology Water and Resilience (CAWR), Coventry University

garden organic

Coventry University

Research Centre for Agroecology, Water and Resilience

Thank you and congratulations

On behalf of Garden Organic, the authors would like to extend a heartfelt THANK YOU to all the thousands of individuals who have participated in the Members' Experiments over the last 60 years. Many congratulations on your fantastic achievements! This important programme of research has played a vital role within the organisation itself and it has had a tremendous impact on the development of the organic agriculture movement as a whole, as well as on organic gardening practice. Without this involvement, there would have been no citizen science programme in organic horticulture and it is unlikely that organic gardeners would be as many, and as successful, as they are today.

We would like to acknowledge the continuous commitment of HDRA / Garden Organic to this programme of work. This important collection of citizen science in organic horticulture is truly unique and something that we can be very proud of.

The authors also wish to thank everybody who has contributed to this review of the Members' Experiments' including staff (past and present) and members who have so generously shared their experiences and memories of the scheme. As a project, this review was funded by Centre for Agroecology Water and Resilience (CAWR), Coventry University and the authors would like to thank the centre for its support and involvement

About this booklet

This booklet summarises the findings from a project that reviewed the long running citizen science programme - the Members' Experiments scheme of the Henry Doubleday Research Association, now operating as Garden Organic. This project aimed to:

- Review and celebrate the activities and achievements of the scheme.
- Evaluate the role and impact of the programme for the organisation itself, the participants, the wider organic movement and for organic gardening practice.
- Evaluate citizen science as an approach for generating and sharing knowledge.

When complete the booklet will be available as an e-book with links to all of the resources and documents created as part of this project.

Resources and outputs of the project

- Members' Experiments Database; including year, title and category of each experiment, details of participants, resources supplied, other collaborators, origins of the idea, summary of results, archive of reports.
- Digital archive of Members' Experiments and Reports.
- Members' Experiments Report 1958 - 2018; covering 6 eras the organisation, plus a section on the future, activities, role and impact of research programme, dissemination of results.
- Research case study reports on key topics, including carrot root fly, clubroot, green manures, composting, comfrey.
- Interviews and feedback from participants and others involved.

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To cite this document:

Rayns, F., Davies, G. and Lennartsson, M (2018). *The Garden Organic Members' Experiments Programme - Celebrating 60 years of Citizen Science in Organic Horticulture*. Report prepared by Garden Organic in association with the Centre for Agroecology Water and Resilience, Coventry University.

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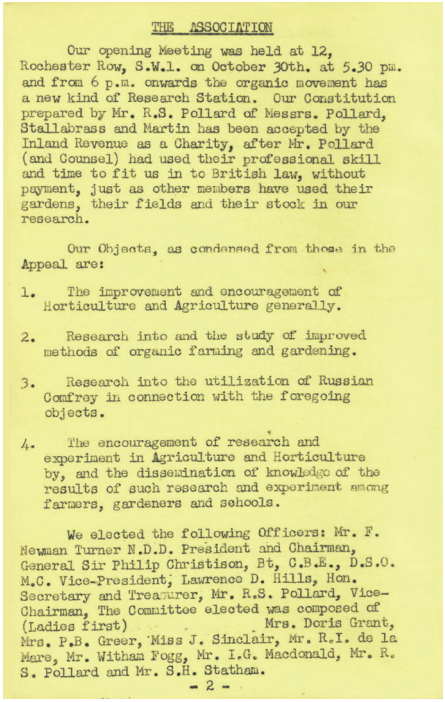
Foundation of the Henry Doubleday Research Association

The Henry Doubleday Research Association (HDRA), now known as Garden Organic, began informally in 1954 but was established as a UK charity in 1958 by Lawrence D Hills. Lawrence, a horticulturist and journalist, was strongly motivated by a desire to challenge what he perceived as 'orthodoxy' or 'authority' by using experimentation to challenge the type of industrialised food production that was being developed after World War II.

Lawrence D Hills, Founder of HDRA and a pioneer of the organic agriculture movement, alongside Lady Eve Balfour, Sir Albert Howard and Mr F Newman Turner.

The Members' Experiments were the raison d'être for the organisation from the beginning. With very limited funds, the idea was that simple experiments would be conducted by the members in their own gardens and the results sent back to Lawrence Hills to be collated and published in the quarterly Newsletter of the association.



THE ASSOCIATION

Our opening Meeting was held at 12, Rochester Row, S.W.1. on October 30th. at 5.30 pm. and from 6 p.m. onwards the organic movement has a new kind of Research Station. Our Constitution prepared by Mr. R.S. Pollard of Messrs. Pollard, Stallabrass and Martin has been accepted by the Inland Revenue as a Charity, after Mr. Pollard (and Counsel) had used their professional skill and time to fit us in to British law, without payment, just as other members have used their gardens, their fields and their stock in our research.

Our Objects, as condensed from those in the Appeal are:

1. The improvement and encouragement of Horticulture and Agriculture generally.

2. Research into and the study of improved methods of organic farming and gardening.

3. Research into the utilization of Russian Comfrey in connection with the foregoing objects.

4. The encouragement of research and experiment in Agriculture and Horticulture by, and the dissemination of knowledge of the results of such research and experiment among farmers, gardeners and schools.

We elected the following Officers: Mr. F. Newman Turner N.D.D. President and Chairman, General Sir Philip Christison, Bt, C.B.E., D.S.O. M.C. Vice-President; Lawrence D. Hills, Hon. Secretary and Treasurer, Mr. R.S. Pollard, Vice-Chairman, The Committee elected was composed of (Ladies first) Mrs. Doris Grant, Mrs. P.B. Greer, Miss J. Sinclair, Mr. R.I. de la Mare, Mr. Witham Fogg, Mr. I.G. Macdonald, Mr. R. S. Pollard and Mr. S.H. Statham.

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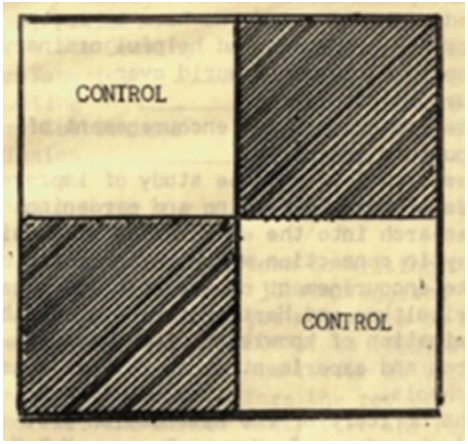
The first page of Newsletter Number 1 in 1958, listing the objectives of the organisation with a strong emphasis on research.



The first logo of the organisation, representing a basic replicated trial with two treatment plots and two controls- the Latin square.

Over the years, the charity expanded and developed as an active player in the organic and environmental movements, which grew during the 1970's, and as part of the 'alternative lifestyle' culture that emerged at that time and which continues to this day.
In particular, the charity has championed and actively promotes organic gardening and organic food for its environmental, educational and health values.
The organisation played an important role in, what some would argue, has been the successful promotion of organic agriculture as a viable and sustainable farming method, not only in the UK, but as part of an international movement that has developed a set of coherent principles and standards.

Members' Experiments - teams and themes

The Henry Doubleday Research Association was conceived as an association of individuals that would explore, observe, experiment and share knowledge about 'alternative' farming or gardening techniques. At the beginning, in 1958, members were organised into four 'teams'.

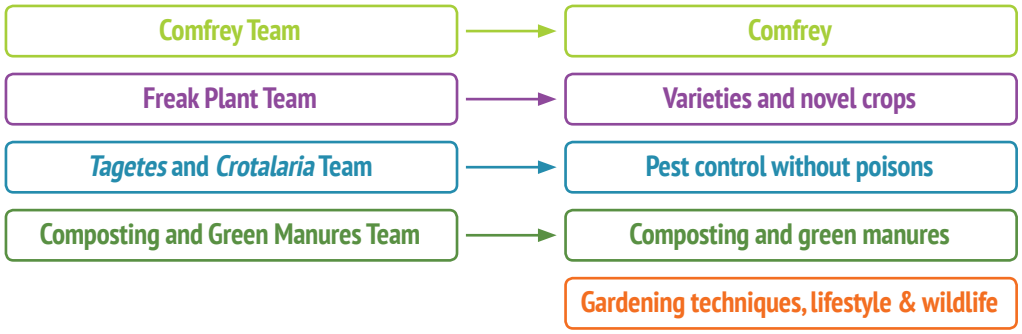
Members in these teams experimented on the same topic, but many drove their own agendas and explored specific aspects of the subject over several years and then shared the results.

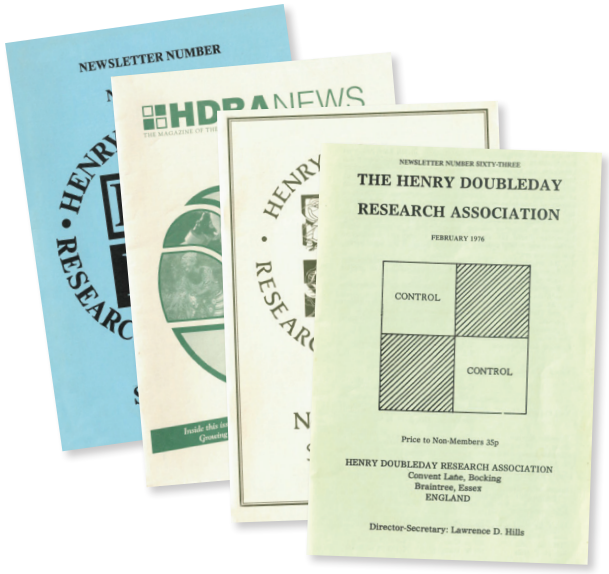
By the mid 1960's the 'teams' developed more into 'themes', with members undertaking similar experiments within the theme, as agreed between themselves and with guidance from Lawrence Hills. Many of the experiments were repeated over several years, each year refining the hypotheses and the approach.

Since that time, the basic approach for the programme has remained much the same, as follows:

1. Topics suggested by members & staff of the organisation, usually reflecting the horticultural problems and issues of the time.
2. Experiments advertised to the members.
3. Instructions, record sheets, seeds and materials distributed.
4. Members (individuals, groups, schools) undertake experiments in their gardens & allotments over a period of 3-12 months.
5. Results reported and disseminated -directly through the organisation's magazine or via more widely published books, courses and advisory information.

The development of research themes within the Members' Experiments programme





A selection of Newsletters, produced between 1958 and 1999.

The Organic Way magazine replaced the HDRA Newsletter from 1999 onwards.

Members' Experiments - timeline

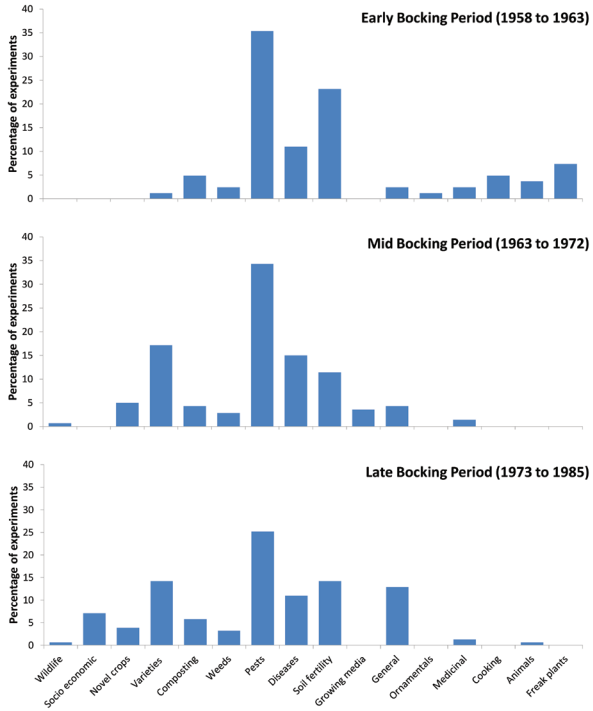
Year	1958	1964	1973	1986	1993	2004	2017 onwards
Era	Early Bocking	Mid Bocking	Late Bocking	Early Ryton	Mid Ryton	Late Ryton	The Future
Membership	106	1200	3300	8700	17400	30464	23500
Participants per experiment	43	19	60	97	218	194	84

The history of the association can be conveniently divided into seven 'eras'. These are separated by important milestones within the organisation in terms of size, leadership and location of the headquarters (initially Bocking in Essex and later Ryton-on-Dunsmore in Warwickshire).

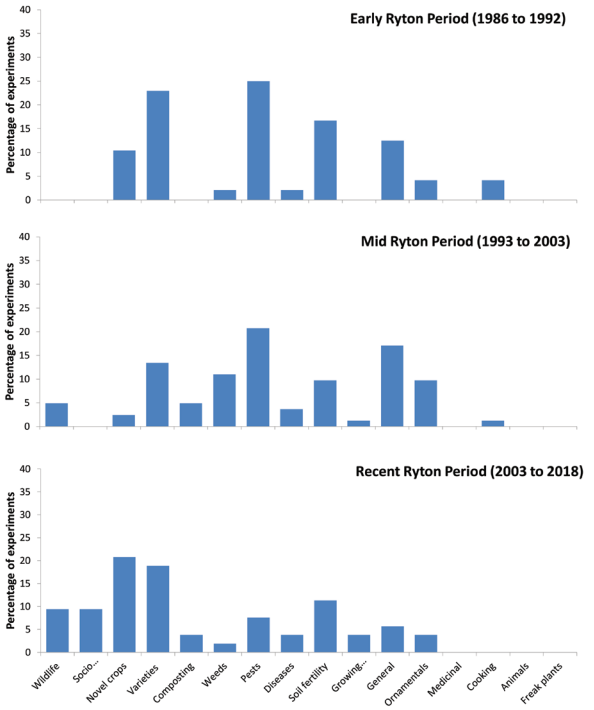
Between 1958 and 2018, an **impressive total of 550 experiments** have been conducted within the scheme. The topics of the Members' Experiments during the different eras have reflected the horticultural concerns and environmental issues of the day. The graphs on this page illustrate this. For example, in the Bocking era most experiments investigated the control of pests and diseases (e.g. by using companion cropping). In the 2000's the most common experiments concerned novel crops and varieties.

During the Bocking eras, many of the experiments also became nationwide campaigns. In 1962 for example, Lawrence Hills publicised the idea of using *Tagetes minuta* to control weeds, in his gardening column in *The Observer*, and as a result there were more than 2300 request for seeds. Also in the same year, to use of rhubarb to control clubroot was picked up by several national newspapers and magazines, resulting in 600 letters from gardeners nationwide.

Experiments between 1958 and 1985



Experiments between 1986 and 2017



The Early Bocking Era (1958 -1963)

Lawrence Hills (Honorary Secretary and Treasurer) established the organisation at Bocking in Essex. The organisation had access to 1.75 acres of trial grounds but the idea from the beginning was that most of the research would be carried out by the members in their own gardens. Lawrence Hills was clearly central to the work of the association, although other members of the committee were also well known organic pioneers. The first President and Chairman of the organisation was Mr F Newman Turner. Also on the committee was Doris Grant, an author on the subject of whole food nutrition, which was an important focus of the early organic movement. There were also close links with the Soil Association.

Initially the membership of the organisations was about 100, but this increased to around 1000 by 1963. The main means of communication with members was via the 'Newsletters' that appeared quarterly. Lawrence Hills was a very prolific author and, in addition to the Newsletters, he also wrote about the work in his weekly articles in *The Observer* newspaper and summarised some of the findings in reports on particular topics. A list of members' addresses was circulated to encourage them to write to each directly and the annual general meetings of the organisation played an important role in facilitating face-to-face communication within the membership.

Members were encouraged to sign up for participation in one or more 'teams':

The Russian Comfrey Team

Concerned with the differences between various strains of Russian Comfrey, its productivity in different situations, its value as a stock feed and as human food, its medicinal effects and use as a soil improver.

The Freak Plant Team (or Radioactivity team)

Concerned with finding abnormal plants that may have originated as a result of the nuclear testing that was then being carried out. There was a focus on the possible usefulness of these.

The Tagetes and Crotalaria Team

Concerned with the effect of various plants, particularly *Tagetes* species on pests and diseases, especially nematodes that affected potatoes or other crops.

The Composting and Green Manures Team

Concerned with techniques of composting, the effect of compost on soil fertility and the use of different green manure species.

Quotations from Lawrence Hills, from early HDRA Newsletters, explaining his philosophy behind the type of research that the organisation was conducting:

"We are Observers not Believers."
Newsletter 13

"The experimenters are all ordinary amateur gardeners, without however the determination to explain away the unusual that is the handicap of modern science, or the organic prejudice against anything that fails to fit a philosophy."
Newsletter 13

"It is so easy to believe in a garden legend, our job is to test it."
Newsletter 16

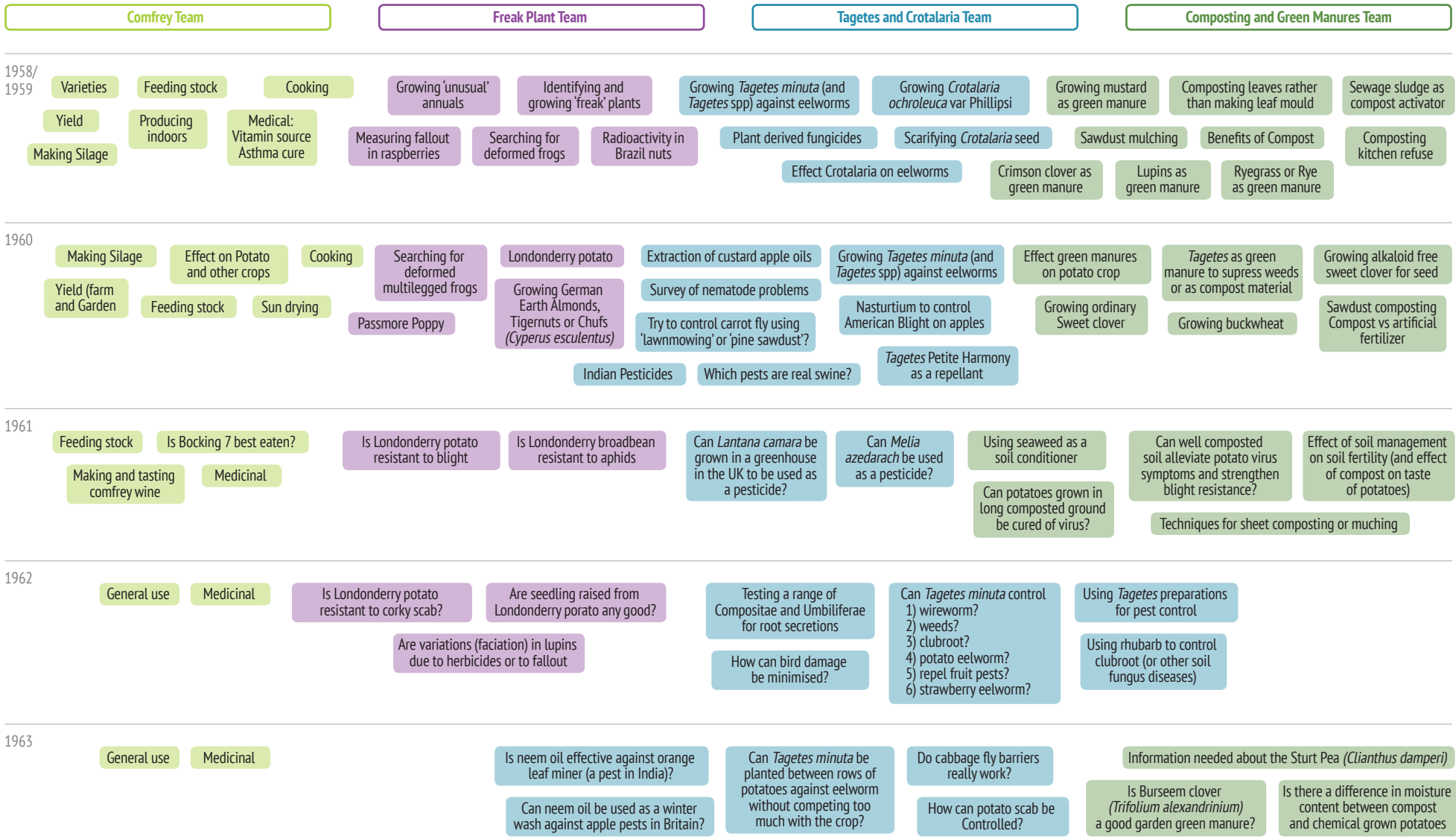
"A well documented failure is better than wild enthusiasm with only belief behind it."
Newsletter 25

"We shall have given an example of the value of small scale 'do it yourself' research to a generation that imagines that Science is merely Space."
Newsletter 29

"As the years go by you will notice that the same names crop up again and again in the reports. These are our 'hard core' of experience experimenters, and I do hope that this year we can add to their number, both in Britain and overseas."
Newsletter 36

"Before we fire a full scale members' experiment to establish something, we like to have something more than a single experience to base it on, and always we have ideas from members that we should like to grow into remedies that we can put our weight on."
Newsletter 80

Members' Experiments (1958 - 1963)



The Mid Bocking Era (1964-1972)

During this period, the Members' Experiments continued to play a prominent role in the work of the organisation. There were also other lines of work, which although not Members' Experiments *per se*, often involved pleas for active involvement of the members. The work on comfrey continued to be prominent with reports from members, particular on its nutritional and health qualities.

The organisation also became more involved in general compilation and dissemination of practical organic knowledge. Many general environmental issues came to the fore in the reports of activities. The Trial Ground at Bocking was increasingly used to try out the ideas and suggestions put forward as Members' Experiments; it became the focus of open days for members to visit and engage with the activities of the organisation.

By the early 1970s the organisation was reporting on work on a wide range of topics including:

- Biological control (e.g. work on hedgehogs, frogs and toads, glow worms, fox management, ladybirds).
- General pest control without recourse to 'synthetic' pesticides (e.g. bird control, squirrel management, pest control without poisons).
- 'Alternative' approaches to gardening such as use of green manures and composting, no dig methods, composting paper.
- A 'housewives help' section of the newsletter regularly reported on subjects concerned with more healthy ways of eating and living - recipes and preserving vegetables, diet (e.g. for coeliacs) and nutrition.
- A 'wholefood finder' was introduced to the membership, listing sources of organic food and even accommodation.
- Pollution, in particular pesticides (e.g. DDT in eggs, lead and cadmium in the environment).

Lawrence Hills was the central figure of the organisation, supported by his wife Cherry Hills, and he was also prominent in the national press, both as a journalist and for writing campaigning letters. By the end of the period the organisation had a modest staff to process correspondence and to work in the garden.

Membership of HDRA increased from 1200 to 3300 between 1964 and 1972. Information and results from the Members' Experiments were shared via the Newsletter, but by the end of the period, reports of experiments carried out on the Trial Ground were equally prominent in the quarterly magazine. Many other publications were also produced during this period and were available for the members to purchase.

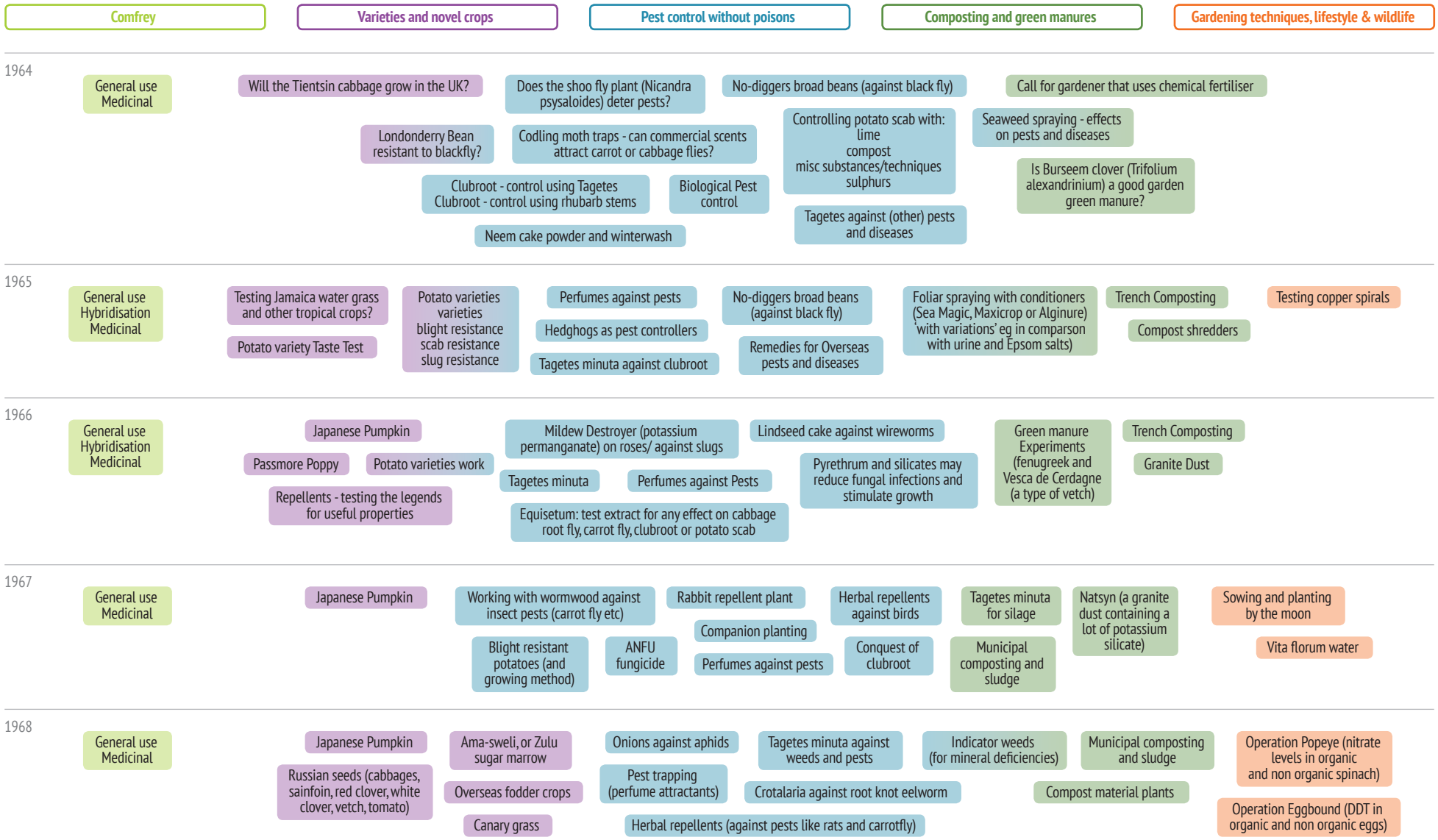
In this period the organisation also began to sell a number of items, often directly linked to the work on comfrey or other themes, that we otherwise difficult to obtain. This included comfrey (plants, ointment, tea, flour), green manure seeds, compost sundries (bins, activators etc.) and occasional pest control items (e.g. *Fertosan* slug destroyer).

From the outset there was strong international element to the work of HDRA. Many of the members had recently returned from parts of the British Empire that were being given independence and there was much emphasis on ensuring adequate, healthy, food for a rapidly growing World population. Novel crops were a common subject for study, for example in 1966-1969 a series of experiments were conducted on 'Japanese Pumpkins':

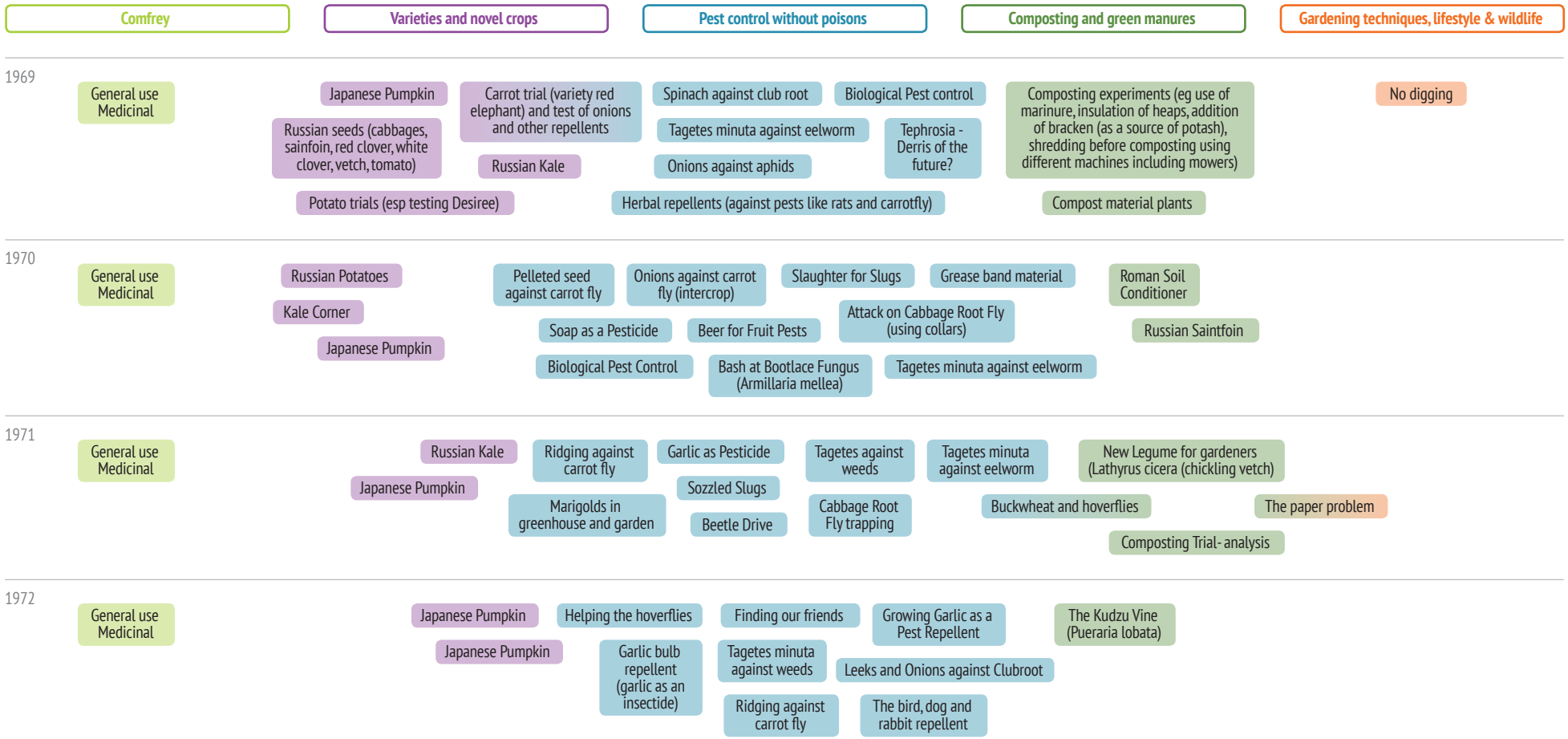
"There are now 241 experimenters in South Africa, 34 in Kenya, 32 in Rhodesia, 4 in Uganda, 1 in Angola, 3 in Tanzania, 4 in Swaziland, 1 in Malawi, 1 in Zambia, 1 in Lourenco Marques, 7 in Mauritius, 8 in Jamaica, 8 in Fiji and 2 in Seychelles. This total of 337 people covers the whole range of tropical climates. The enterprise may well do more for World Hunger than anything else we have done so far."
Newsletter 29

In 1967 Lawrence Hills toured South Africa, giving talks and recruiting many new members. As a result, in 1968, five experiments were planned specifically to cater for them.

Members' Experiments (1964 - 1972)



Members' Experiments (1964 - 1972) *continued*



Comfrey Experiments

Several species of comfrey *(Symphytum spp.)* occur naturally in Britain and the plant has long been known to herbalists because of its medicinal value. In the 19th century there was interest in developing it as a fodder crop because of the high protein concentrations in the leaves. A type that became known as Russian comfrey was imported from St Petersburg by Henry Doubleday, a smallholder and inventor from Essex. Russian comfrey does not set seed and so must be propagated vegetatively - a reason that Lawrence Hills suggested for the neglect of the plant by seed merchants. In the 1950's a group of farmers and racehorse trainers began to compare the performance of the crop in what became known as the 'Comfrey Races'. This was the core of the book *Russian Comfrey*, written by Lawrence Hills in 1953, that led to the foundation of HDRA, named after its long dead pioneer.

A plant of Russian comfrey.

Until the end of the 1960's comfrey research was the main focus of the association and a motivation for the participation of many of the members. Its potential to contribute to food security in the UK and overseas was of key importance. An early activity was a categorisation of the available Russian comfrey into distinct 'strains' (according to flower colour, vigour, leaf shape and plant form etc.) since it was felt that each could be more suitable for specific purposes. These were identified with 'Bocking numbers' since the work was done on the Trial Ground at Bocking.

In total, 26 formal Member's Experiments were conducted on comfrey but actually much of the early Newsletters was taken up with correspondence relating the experiences of the members. The work fell into a number of categories:

- Determining the potential yield of the different Bocking strains under both farm and garden conditions.
- Attempts to hybridise the stains to develop new characteristics.
- Its value as a stock feed for domestic animals; members sent in samples for analysis of nutrient content.
- Ways of preserving the crop (e.g. making it into silage or drying)
- Reporting case studies of effective medicinal use, either when taken daily (e.g. in tea or as an ointment on wounds).
- Reporting recipes to make the crop more palatable, including the production of comfrey wine.
- Its use as a plant feed, using the leaves as a mulch, to make comfrey liquid or as a compost activator.

In the 1980's concerns about the possible carcinogenic effects of comfrey taken internally resulted in the subsequent work being focussed on its use as a source of soil fertility.

Russian comfrey has very much come to be associated with the organisations and the widespread cultivation and use of the 'Bocking strains' is clearly thanks to the innovative work of the Members' Experiments programme.

Comfrey leaves being packed into a barrel of water in order to produce 'comfrey liquid', a high potassium feed particularly suitable for tomatoes.

The Late Bocking Era (1973-1985)

In this period the organisation became even more involved in a broader range of issues and campaigns that built on the Members' Experiments.

- The formation of local HDRA groups around the country. Many of these groups were also affiliated to the Soil Association.
- A free advisory service for members was developed and there was also an attempt to initiate an advisory service for commercial organic growers (later taken over by the Organic Growers Association and others) as well as promoting training in collaboration with agricultural colleges.
- A vegetable seed library that provided access to rare vegetable varieties was developed on the back of campaigning work against restrictive seed legislation that was being introduced at the time (mainly under EC directives). This helped to provide the impetus for the founding of the National Vegetable Gene Bank at National Vegetable Research Station at Wellesbourne.
- An 'Overseas Programme' arose from interest in tree (perennial) cropping, which led to much subsequent work on *Prosopis* spp. This was largely done in collaboration with academic institutions in the UK and elsewhere.

There was a new intake of professional and technical staff. In 1974, Alan and Jackie Gear were taken on particularly with the aim to improve the running and evaluation of the Members' Experiments. With their scientific background, they took a more objective approach for the running of the scheme and evaluating the results. In 1978, a research assistant, Pauline Pears, also with a scientific biological training, was taken on and by the end of the period she had largely assumed responsibility for running the Members' Experiments. Lawrence Hills, however was still involved - proposing modifications and additional experiments based on members' experiences, meetings and visits. A Scientific Advisory Committee, chaired by Dr Bill Blyth and with representatives from the Trustees, was set up in1982.

The Members' Experiments continued to have a very prominent role, with up to twelve experiments run each year and with high number of participants. The success of the organisation also came from the efforts devoted to the dissemination of the results, with a prolific number of publications and campaigns reaching not only the members but gardeners nationwide. Lawrence Hills, and the new staff recruits, also engaged in extensive speaking tours across the country.

Experiments concerning pest and diseases continued to be prominent, within the theme 'Pest Control without Poisons'. This was at a time when many of the new products for biological control were being introduced to the gardening sector. Experiments within the wider theme of 'Gardening techniques, lifestyle & wildlife' also increased greatly, for example with survey-type experiments aiming to increase measure how productive gardens could be to increase self-sufficiency, particularly with regard to protein production.

Lawrence Hills was still the main public face of HDRA doing most of the writing, but by the end of the era, Alan and Jackie Gear, Pauline Pears and others also had considerable influence in the running of the organisation. The HDRA membership steadily increased between 1973, when it was around 3300, to 7000 in 1985, at the time the organisation physically relocated to Ryton-on-Dunsmore in Warwickshire.

Photo and quote from an experimentor of the era.

Bocking Trial Ground.

Members' Experiments (1973 - 1985)

	Comfrey	Varieties and novel crops	Pest control without poisons	Composting and green manures	Gardening techniques, lifestyle & wildlife
1973	General use Medicinal		Conquest of Clubroot (root secretions) Countering Cabbage Root Fly (collars) Garlic as Repellent Garlic as Insecticide Helping the hoverflies War against Weeds	Pengift Crownvetch Lasting Potash	Life Support Gardening Tank corps (using septic tank waste) Tomorrow will be Friday (fish farming)
1974	General use Medicinal	The Has Beans (soya)	Conquest of Clubroot (root secretions) Countering Carrot Fly (coriander planted as repellent) War against Weeds Safe and simple sprays Mole Menace (renardine repellent) Cartons against Cabbage Root Fly (barriers)	Crown Vetch Lasting Potash Green Manuring (grazing rye)	Life Support Gardening Sward Gardening
1975	General use Medicinal	Prodigious potatoes Drying Peas and Beans	Conquest of Clubroot (root secretions) Countering Carrot Fly (coriander planted as repellent) War against Weeds Safe and simple sprays	Compost without choppers Natural Nitrogen	Survival Gardening Sward Gardening
1976	General use Medicinal	Prodigious potatoes Drying Peas and Beans	Conquest of Clubroot (root secretions) Cheapest Organic Weed Killer Countering Carrot Fly (coriander planted as repellent)	Gardening with Clover Grass as Green Manure Liquid Comfrey Manure	Survival Gardening Compost Holes
1977	General use Medicinal	Runner Beans for Drying Super Lupins	Control of Clubroot (large pot transplants) Control of Carrot Fly (Resistant Variety) Potato Scab Irrigation to manage Bacteria against bugs (Bt) Potato Green Sprouts against eelworm Conquering Cutworms Neem against Mildew	Compost without choppers High Humus Gardens	Potatoes: Long vs Short Shoots Cabbage Campaign (lead testing) Survival Gardening Companion Planting: Onions and Beetroot Compost Holes
1978	General use Medicinal	Peas for Drying Lupins for Lunch	Control of Clubroot (large pot transplants) Control of Carrot Fly (barrier) Potato Scab Irrigation to manage	Compost without choppers	Potatoes: Long vs Short Shoots Better Bee Plants Survival Gardening Companion Planting: Onions and Beetroot
1979	General use Medicinal	Roast port plant: Shriona (Japanese Greens) Irish (potato) onion Lupins for Lunch Peas and Beans for Drying	Eqisetum Experiment (fungicide) Potato Green Sprouts against eelworm and other pests Homeopathic Clubroot Cure	Potatoes and Broad General use Beans (intercrop) Potatoes: Long vs Short Shoots	Bee plants and predator attractors How does your garden grow? (yield survey)

Members' Experiments (1973 - 1985) *continued*

	Comfrey	Varieties and novel crops	Pest control without poisons	Composting and green manures	Gardening techniques, lifestyle & wildlife
1980	General use Medicinal	Ocas; Irish (potato) onion; Lupins for Lunch; Peas for Drying; Shriona (Japanese Greens)	Control of Carrot Fly (barrier)		Space Saving Potatoes; Hoverfly attractors; How does your garden grow? (yield survey)
1981	General use Medicinal	Outdoor bush Tomatoes; Beans for Drying	Lettuce against Caterpillars (extract); Carrotfly control by cunning (barrier); Biological Control: Limnanthes vs blackfly; Scorzonera against carrotfly (companion intercrop); Anti clubroot vaccination	The Compost Radish?	Test Tube Potatoes; How does your garden grow? (yield survey); Survey Different Growing Systems; No Dig Potatoes
1982	General use Medicinal	Nadja: Multipurpose pea; Beans for Drying; Outdoor bush tomatoes	Biodynamic slug control; Carrotfly control (barrier); Creosote against Carrotfly	The Compost (Fodder) Radish?; Red clover for green manuring	How does your garden grow? (yield survey); No Dig Potatoes
1983	General use Medicinal	Nadja: Multipurpose pea; Texcel greens	Computers against Birds (tape; Artemisia spp against aphids; Fungus fights whitefly Biological control	Yellow sweet clover for green manuring; Green manuring: (tares, rye, nadja pea field beans)	Univert (for all); How does your garden grow? (yield survey); Landspeed (soil conditioner); No Dig Potatoes
1984	General use Medicinal	Unusual vegetables (beetroot, winter radish, Chinese greens Japanese Peppers, pole bean, lettuce); Red Alert bush tomatoes	Seaweed meal against carrotfly; Clubroot soup (boiled extract); Bicarb beats mildew; Artemisia spp against aphids	Good companions (intercrop beans and cabbage)	How does your garden grow? (yield survey); Willow promotes rooting?
1985	General use Medicinal	Bath Cos lettuce; Unusual vegetables (soya bean, pepper, tomato Spinach, pea, lettuce)	Bicarb beats mildew; Artemisia spp against aphids; Fungus fights whitefly Biological control	Yellow sweet clover for green manuring; Green manuring: (tares, rye, nadja pea field beans)	Landspeed (soil conditioner); Univert (for all); How does your garden grow? (yield survey); No Dig Potatoes

Pest control without poisons: carrot fly experiments

Carrot fly *(Psila rosae)* is a common pest of carrots. The adult fly lays eggs on the soil surface close to carrot plants and the eggs then hatch into maggots that initially feed on fine root hairs and then mine underneath the surface of the carrots as they develop.

Carrot fly damage.

Already in 1960, carrot fly was identified as one of the most important pests in organic vegetable production in a survey of the members (Members' Experiment 17, 1960) and at the same time, the first Members' Experiment on carrot fly was proposed. The experience of Mr Tyldesly of Wimbledon seemed common and in his words:

"I have tried so many ideas that enthusiasm has waned a bit. Let's try to recall some... leather dust; leather dust moistened with paraffin; mulching with lawn mowing; sowing rows alternately with onions; sowing carrots and onions mixed in the same row; sowing thinly and not thinning at all; mixing carrots and parsley; and so on - none of these gave me a crop of carrot".

HDRA Newsletter 19, 1964

Experiences like this led to carrot fly becoming a priority pest for study by the association and was the subject for many experiments (29 in total), especially in the 1960s, 1970s and 1980s. A wide range of approaches to control the pest were investigated, including:

- Barriers - using mulching materials such as sawdust, grass clippings or sand mixed with paraffin; barriers made by ridging the soil around the carrots and barriers (e.g. yoghurt pots) placed over carrots sown in stations, or around blocks of carrots.
- Scents and repellents to divert carrot flies away from the carrots including herbal oils, living plants, seaweed meal or other agents (including some more dubious materials such as creosote). Scents were often tested in combination with some trapping device to catch and remove the flies (Perfumes Against Pests).
- Companion or intercropping, especially using some form of alliums as intercrops with carrots, but also other species.
- Sowing date - testing different sowing dates to avoid the peak of the egg laying activity.
- Resistant varieties - testing new and traditional varieties such as Locke's Maincrop in 1964, Egmont Gold in 1977 and Flyaway in 1994.

The carrot fly barrier

The carrot fly barrier (a 60 cm high wooden frame with fine mesh, placed around a small patch of carrots), first thought to have been suggested by a member of the Manchester Local Group, was tested in three years (1979-1980). The results were promising, and the technique soon became standard advice in organic gardening books and magazines and remained common practice for control until the protectant fleece used to cover the whole crop became more widely available. Today, the pest is managed by using the information from forecasting models to predict the best sowing dates to avoid carrot fly attack (developed by scientists at HRI Wellesbourne, now Warwick University) in combination with using fleece as crop cover.

The carrot fly barrier.

Interestingly, research on the carrot fly barrier is still undertaken today, and in 2016 different designs were tested by the Royal Horticulture Society on their trial grounds at Wisley - with the barrier still showing good effect against carrot fly damage (RHS 201X tbc).

Pest control without poisons: clubroot experiments

Clubroot is a disease of brassicas caused by the soil-borne organism *Plasmodiophora brassicae*.
The pathogen infects the roots and causes them to swell and deform with tumour (or club) like growths leading to poor translocation of water and nutrients, stunted growth and low yield. Spores of the pathogen are produced in infected roots and can remain dormant in the soil for 20, or more.

Lawrence Hills considered clubroot to be one of the worst diseases in the garden and it was first mentioned in Newsletter 9 (1961) in connection with the Tagetes Team. Although the scientific consensus at the time was accepted as a base for moving forward i.e. that clubroot was caused by a fungus and that management methods like rotation could serve to control it, interestingly, this was not without contention. Some members (dubbed by Lawrence as 'extreme organic gardeners') raised doubts as to the veracity of the underlying assumptions. They regarded the use of substances such as rhubarb to 'cure' the problem was unnatural as they were not convinced that it was a fungus that was responsible for the disease and, instead they believed that the solution should be based on using compost to improve general soil health. Lawrence's view was that irrespective of the causal agent, a simple 'organic cure' would be valuable for all gardeners even if the underlying cause was not fully understood.

"There are members of the organic movement who insist that detailed measures against individual pests are 'fragmentation' and all that is needed is compost".
Lawrence Hills, Newsletter 6 (1960)

Altogether there were 36 Members' Experiments investigating clubroot, most of them in the 60s and 70s. Much of the work was carried out in collaboration with researchers from other institutes such as National Vegetable Research Station at Wellesbourne and Rothamsted Research Station. The experiments tested:

- ***Tagetes minuta* and other green manures**, the first experiment in 1961 tested the effect of using *Tagetes minuta* as a green manure/cover plant on infected land prior to brassicas. The working hypothesis was that *Tagetes* root secretions could destroy the spores of the pathogen. Experiments using spinach, rye, crown imperial *(Fritillaria imperialis)* and mustard as green manures followed in later years.
- **Rhubarb**. Mrs Regan, a member from Esher, reported success with an 'old wives tale' that recommended dropping two-inch sections of rhubarb down the dibber holes when planting Brussels sprouts. This technique, and many adaptations of it, were tested in numerous experiments.
- **Organic fungicides**, a wide range of substances were tested, including preparations with pyrethrum, silicates, equisetum, sulphur, slaked lime; oxalic acid, acetic acid, seaweed extract; Jeyes fluid, crushed egg shells mixed with wood ash, calcium carbide etc. Clearly, some of these would not be considered acceptable in organic gardening today.
- **Brassica root secretions**, to stimulate zoosprose to hatch in the absence of a host.
- **Compost**, applying compost to improve soil health and suppression of the disease and to promote strong plant growth. This also included adding composted brassica roots to 'vaccinate' the soil against the disease.
- **Thermal treatment**, of soil and growing media to provide a 'sterile', clubroot-free barrier around the plant as it established.
- **Resistant varieties**, different varieties of kale and purple sprouting broccoli were tested for tolerance to club root. It was suggested that these could awaken the spores which could then be killed with an organic fungicide.

Although the significant efforts devoted to this disease were beneficial in terms of improving knowledge and awareness of the problem among gardeners, it is clear from the records that, unfortunately, most of the approaches tested proved to be ineffective against the disease.

Today the current methods of control of clubroot for organic gardeners include use of rotation (leaving at least a four-year gap between brassicas to starve the pathogen), liming to raise pH, improving drainage (e.g. raised beds), using transplants to establish root systems before planting in the field, managing susceptible weeds were possible to prevent carryover between crops, and prevention of spread by cleaning boots and tools after working on infected plots.

Biological control experiments

Biological control is the introduction of specific beneficial organisms (usually bacteria, fungi, insects or nematodes) to assist in the management of pests or diseases. In its broadest sense it can also be taken to mean enhancement of the environment to favour conditions in which the beneficial predators and pathogens of harmful species will flourish – a key principle of agroecology today. An example of an experiment to test this approach was the use, in 1980, of Limnanthes douglasii (the poached egg plant). This was planted between the rows of broad beans to attract hoverflies whose larvae could then predate on blackfly.

"When we first arrived at Bocking, biological pest controls, or biocontrols for short, didn't exist – not for gardeners anyway. But they were being used commercially by glasshouse growers, who employed a minute parasitic wasp, the size of a pinhead, called Encarsia formosa, to control outbreaks of whitefly and Phytoseilus persimilis, a predatory mite to deal with spider mite. Working with Bunting and Sons of Colchester, then one of the major suppliers to the glasshouse industry, we developed packs suitable for amateurs which we trialled with HDRA members."
Alan and Jackie Gear, 2009

Subsequently a range of biological control agents were made available through the mail order catalogue run by HDRA, later in collaboration with Chase Organics Ltd. These were effective against many pests including slugs, sciarid flies, leatherjackets and vine weevils. In 1994 as survey was conducted to assess how well they performed in a garden situation. Most people reported success but there were issues if the pests had got out of hand before the predators had been ordered. For some pests, e. g. vine weevils, it was difficult to tell how effective the control had been as the pests themselves are rarely spotted and some people had issues with the short shelf life of the products.

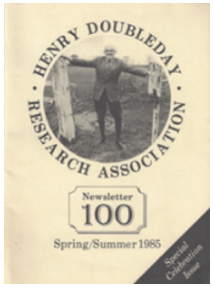
Trichoderma is a genus of fungi that is ubiquitous in soil and some species are parasitic on other fungi. Several strains have been developed as biocontrol agents against diseases of plants. Although not always part of the Members' Experiments scheme itself, a series of participatory trials were conducted in the 1970s and 1980s to investigate the potential of *Trichoderma* inoculation, sometimes in combination with other fungi. These trials used pellets inserted into holes drilled in tree trunks against diseases such as silver leaf (affecting plums), honey fungus (affecting many species) and Dutch elm disease (a devastating dieback that is caused by a fungus carried by the elm bark beetle). The results were promising but any potential solution really came too late to save most of the elm trees in the UK in the face of overwhelming disease pressure. Much of this work was done in collaboration with Dr Jaques Ricard in Sweden.

"We have been granted limited trials clearance for the Trichoderma / Scytalidium pellets under the Pesticide Precautions Scheme for experiments on 500 trees. I should like to hear from any members who have diseased elms on their land who would be prepared to let me organise a trial, bearing in mind that this would mean that some trees would go untreated and hence might die. I am looking for plots primarily in the South East and East Anglia so that I can personally supervise the operation myself"
Alan Gear, Newsletter 90 (1982)

The Early Ryton Era (1985-1992)

The Association continued a period of very strong growth in the late 1980's and 1990's following the move to Coventry and the establishment of the *National Centre for Organic Gardening* at Ryton Gardens. The work with schools and the campaigning activities became much more prominent and the scientific research also expanded greatly. Although the Members' Experiments continued, the overall research programme now became increasingly focused on externally funded research projects investigating and developing both commercial and domestic organic vegetable production systems.

The move to Ryton coincided with the retirement of Lawrence Hills as the Director to become President. He was replaced by Alan Gear as Chief Executive and Jackie Gear as Executive Director. Shortly before his death in 1990 Lawrence Hills was awarded an Honorary Doctorate by Coventry University.



Newsletter 100; front cover illustration showing Lawrence Hills at the new Ryton-on Dunsmore site.

In this period, the work of the association included:

- Development of the *National Centre for Organic Gardening* including a restaurant and a shop. Promotion of this was facilitated by the Channel 4 TV series 'All Muck and Magic', which ran between 1987 and 1990.
- Encouraging the local groups (over 60 in number) to promote the work of the organisation at a local level.
- The Heritage Seed Library was expanded and a dedicated curator was taken on as the number of accessions was increased.
- The Overseas Programme experienced very rapid growth with a number of large externally funded research and development projects and collaboration with partners in UK and abroad.

The membership rose dramatically from 6300 to 17000 by 1992. This was undoubtedly related to the increased promotion of the organisation through the TV coverage, but was probably also linked to the prominence accorded to organic food production methods in the wake of various food scandals, such as the rise in incidence of BSE during the 1990s.

With the move to Ryton, the ambition was also to strengthen and expand the association's horticultural research. The new trial ground was brought into service and the Research Department, headed by Dr Margi Lennartsson, was created in 1987. Collaborations with external organisations developed rapidly; the closest link was with Lanchester Polytechnic (now Coventry University), where a long lasting partnership was established with Drs Phil Harris and Bill Bourne to enable use to be made of their laboratory facilities. Fruitful collaboration was also developed with many other research partners including the National Institute of Agricultural Botany, Elm Farm Research Centre, The Royal Botanic Gardens, Kew and Horticulture Research International at Wellesbourne, as well as with commercial companies. The first government funded project for organic horticulture started in 1988, which was then followed by many subsequent grants from MAFF/Defra's research budget on organic farming.

During this period, there was a change in the methodologies and approaches used for the scientific research. Although the organisation continued to value the citizen science approach of the Members' Experiments, there was a need to also adopt the more 'conventional scientific' methods in order to attract external funding and to stand up to scrutiny by the establishment. The Members' Experiments were, however, continued without interruption.

From 1986 to 1992 between five and eight Members' Experiments were offered each year. The experiments were of a more straightforward design than previously. In some cases, the same experiment was repeated over a number of seasons. All the necessary materials (especially seed, protocols and record sheets) were supplied to the members taking part. The number of participants varied depending on the topic but often 200 or more members took part in the popular experiments, such as evaluations of new crops or varieties, or the simpler experiments such as inoculation of beans with *Rhizobium*.

In this period, the evaluation of the results from experiments generally included basic statistical analysis, working in collaboration with statisticians at Coventry University. However, much of the data gathered was still qualitative, reporting opinions on, for example, ornamentals and new varieties. With the rapid expansion of the other research activities, there were often delays in the evaluation and reporting of the results of the Members' Experiments, which led to a backlog. Towards the end of the 1980s the members themselves and the Trustees (many with a scientific background) were asked to come forward and be more actively involved in the analysis and reporting of the experiments.

The results were generally presented in the magazine in summary form together with the reports from the trials ground. Although Members' Experiments were shown in the demonstration gardens much less of the experimental work was now undertaken there, where the focus was more on displaying and demonstrating established organic techniques and practices.

Members' Experiments (1986 - 1992)

	Comfrey	Varieties and novel crops	Pest control without poisons	Composting and green manures	Gardening techniques, lifestyle & wildlife
1986		Seed Library Variety Trials (Bath Cos, asparagus kale) Unusual and New Varieties (broccoli, runners, tomato, spinach, pea, lettuce)	Bicarbonate of soda against mildew Fighting Flea Beetle Insecticidal soap Against whitefly	Companion planting (French marigolds against whitefly)	How does your garden grow? Improving outdoor tomato yield (leave side shoots)
1987		Dons Delight (broad bean) High Carotene Carrots Variety trials (pea bean, brussles, swede, asparagus, water melon) Ocas from the Andes	Bicarbonate of soda against mildew Weed Control Mulching Fighting Flea Beetle	Alfalfa as a green manure	Companion planting (celery/celerias with cabbage/cauliflower chervil with lettuce)
1988		Ocas from the Andes Variety trials (beans, romanesco, radish pods, pumpkins)	Tanner bags for troublesome weeds	Alfalfa as a green manure Companion planting (celery/celerias with cabbage/cauliflower chervil with lettuce)	Grafting tomato plants
1989		Variety trials (leeks, chinese cabbage, pumpkins, dwarf sunflower, Phacelia, decorative kale) Ocas at increased speed	Protective barriers against slugs	Phacelia as Green Manure	Storage of root crops Improving outdoor tomato yield (leave side shoots)
1990		Variety trials (indian mustard, marrow, kale, etc.) Oca varieties and disease	Protective barriers against slugs Chopseuy greens (to protect against cabbage caterpillars)	Annual Medics as Green Manure	Rhizobium innoculation (peas and beans)
1991		Quinoa Ornamentals Variety trials (sweet corn, leeks, caluls, Indian spinach)	Protective barriers against slugs Beer not beetle traps	Subterranean Clover as Green Manure	Rhizobium innoculation (peas and beans)
1992		Variety trials (beetroot, soya, broad bean, calaloo) Ornamentals Quinoa (seed)	Beer not beetle traps	Grazing rye as Green Manure	Compost making survey Wool liners (for hanging baskets)

Compost and composting experiments

Composting is the controlled decomposition of organic 'waste' (e.g. garden debris, food waste or animal manure) to make a stabilised material that can supply nutrients and build soil organic matter. Composting and the use of compost is often considered to be at the heart of organic growing techniques and the Members' Experiments have addressed a range of practical issues concerned with its production and use:

- Many experiments focussed on composting techniques, investigating aspects such as the best shape and size of containers (and should they be insulated or covered) and the right mix of ingredients (gardeners often have an excess of kitchen waste or grass clippings that can be effectively mixed with carbon-rich materials such as sawdust or paper).
- Alternatives to conventional approaches such as trench composting (burying the waste) or sheet composting(mulching).
- Compost activation is the stimulation of decomposition as a result of addition to the heap of a commercial microbial inoculant or of a rich nitrogen source (e.g. urine). In the 1960's sewage sludge was available to gardeners and its value as a compost activator was investigated although there were concerns about potential contamination with toxic elements.
- Identification of plants that can be specifically grown as material for compost making e.g. sunflowers, artichokes, Swiss chard or mustard.
- Equipment for shredding materials for composting. Before garden shredders became available commercially in the UK members provided details of homemade devices.
- Utilisation of compost. The benefits of compost application on soil fertility and the performance of the following crops were the focus of much activity; repeated attempts were made to collect samples of potatoes grown with compost and compare their nutritional value with those grown using synthetic fertilisers. Unfortunately, the variability of the systems investigated made it difficult to draw firm conclusions.
- Bokashi is a specialist form of waste treatment that takes place under anaerobic conditions and has been particularly recommended for dealing with food waste that includes meat scraps. Most participating members were generally happy with the system although there were concerns about smells.
- From 2000 onwards 'compostable packaging' has become increasingly common but it frequently does not decompose effectively in a domestic heap. In 2015, an experiment was conducted to compare the fate of compostable plates, forks and compost caddy liners.

Many of these experiments have been done in collaboration with a commercial sponsor (e.g. some of those testing a particular type of bin). Overall the work has formed the basis of much of the advice provided through the Master Composter scheme.

The Mid Ryton Era (1993-2003)

During this period, HDRA grew to medium sized charity with a wide range of programme activities, demonstration gardens and a commercially run shop, restaurant and gardens. The Newsletter underwent a major overhaul to be produced as a magazine and the organisation became increasingly recognized, both nationally and internationally. The activities included:

- Running three nationally acclaimed organic gardens, (Ryton, Yalding, and Audley End Kitchen Garden), together with the infrastructure needed to manage visitors and provide food and retail opportunities.

The vegetable Kingdom Building.

- Maintaining a large membership base requiring a sophisticated membership management system.
- A strong commitment to keep the profile of the organisation in the national media by attending national shows (e.g. The RHS Chelsea Flower Show and Hampton Court Flower Show), setting up a website and running campaigns (e.g. Grow Your Own Vegetables).
- An extensive advisory and information service for members, comprising a considerable staff resource working closely with the demonstration gardens using these as an educational resource. The advisory team also developed educational activities both for schools and members through courses, events, information leaflets, booklets and books. *The Schools Organic Network* was launched in 1999.
- Servicing a network of local groups.
- Investment in new facilities for the Heritage Seed Library (HSL). Membership of HSL was offered as a separate category and programmes such as *Adopt a Veg* and the Heritage Seed Library Gardens at sites around the country saw HSL membership pass the 6000 mark.
- Development of the Overseas Department to run externally funded projects (e.g. Ghana Organic Agriculture Network) and an advisory service. There was a separate membership category for supporters of the overseas work. However, by the end of the Millennium, as the governments approach for overseas support changed, the Overseas Department struggled to maintain the same level of activity.
- Setting up the Composting Association and HDRA Consultants Ltd to offer various services related to large scale composting. With the introduction of the Landfill Tax, the first substantial research grant investigating the use compost on agricultural land were secured in 1995. HDRA Consultants also established the first Master Composter Programme in Cambridgeshire in 2000.

The Research Department underwent a rapid expansion with the increase in government funded projects investigating a range of aspects concerning commercial organic horticulture. The new research findings also helped to support the rapid expansion of the domestic organic production of fruit and vegetables taking place at the time. Much of the work was carried out with other academic and/or industry partners, e.g. Horticulture Research International and ADAS. Many projects were funded by MAFF/Defra's dedicated budget for organic farming research. The largest one, *Conversion to Organic Vegetable Production,* ran for eight years (1996-2004). At this time HDRA's Research Department was probably the largest of its kind in Europe, in terms of numbers of researchers focussed on organic horticulture, with more than 30 members of scientific staff.

During this period the number of Members' Experiments offered was reduced to between four and six per year. This provided an opportunity to improve the quality of the experiments offered and to engage members more actively. Participation varied depending on topic or theme but there were consistently over 100 and sometimes more than 200. Similarly, there were good rates of return of results with half, or more, of participants consistently providing results.

The research team was responsible for the Members' Experiments and many of them were linked to externally funded projects. This enabled new findings to be tested and applied within the domestic gardening context. With the expanded science expertise, the Members Experiments were often co-ordinated by staff and student researchers with specific expertise related to the topic. The results were analysed and evaluated by members of staff and were presented in scientific form with graphs and tables in a dedicated section of the magazine. Publication of the results was generally done in a more timely manner, resulting in better engagement with the participants.

Members' Experiments (1993 - 2003)

	Comfrey	Varieties and novel crops	Pest control without poisons	Composting and green manures	Gardening techniques, lifestyle & wildlife
1993		Shallots from seed (var Creation) Outdoor cucumber (var Slice King) Lettuce in winter (var Dynasty) Prickly ornamental for flower arranging	Dare you weed only once? Woodlouse trap (for greenhouse and gardens)	Winter Vetch as Green Manure	Woolly moss liners (for hanging baskets) Speedy salad onions Lacewing Hotels
1994		Spud u like it variety survey	Biological Control survey Minimum weeding for salad onions Flyaway Carrots		Survey hybrid Japanese knotweed Lacewing Hotels Blackwall compostabin Cosmos (as attractant)
1995		Minor sweetcorn cobs Ornamental Gomprena globosa	Hammer and snail (survey) Dare you weed only once? carrots (3) and cabbage (4)	Potatoes from microchips	Barley straw to clear ponds Strawponics (for tomatoes)
1996		Apple survey (vars and problems) Yellow tomatoes on trial Climbing Convolvulus	Control slugs with comfrey Mulch before you grow Trouble with Cats (repellent)		
1997		Leprechaun courgette Forgotten Nasturtium	Ridging carrots against carrot fly Sowing to miss carrot fly	Mowing autumn leaves	Leafmould in seed drill to enhance germination (beetroot and parsnip) Biotol leafmould activator
1998		Mild onions Living archaeology: Spelt Heritage seed potatoes	Voodoo lillies (against whitefly)	Lobelia in shade Saving tomato seed	Mixed cropping (runner beans and potatoes) Feed for pot plants
1999		Cheer up the shade (ornamentals)	Rhubarb against clubroot Compost to supress White rot	Grass boarding	Charcoal to retain water Tomato seed vs cuttings
2000		Long life baskets (various varieties)	Charcoal to control moss Flighting flea beetle (intercropping radish/brassicas)	Will moss Compost? Planting by the moon	Best blub fibre (planting media) Organic rooting aid
2001		Perennial runner beans	Garlic clove in compost to deter aphids Banish blackfly (with aromatic herbs) Slugs eat or retreat (bran bait)	Will moss Compost?	Which green manures inhibit germination When to sow after green manures
2002		Pictoral meadows Sweet potatoes	Fito slug stoppa for crops (1) and containers (2) Charcoal to clear moss In lawns		
2003		Can these tomatoes beat blight? Are these annuals good for cutting?	Does cabbage root fly hate garlic chives?		Friendly fungi for shrubs, perennials and leeks

Green manure experiments

Green manures are plants grown specifically to benefit the soil - to prevent leaching, to add nutrients (legumes in particular provide nitrogen by fixation from the atmosphere), to add organic matter, to prevent erosion and to assist in the control of weeds, pests and diseases. Although they have been included in some agricultural rotations for thousands of years, much remains to be learned in order to optimise their use. One of the very first Member's Experiments investigated the potential of *Crotalaria ochroleuca* for use in the UK. Although, as a subtropical species, this was found to be unsuitable for this climate many other green manure experiments have been conducted since:

- Evaluation of the performance of a wide range of species sown either as winter or summer green manures - assessing factors such as speed of growth, frost hardiness, regrowth after mowing and ease of incorporation.
- Legumes are well known for their symbiotic association with rhizobia bacteria but some soils lack the required strains for certain species. Although actually quantifying fixation is technically difficult the extent of nodulation can be assessed visually.
- Couch grass *(Elymus repens)* is a common garden problem. In 2015 an experiment was conducted to assess the extent to which buckwheat *(Fagopyrum esculentum)* can supress this.

A particular strength of the Members' Experiment approach for working with green manures is that it has enabled their performance to be rapidly tested across the country, representing a wide variety of climates and soil types. It has also very successfully promoted the benefits of green manures to the growers in general - as a result the seeds are now much more widely available than previously.

Red clover.

Grazing Rye.

Persian clover.

Phacelia.

Snail medic, Medicago scutellata, was tested as a green manure in 1990. Mr B form Herefordshire, in common with many others, initially had disappointing results but went on to grow it every year with great success.

"A great advantage that snail medic has over many other leguminous green manures, is that it appears to be distasteful to slugs and snails; frequently I have lost whole beds of fenugreek and various types of clovers, as their seedlings have been grazed down to the ground, whereas the snail medic has been untouched".

The Recent Ryton Era (2004-2018)

By 2004, HDRA was facing a period of gradual contraction in activities, turnover and staff numbers. This was at a time when the country was heading into what turned out to be the deepest recession since World War II. Paradoxically, although the organic message was popular, its very popularity had led to a proliferation of organisations 'competing' within the 'market' to promote organic gardening. This led to a decline in membership numbers and levelling off in the income from memberships, visits and sales. Furthermore, grant funding for horticultural research underwent major change as Defra's research and development budget was much reduced, the ring-fencing of money for research in organic systems was removed and the priorities were moved away from those relating to horticulture/agriculture production to environmental protection.

Alan and Jackie Gear retired from running the organisation in 2003 and the appointment of a new CEO with less experience of the organic agriculture movement meant that the organisation was to some extent breaking its direct link with its past and set for a future more focused on delivering towards the educational and promotional objectives. During this period, three CEOs were appointed in succession, Dr Susan Kay Williams (2004 to 2008), Myles Bremner (2008 to 2014) and James Campbell (2014 to present), each with slightly different ideas about the positioning of the organisation within the UK gardening sector and within the organic movement.

Although research funding was reduced, new income streams became available, e.g through service provision to councils, education or health authorities. During this period, the organisation also successfully secured substantial grants from the Big Lottery Programme. Key developments included:

- In 2005, the name of the organisation was changed to Garden Organic, with the aim of repositioning the organisation to facilitate an increase in membership and to raise its profile within the gardening sector.
- Two of the demonstration gardens were handed over to alternative management (Yalding gardens and Audley End Kitchen Garden).
- The functions of the dedicated Information and Advisory Service, providing information for members, was taken on by other departments including the education team, gardeners, researchers and staff working in the seed library or on composting. More recently, in 2015, a Knowledge Hub was re-introduced, aiming to gather and disseminate knowledge and information relevant to organic gardening.
- The educational activities with schools were expanded, with *The Food for Life Partnership*, funded by the Big Lottery Fund (2007-2011) and working to transforming food culture in school. This was followed by *Food Growing Schools, London*.

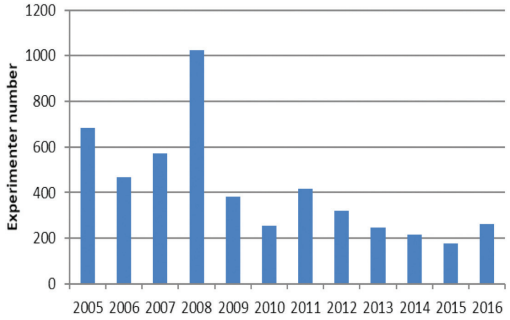
Master Composter meeting

- The Master Composter programme was expanded to promote home composting under contract with Local Authority waste departments around the country. With funding from Big Lottery Local Food Fund, the Master Gardener Programme was established in 2009 and was subsequently expanded into new areas with funding from Public Health Departments. The programme was also developed and adapted for new settings, and the Master Gardener scheme developed for prisons was launched in 2013. During this period Garden Organic was one of the largest recipients of the Local Food Fund and, in addition to beacon grant for the Master Gardener Programme, Garden Organic was awarded grants to deliver, for example, *Sowing New Seeds* and *Hens@Home*. Working together with Warwickshire County Council and a Local Action Group, Garden Organic was the lead management partner delivering to Central Warwickshire Villages Leader Programme between 2010 - 2015.
- Garden Organic Local Groups have continued their activities and, under the direction of James Campbell, there has been much increased focus and support for them in all parts of the UK.
- The Heritage Seed Library continued to conserve and make available a collection of rare and heritage vegetable varieties. A number of EU projects enabled collaboration to be established with other seed saving networks throughout Europe.

The Recent Ryton Era (2004-2018) *continued*

During this period, Garden Organic's Research Department underwent a gradual contraction of activities, as government funding for near market organic research was severely curtailed and competition for funds increased. By the end of the period the research team, including the co-ordination of the Members' Experiments, was merged in to a newly formed Sustainable Communities Department. At this point, the organisation renewed its strategic partnership with Coventry University and the Centre for Agroecology, Water and Resilience (CAWR) was established in 2014. CAWR is now one of the largest centres in the world conducting transdisciplinary research on the links between agroecology and sustainable food systems, water management, and community and socio-ecological resilience. CAWR is based at Ryton Organic Gardens and some of Garden Organic's research work has now been transferred to the Centre, together with some of the previous overseas activities.

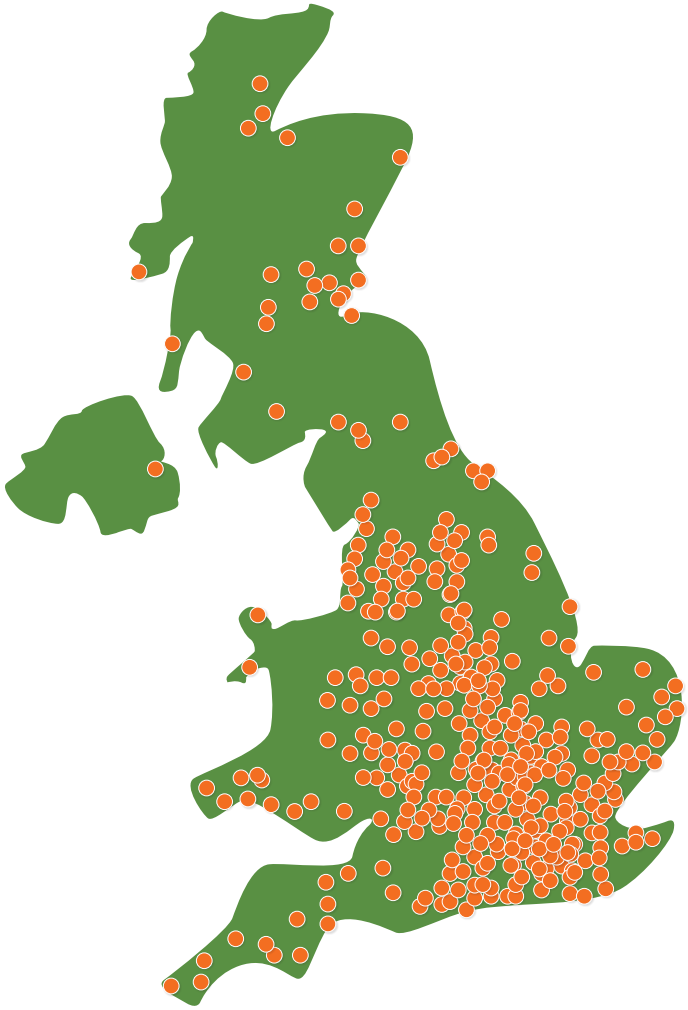
Ryton Gardens.



The total number of participants in Member's Experiments between 2005 and 2016

The Members' Experiments programme has however, continued throughout. There has been was a gradual reduction in the number of experiments offered per year and for the last few years this has levelled out to approximately four experiments per year, with an additional survey in some years. The exception was in 2008 when the organisations celebrated its 50th anniversary when a number of experiments celebrating the original themes were offered.

The interest in the experiments has, however, very much been maintained with numbers of participants being 100 or more in most of the experiments. Many of the experimenters take part in more than one experiment, so the overall numbers fluctuate considerably from year to year. As in the previous era, protocols and record sheets have been sent out together with any materials (e.g. seeds) necessary. In 2015 the use of electronic forms for recording the results was introduced.



Location of Members' Experiment participants in the UK between 2005 and 2016. The distribution is roughly proportional to that of the membership.

Members' Experiments (2004 - 2018)

	Comfrey	Varieties and novel crops	Pest control without poisons	Composting and green manures	Gardening techniques, lifestyle & wildlife
2004		African Horned Cucumber; Blight beating tomato; Climbing Nasturtium	Annuals for Cutting; Blight beating Resistant Potatoes		Supermaket Watch
2005		Grow you own GM free soya	Biological Control survey; Plants for pest control (attractants)		Organic box scheme watch; Best way to grow onions seeds or sets?
2006		Carrot taste test	Rose Black Spot	Summer cover crops (vetch, sweet clover, cimson clover, Phacelia, buckwheat)	Plants for birds
2007		Novel crops- chickpeas; Edible flowers			Germination Test; Biodiversity surveys; Measuring your garden footprint
2008	Using comfrey in the garden	Growing Winter Salads (various vars like cornsalad, Pak choi, purslane etc.)		Boshaki Composting; Old and New Vegetable Varieties Compared (lettuce and tomato); Home made growing media	Measuring your garden footprint; Garden bee survey
2009		Quinoa as staple; Peas old and new compared			Slug and snail survey
2010		Tree spinach	'Slug lady' slug barriers		Comparing seed composts; Butterfly survey
2011		Mango ginger an unusual edible	Trialling tomatoes for blight resistance		Feeding plants in pots
2012		Growing wheat at home; Sharks Fin Melon as a novel crop	Trialling tomatoes for blight resistance		
2013		How popular is Amaranth as a leafy vegetable?		Cut and come again leeks	Do all legumes actually fix Nitrogen?; Bumblebee survey
2014		Growing oca or New Zealand yam	Slug resistant lettuce		Biochar soil improver
2015		Growing Vietnamese or Indian mustard for leaves	Does buckwheat control couch grass?	Can compostable packaging be composted?	Survey of garden and allotment fruit growing
2016		Growing field beans	Blight beating Resistant Potatoes	Using Persian clover as a no dig green manure	Survey of vegetable growing and seed saving
2017		Growing tomatillos			Survey of non food uses of plants; Blooms for bees bedding plants
2018	Survey of comfrey use	Growing edible lupins	The best way of trapping slugs		

Experiments concerning novel crops and varieties

Even in the very early days of the association there was considerable interest in increasing the diversity of crops grown, both for general interest and with the aim of improving food security. This was the aim of the Freak Plant Team's in searching for possible genetic mutants that could prove useful. Experiments to test novel crops (often ones more commonly grown in warmer climates) and unusual varieties (either new varieties with a particular characteristic or 'heritage' varieties') have always proved popular.

Protein crops

A large number of experiments have investigated ways of increasing protein production in the garden - both from a desire to increase food security (many legumes are imported) and to reduce the reliance on meat in the diet. The value of varieties held in the Heritage Seed Library has been repeatedly investigated, with particular interest in their use as dried peas and beans. Climbing peas are not so commonly grown but they can give very high yields from a small area. An experiment from 2009 clearly demonstrated this, with 95% of participants saying that they would grow them again. In 2009 soya *(Glycine max)* was tried (1974, 1985 and 2005) with disappointing results. Lupins are another high protein legume but only some varieties have been bred to have low alkaloid concentrations to make them safe to eat. In 1977/78 several varieties of *Lupinus angustifolius* were compared. Wet conditions in the autumn were found to limit yields. Since that time a number of countries have been conducting breeding programmes to develop a lupin more suitable for the British climate; lupins are to be tested again in 2018.

Oca or New Zealand Yam

This plant *(Oxalis tuberosa)* originated in the Andes and, like the potato, produces edible tubers. The crop is popular in New Zealand, hence its alternative name, but is only rarely available in the UK - it has been the subject of a series of experiments. In 1980 it was thought that it might be a disease-free alternative to the potato; most experimenters reported a mass of foliage but very low yields, possibly because it is a short day plant and really needed a longer frost-free growing season. Following suggestions by members the experiment was repeated (1987-1989) using a lower planting density and starting the plants off in pots but the results were very variable. In 1990, in conjunction with formal trials conducted at Ryton

Oca tubers.

in the research field, a number of different varieties were tested. The results were generally disappointing although individual plants were found to do well, suggesting that it may be possible to select for improved tuber formation. In 2014 oca was tested again - this time the experiment was linked to the Sowing New Seeds project which had a specific aim to promote the cultivation of more unusual vegetables. Although the plants produced many small tubers 65% of experimenters said that they would try the crop again because of its characteristic flavour.

Blight resistant tomatoes

Late blight, the result of infection of *Phytophthora infestans* can devastate outdoor tomatoes as well as potato crops. The use of resistant varieties is an excellent way to combat this disease but these need to be regularly updated as the disease evolves new strains. In 2011 and 2012 experiments were conducted in collaboration with Dr David Shaw of the Sarvari Research Trust and Pro Veg Seeds Ltd. Four varieties were evaluated for blight resistance, yield and flavour.

Leaf samples were also sent to the Sarvari Research Trust for genetic analysis to determine the strains of blight across the country.

Tomatoes infected with blight.

Gardening Lifestyles experiments

Using domestic gardens as a central part of sustainable living, rather than just for recreational activities, has always been central to the activities HDRA/Garden Organic. In the 1970s and 1980s a series of experiments/surveys entitled 'Life Support Gardening' and 'How does Your Garden Grow' attempted to quantify the productivity of garden-scale production. This was part of a wider 'self- sufficiency' movement in the country that was stimulated by the Oil Crisis and harsh economic conditions.

Footprinting of gardening activities

From the Millennium onwards there has been widespread concern about global warming. It is generally considered that growing fruit and vegetables at home will minimise the environmental impact of a household but is this necessarily true? How significant is gardening in the context of overall activities?

In 2007 and 2008 members were asked to complete a questionnaire to assess their carbon and ecological footprints using the *Best Foot Forward Calculator* (ecologicalfootprint.com). On average Garden Organic members had a markedly lower carbon footprint than the UK national average (7.4t CO2 compared to 10.9t). Although they can be seen to have already begun to address climate change (for example, 23% of respondents were vegetarian, compared to 7% nationally) there is clearly a long way to go.

Overall the participants produced about half of their annual fruit and vegetable requirements, saving money but also bringing other benefits such as physical well-being and psychological satisfaction.

The inputs used to achieve this were categorised into high impact (manufactured products with a long supply chain - slug pellets, plastic mulches, commercial compost and seeds), medium impact (sourced close to home but often in high volumes - farm yard manure and straw) and low impact (produced at home - compost and comfrey liquid). Tools were also considered (especially power tools which have a high impact in their manufacture and require ongoing supplies of fuel). The survey showed that 61% had glasshouses with 20% of these heated. The use of energy demanding fridges and freezers to store produce was almost universal (93%) but a whole range of 'traditional' storage methods such as clamping, bottling, dry storage and wine were also popular.

The average garden footprint of those who took part in the survey was 0.15t CO2 per person - only around 2% of the household footprint. Growing fruit and vegetables at home can reduce the ecological problems that we face although it can only be part of the solution - long distance flying dwarfs any mitigation measures.

Gardening Lifestyles experiments *continued*

Promoting and maintaining biodiversity are important parts of organic gardening. Over the years there have been many Members' Experiments investigating how beneficial micro-organisms, insects and mammals can be encouraged in the garden, sometimes specifically with the aim of helping in the control of pests and diseases.

Operation Tiggywinkle

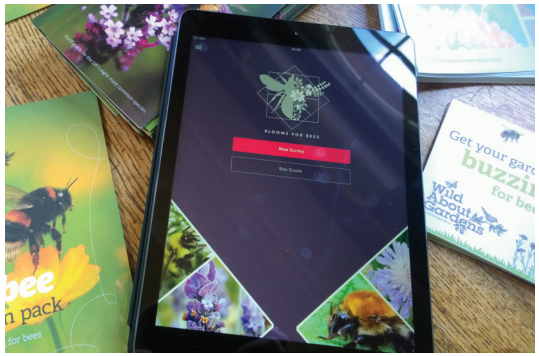
In 1965, members investigated the role of hedgehogs for controlling slugs, looking at ways of encouraging them to hibernate in the garden. The wooden box described by Lawrence Hills in the booklet Operation Tiggywinkle in 1970, was very similar to the hedgehog hotels that are still on sale today. Lawrence Hills even described how members could obtain 'a married couple' of hedgehogs, which apparently were dispatched by train to be collected at the station. This service would probably not possible today!

Wildlife surveys

Surveys to observe wildlife in the garden and to monitor the use of different plants or gardening techniques to attract (or deter) specific species have always been popular. In 2009, many members reported how useful it was to learn about slugs and snails, so that they could recognize and spare the ones that are harmless. In 2010 and 2013, the surveys to observe butterflies and bumblebees, were also very popular with high numbers of participants.

Blooms for Bees

In 2017, the previous survey of bumblebees was followed up with a much larger collaborative study, aiming to promote and improve gardening for bumblebees. Participants were asked to observe which bumblebee species visited gardens and allotments and which flowers were bumblebee favourites. The study, which was led by CAWR at Coventry University, was carried out in collaboration with Garden Organic, RHS, Bumblebee Conservation Trust and Hozelock. With external funding from The Heritage Lottery Fund, CAWR was able to engage not only with Garden Organic members but also with gardeners nationwide and, to date, more than 5600 have taken part. Supported by a full identification guide to all 25 UK species, participants used an app (suitable for a smartphone or tablet) to carry out timed survey of garden plants recording any bumblebees that visited. The results, returned as photos of bees and plants that they foraged on, were the verified by expert entomologists and botanists. In 2017, the project received the Defra 'Bees' needs' award.

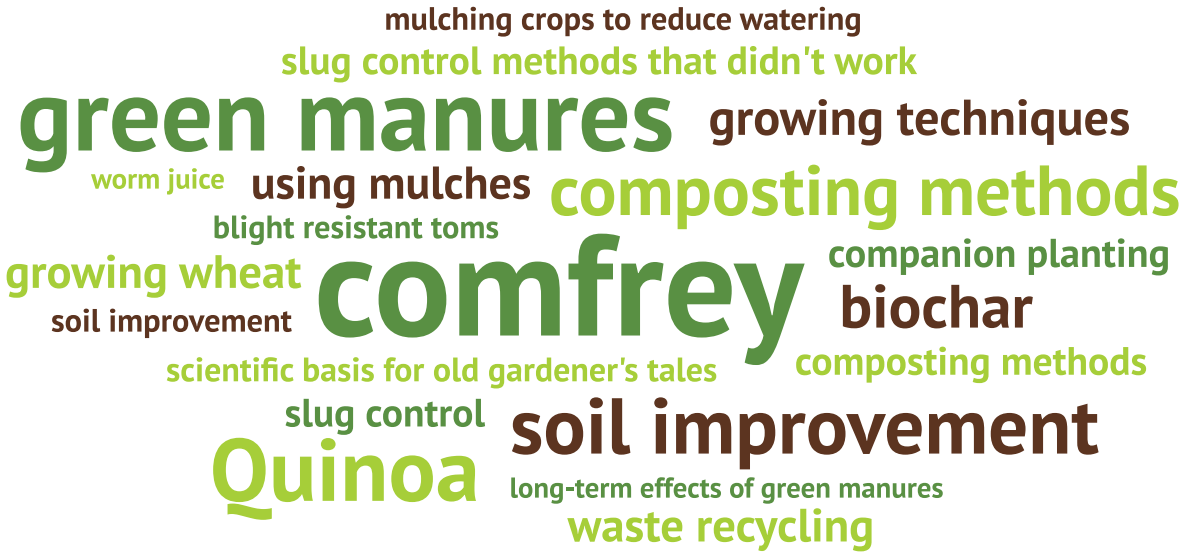


Members' Experiments - the role and impact on organic gardening practice

The collection of Members' Experiments, 550 in total, shows that although the results from individual experiments were often inconclusive, cumulatively the research has resulted in real change in organic gardening practice. The persistence of participants in working to find solutions for practical gardening problems by repeating and refining experiments and testing new ideas, has developed and improved organic gardening practice over time. During the Bocking eras, the Members' Experiments programme was unique, certainly in the UK, in terms of research dedicated to organic gardening and horticulture and the information it generated formed the foundations for the early development of organic horticulture.

"the talents of the gardeners of Britain ... a mighty army of experimenters ... their combined results formed the bedrock of organic gardening practice".

Alan and Jackie Gear, 2009



Innovations from the Members' Experiments have led to change and improvement in organic gardening practice - common themes of innovations as identified by the participants of the programme in a survey conducted in 2017.

Organic gardening innovations

The Members' Experiments programme led to significant innovations on a range of topics:

- Building health and fertility of the soil, by composting and recycling organic waste resources, by growing green manures and comfrey and by using other organic amendments.
- Managing pests, diseases and weeds without using chemicals.
- Selecting varieties and crops suitable for growing in garden situations.

Understanding the organic system

The experiments have also played a very important role in improving our understanding of organic growing systems and the factors and functions that are at play. This has included furthering our knowledge on:

- Soil health and fertility, and how this links to the health of plants, animals and humans.
- Biodiversity, in terms of both species diversity and genetic diversity within the food and other garden crops.

Members' Experiments - the role and impact on organic gardening practice

- Impact of gardening on the environment and sustainable lifestyles.
- Impact of gardening on household food security, self-sufficiency and the carbon footprint of the household.

Citizen science approach

The citizen science approach, in combination with excellent and extensive dissemination of the results, resulted in fast and effective knowledge exchange and uptake of the research findings in practice. The success of the approach was clearly linked to the fact that it was gardeners themselves who were undertaking the experiments - working with a clear incentive to find solutions for real gardening problems and helping them to learn and to improve their own gardening practice.

However, thanks to the fantastic efforts made to disseminate the results and knowledge gained, the impact of the Members' Experiments clearly went far beyond those who were directly involved. Lawrence Hills himself, as well as the new intake of staff in the 1970s, Alan and Jackie Gear and Pauline Pears, had an

amazing flair for writing and for creating imaginative campaigns, through which the finding were shared, far and wide, with the nation's gardeners, and even internationally.

During the Bocking periods and into the early years at Ryton, the new knowledge generated by the Members' Experiments formed a firm base for organic gardening advice. This was very effectively promoted through new text books, in gardening magazines and even through TV broadcasting in Channel 4's All Muck and Magic series, which was filmed at Ryton Gardens. At that time, the information was not only important for the increasing number of organic gardeners, but also for many of the early pioneers growing organic fruit and vegetables on a commercial scale.

From the early 1990s onwards, with the increased interest in research in organic agricultural systems worldwide, organic gardening practice has been increasingly informed not only by the findings from HDRA /Garden Organic's research, but also by that from other research institutes.

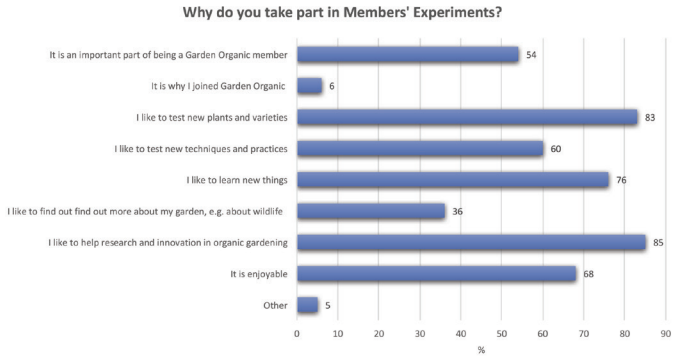
Members' Experiments - role for and impact on participants

Garden Organic members have shared their experiences of the Members' Experiments and have told us what role and impact their involvement in the experiments have had on them. In 2017, as part of this review, 104 members completed a questionnaire survey and some have also taken part in interviews.

The respondents of the questionnaire, described themselves as taking part in the experiments on a regular (39% of the respondents) or occasional (45%) basis and 12% of the respondents had taken part previously, but not in recent years.

Motivation for taking part

The participants value the opportunity to be part of a network helping with science and innovation and they particularly liked the opportunity to learn new things, to test new crops, varieties and growing techniques (see bar chart).



Influence of the scheme on members' own gardening practices - common themes identified by the participants of the programme.

Influence on members' gardening practice

Members also explained what participation in the scheme has meant to them and how this has influenced what they grow and how they manage their garden. Responses included:

"I grow a lot of green manures now, and have been able to influence other gardeners"

"I now grow many new crops and use comfrey as a fertiliser and composting aid and I notice the wildlife a bit more"

"I grow more organically"

"taking part in the experiments has made me realise to what extent all gardening is in fact a series of in vivo experiments ... I am now more likely compare two things and see what work best".

"the knowledge is absorbed by osmosis - just using better techniques every year"

"I can tell the grand-kids what sort of bumblebee it is"

"the Members Experiments make me feel that I am doing something useful"

Members' Experiments - role and impact on HDRA / Garden Organic

Encouraging individuals to observe, experiment and share knowledge in organic gardening was, of course, the reason why Lawrence Hills started the organisation. Throughout its history, the Members' Experiments have had a central role within the organisation and the citizen science research has been important for many different reasons.

Supporting growth and development of the organisation

During the Bocking period, the growth and development of the organisation was essentially based on the Members' Experiments programme. The results and the new knowledge generated provided information and ideas for campaigns to promote organic gardening, which in turn increased the membership and the impact of the organisation.

Following the move to Ryton, the work expanded to include a much wider range of activities to spread the organic message. From this time onwards, the growth and development of the organisation was therefore not only based on the research activities, but equally important were the demonstration gardens, the educational programmes, the work of the local groups, the Heritage Seed Library, the overseas programme and the much expanded communication and promotion activities. The combination of Members' Experiments and the new research programme in organic fruit and vegetable production (working with both gardeners and commercial organic growers) has, however, continued to play an important role for the organisation throughout its history.

Encouraging active engagement with members

The citizen science approach has been key for encouraging active engagement with members. The participants clearly value the opportunity to be actively involved, not only by gardening organically, but also by taking part in the research. In the 2017 questionnaire, most (85%) participants reported that the main reason for taking part in the experiments was because they *'like to help with research and innovation in organic gardening'*.

Establishment of HDRA/Garden Organic as a key player in the organic movement

As for many of the early pioneers of the organic agriculture movement, Lawrence Hills had an interest not only in the practical application of organic growing but also in research and development. With Lawrence's specific focus on horticulture and gardening, the Members' Experiment programme was unique and enabled the organisation to establish itself as a key player within the organic movement, both nationally and internationally.

"The HDRA is the supreme success story of British organic gardening - in fact, if measured purely in terms of numbers, of the British organic movement as a whole".
P Conford 2011

Members' Experiments - role and impact within the Organic Agriculture Movement

Support for the growth and development of the organic movement

Being involved from the beginning, HDRA / Garden Organic has always had a key role within the organic agriculture movement, both nationally and internationally. With its focus on gardening, the association has been uniquely placed to connect with the public and to bring lots of people into the organic movement - people who are not only interested in organic food and farming, but who also want to be directly involved themselves in organic food production, albeit on a domestic scale.

"No one can say how much of this [growth of organic movement] was due to the hard work of the talented populists at the HDRA. What can be said is that it was the gardeners who made the organic movement popular".
HRH The Prince of Wales & C Clover, 1993

The International Federation of Organic Agriculture Movements (IFOAM) was formed 1972 as the international umbrella organization for the organic world. HDRA has been a member since the early days. In fact, for many years during the 1980s and 1990s, HDRA was, one of the largest members of IFOAM, based on its membership number. HDRA / Garden Organic has been represented at many of IFOAM's world conferences where research results have been presented and disseminated.

With its expertise in organic horticulture, HDRA / Garden Organic has taken a very active role in the development of organic farming standards. On a national basis, this started by supporting the work of the Soil Association to develop national standards for the UK, and then subsequently the development of the EU Regulation for Organic Farming.

Secured a key role for gardening and horticulture within the organic movement

The impact that the organisation has had on the development of organic agriculture in terms of securing a key role for gardening and horticulture within the sector, cannot be emphasised enough. All too often, horticulture is regarded as 'the poor relation' of agriculture, and often gardening does not feature at all, for example, in the eye of the government or in relation to funding for research and development. However, thanks to the prominent role and hard work of HDRA / Garden Organic, this has, in many ways, not been the case in the organic sector, neither nationally nor internationally.

Quote

Members' Experiments - today and the future

In 2018, as the organisation celebrates in 60th anniversary, the Members' Experiments programme is going from strength to strength.

Members Experiments in 2018

For 2018, experiments were offered on four topics:

1. *A survey of comfrey use*. This is a simple survey looking at how people use comfrey in their gardens. It is aimed to look at the long-term impact of the organisation on encouraging people to use this plant.
2. *Growing edible lupins*. Garden Organic last tried growing edible lupins in 1979, but came to the conclusion that the varieties tried were not very well suited to the UK climate. This year, members are trying some of the newer low-alkaloid varieties that have been bred for growing in the UK.
3. *What is the best way of trapping slugs?* Slugs have long been the most widely discussed pest amongst gardeners. Beer traps have shown to be effective over short distances, so this year, we are testing which baits are most effective.

Current approach

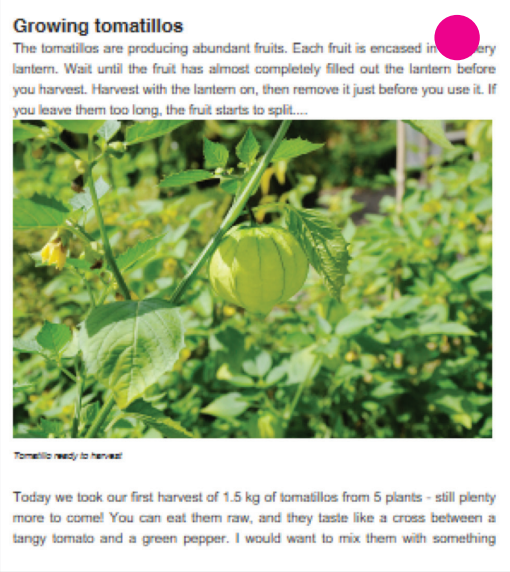
Today, the Members' Experiments scheme is being co-ordinated by Dr Anton Rosenfeld, and recently a number of changes .

have been made to improve participation and engagement. In 2015, on-line electronic entry was provided as an alternative method of returning data. More than 50% of results are now returned this way, and it has proved especially popular with surveys, and reduced administration time.

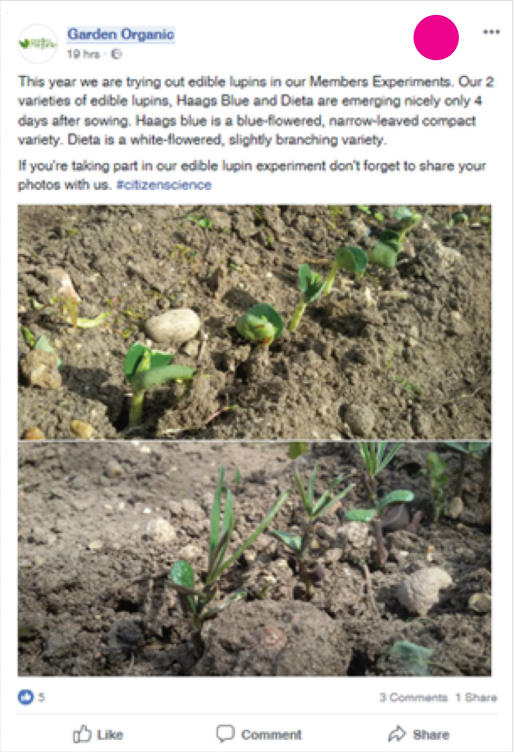
In 2017, a regular e-newsletter was introduced, providing a number of functions:

- Regular updates as to how the experiments are progressing at Ryton.
- Remind people when to send back their results.
- Feed back the results directly when the experiment is still fresh in people's mind.
- Encourage people to sign up to next year's experiments.

We have also started using social media to provide a forum for people to discuss members' experiments.



Example of section of newsletter.



Members' Experiments - today and the future

The future

To outline the future plans for the Members' Experiments programme, Anton Rosenfeld, Senior Researcher and Steve Thomson, Director of Operations, Garden Organic explain:

Lawrence Hills was clearly way ahead of his time, recognizing the importance of the approach of the Members' Experiments - what we now know as citizen science. Nowadays, the full value of back garden surveys and participatory experiments is much more in the public domain and more generally recognized as scientific research. This project, carried out in collaboration with CAWR at Coventry University, to review and evaluate the past 60 years of experiments from Garden Organic's extensive archives and to understand why this methodology has been so successful, what drives people to participate and what significant findings have been uncovered, has been of immense value.

Moving forward we want to build on the last 60 years of experience, and from this highly successful starting point, we want to develop, enhance and modernise the programme. We want to expand the range of experiments, and as in the early days, we also want to be able to extend the reach of some experiments beyond the Garden Organic membership to the general public as a way of spreading environmental, organic and sustainable gardening messages.

Today, most organic horticultural research is aimed at the commercial sector and as a result the message and findings often do not inform or engage gardeners. Going forward we will look at the reports from recent scientific research and we will aim to interpret some of the research findings within a gardening context and make the information available to gardeners, home growers, allotment holders and small-scale commercial growers. Garden Organic already has existing relationships with high level research partners such as CAWR at Coventry University, The Organic Research Centre, The Centre for Alternative Technology, Warwick University and Sussex University who can assist with topic selection.

One of the key developments we would like to see in the future will be the full integration of electronic communications, social media and apps (where appropriate) into the experiments and for the reporting of live data. This technology lends itself particularly well for observational tasks and surveys and also allows more flexibility for experiments to be carried out at different times of the year. For example, an allium leaf miner survey was carried out as an additional experiment in autumn 2017. With increased scope for more real-time communication, we want to encourage more dialogue and exchange of ideas and knowledge between the participants. Garden Organic will also report on progress, publish hints, tips and additional information throughout the length of the activities, making the experience much more dynamic and interactive.

We will continue to explore popular themes such as pest control, soil fertility and new varieties, with suggestions and ideas from members for specific topics always taking priority. The results will continue to inform up-to-date advice on organic gardening and will be disseminated to organic gardeners nationwide.

garden organic

Our charity brings together thousands of people who share a common belief - that organic growing is essential for a healthy and sustainable world. Through campaigning, advice, community work and research, our aim is to get everyone growing 'the organic way'.

Organic Growing: We believe that the best option to protect our food supplies, environment, health and wellbeing is to use organic growing methods. These harness the natural cycles and processes that promote plant growth.

Education: Our education programmes help teachers and school professionals to develop gardening projects that teach children where their food comes from, develop their scientific and environmental awareness and encourage them to eat more fruit and vegetables.

Policy and campaigning: Since 1958, Garden Organic has worked to protect the rich, interdependent, diverse life that makes up our gardens and growing spaces.

Organic Heritage: At Garden Organic, we are dedicated to preserving our valuable organic heritage. We undertake targeted activities to protect diversity and encourage seed conservation.

Healthy communities: Gardening and growing is good for us all. It is good for our physical and mental health, for reducing stress and helping to tackle challenging behaviour. It can also help to build confidence and develop a range of employability skills.

Research: Garden Organic conducts research in partnership with Coventry University's Centre for Agroecology Water and Resilience (CAWR), both for the amateur and professional.

Ryton Organic Gardens: The perfect destination for anyone interested in seeing the principles and practices of organic gardening. Our inspirational demonstration gardens, based five miles from Coventry, provide the perfect chance for visitors to learn more about all aspects of organic growing.

Coventry University

Research Centre
for Agroecology, Water
and Resilience

The Centre for Agroecology, Water and Resilience (CAWR) is driving innovative, transdisciplinary research on the understanding and development of resilient food and water systems internationally.

Food and water security is increasingly threatened by factors such as climate and environmental change, loss of biodiversity, conflict and market volatility. New knowledge, policies and technologies are needed to develop systems that are more resilient to change, and which ensure the health of our food and water supplies. Resilient systems are better able to withstand and recover from stresses caused by short-term change or long-term events, including natural processes like flooding, or human impacts such as war or water pollution incidents.

Through its focus on food and water, the Centre's research develops and integrates new knowledge in social, agroecological, hydrological and environmental processes, as well as the pivotal role that communities play in developing resilience. Unique to this Centre is the incorporation of citizen-generated knowledge - the participation of farmers, water users and other citizens in transdisciplinary research, using holistic approaches which cross many disciplinary boundaries. CAWR also aims to advance resilience science through creative work on a new generation of key issues linked to the governance of food systems, hydrological change, urban agriculture and water, biodiversity, stabilisation agriculture, river processes, water quality and emerging pollutants.

The Centre is conducting research within the following themes:

- Resilient food and water systems in practice.
- Fundamental Processes and Resilience.
- Community self-organisation for resilience.
- Policies and institutions to enable resilient food and water systems.