Botanic Garden Creation and Management: the feasibility and design of new British collections

[On-line Edition]

PhD Thesis

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June 2005

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7 Market Research

The chapters so far have explored how existing botanical collections are structured, the roles they serve and how their design can effect how they achieve these roles. This chapter takes a slightly different approach and asks not what the botanic collection can do but what the stakeholders would like it to do. The results of the survey of British botanical collections in chapter 2 and the case studies in chapter 3 demonstrate that botanical collections have a variety of stakeholders and suggest that these different groups of stakeholders will have differing requirements of a collection and different ways of using it. The aim of this chapter is to establish which of these possible stakeholders are potential users, what they would expect to find, and how they would use a collection. The findings are based on market research that was conducted to help decide what type of botanical collection should be established at the Carymoor Environmental Trust site in Somerset.

7.1 Background to Carymoor Environmental Trust

Carymoor Environmental Trust is situated 4.8km (3-miles) from Castle Cary in Somerset, England on 10ha (soon to be increased to 22ha) of capped landfill leased from Wyvern Waste Services Ltd. "The Centre was initiated by a small group of enthusiasts in 1996 in order to conduct programmes of environmental education. The start up phase was supported by Wyvern Waste Services Ltd through the Landfill Tax Credit Scheme with assistance from the Somerset Wildlife Trust. …[They] have a land management agreement, which provides core income to the Centre. Further Landfill Tax Credit Scheme funding for capital works and research is being provided by Wyvern Environmental Trust Ltd" (CET Website 2003). Carymoor Environmental Trust became a registered charity (No. 1089668) in December 2001 having originally been registered as a company limited by guarantee and not for profit (No.3605584). It is also a Registered Environmental Body (No. 657049). The funding Carymoor receives from the Landfill Tax Credit Scheme is scheduled to end in 2004.

On their Website the CET state their purpose as being "…to provide an actively promoted resource for the demonstration of environmental issues for everyone" and their objectives are as follows-

- Increase awareness of biodiversity and sustainability
- Conduct educational programmes on biodiversity and sustainability
- Manage the land for wildlife and nature conservation
- Provide the local community with an Agenda 21 activity centre

(CET Website 2003)

CET has divided the land it is responsible for managing into several plots. They have then entered into partnerships with a number of organisations, including several universities. These organisations are allotted a plot on which to carryout long-term research work (see Figure 8.1). By the nature of the site, the majority of projects so far have been looking at various aspects of habitat creation on capped landfill sites. With this arrangement the university, or other organisation, gets a location that can be managed to their requirements over a long period of time. (Capped landfill cannot be built on, and the methane and leachate emissions must be managed for many years after.) In return, Carymoor receives a management plan for the area and the kudos of working with university research projects, which can help when applying for funding.

In 2003 the Carymoor Environmental Trust management team was as follows-

Executive Director	Jill Gilbert
Trustees	Gillian Craig Hamish Craig Ian Davies John Lee Peter Moon Simon Smith Dr Laura Tilling
Chairman of the Trustees and Management Committee	Hamish Craig
Company Secretary	Ellie Wainwright
Schools Officer	Graham Jennings
CET Ecologist/Site Development Manager	Angus Davies
Accounts	Ellie Wainwright
External Advisors	Dr Jon Marshall (ecology) Max Foote (financial administration) Raymond Wheeler (natural history)

Of these, a team comprising of Ian Davies, Hamish Craig, Dr. Jon Marshall, Angus Davies and Jill Gilbert, met with the University of Reading approximately every three months to discuss the Somerset Plant Collection (SPC). Of these, Jill Gilbert and Angus Davies were the day-to-day contacts at the centre. The University of Reading team was made up of James Furse-Roberts (PhD student and author of this thesis), Richard Bisgrove (PhD supervisor based at the University of Reading) and Tony Kendle (PhD supervisor based at the Eden Project).

7.2 Survey Methodology

When speculating about who could use a botanical collection specialising in British species, four major groups were identified: schools, universities, professionals working with the British flora and the public. For all of these groups it was decided that the required data could be gathered from a series of fixed questions rather than explorative interviews. Robson (2002) lists three types of fixed question survey; questionnaires, telephone surveys, and interviews. Of these, the questionnaire survey was chosen because it is not as time consuming to operate as the telephone and interview techniques, the respondent chooses when they answer the questionnaire and it could be distributed over a wide area, while interviews are restricted to a smaller area. For the first three target groups, the schools, universities and professionals, names and addresses were available and as a result it was decided that these would be surveyed using the same postal survey technique used for the botanical collection surveys described in chapter two. The questionnaires themselves were developed using the techniques recommended by Dillman (1978 & 2000). Copies of the letters, postcards and questionnaires used can be found in Appendix 1. The method of obtaining the postal addresses and contact names is described within the following sections that deal with each group individually.

7.2.1 Schools

The Department of Education, on its education website, has a searchable database of schools to help parents find schools within their area (Dept. of Education & Skills Parent Centre Website 2003). This database allows the user to enter a postcode and a radius in miles and will then return the names and addresses of all the schools within that area. Using this search facility it was possible to build up a database of schools that included their distances from Carymoor and the names of the headteacher. Whilst it was felt that a survey of headteachers would be beneficial, there were some areas of enquiry that could only be accurately be answered by the teachers themselves. Not having access to the names of teachers meant that there were only two ways they could have been contacted. Firstly, using the school addresses gained from the Department of Education website, a letter addressed to "Head of the Biology Department" etc. could have been sent. This method is very impersonal and because of this would probably have resulted in a low return rate. Additionally this method may have meant that a survey never reaches someone to whom it is relevant because they are not the head of department, or whatever other title is put on the address. The second method, and the one chosen for this survey, is to send the headteachers three teacher-surveys, in addition to their own. The teacher surveys each had a cover letter that explained that their headteacher had been asked to hand these out to people that they felt could best answer the questions. This gave the survey the approval of the headteacher. Only one headteacher voiced a concern about the use of this technique.

Table 7.1 lists the questions on the headteachers survey. It was comprised of a combination of eight multi-choice, yes/no and free answer questions. The aims of the questions were as follows-

- To establish the characteristics of the school replying (unnumbered questions at the start of the questionnaire)
- To establish the present approach of the school towards school trips in general and the reasons (questions 1, 2, 3, 4 & 5)
- To establish the schools present attitude towards trips to botanic gardens and the reasons (questions 6, 7 & 8)

The teachers' survey consisted of ten multi-choice, yes/no and free answer questions; these are shown in Table 7.2 below.

- To establish the characteristics for categorising the respondents (question 1)
- To establish how the school/teacher utilised plant material for education (questions 2 & 3)
- To examine their uses of other botanical facilities (question 4)
- To establish the teachers' present use of and attitudes towards botanic gardens (questions 5 & 6)
- To establish their requirements of a botanic garden (questions 7, 8a & 9b)
- The way they would use a botanic garden (questions 8b & 10)
- To establish whether they would use such a facility if it were at the Carymoor site (question 9b)

Table 7.1 - Headteacher Survey Questions

See Appendix 1 for full version

	Schools details
	Number of students enrolled
	Age range of the students
1	Which departments within your school take students on educational day trips?
2	On average, how many times a year does a student at your school get taken on an educational day trip?
3a	Would you like to increase the average number of educational trips each student in your school goes on?
3b	If Yes, which of the following statements summarise what is preventing you from increasing the number of visits?
4	On what days of the week do you prefer that educational trips be held?
5	What times of year do you prefer educational trips to be held?
6a	Do you think that a Botanic Garden could play a valid role in the education of students at your school?
6b	Do you think that a nature reserve could play a valid role in the education of students at your school?
7	How often does a student at your school get taken on trip to a Botanic Garden?
8a	Would you like to increase the average number of trips to a Botanic Garden each student in your school goes on?
8b	If Yes, which of the following statements summarise what is preventing you from increasing the number of trips to a Botanic Garden?

Table 7.2 - Teacher Survey Questions
See Appendix 1 for full version

	Schools details
1a	At what level or levels of education do you teach?
1b	What subjects do you teach?
2a	Do you use plant material for education?
2b	If Yes, which of the following types of material do you use?
3	If your school uses plant material for education which of the following sources does your school use to obtain its plant material?
4	Which of the following do you or your colleagues use for educational purposes?
5	How often do you visit a botanic garden to use their facilities as part of your work?
6a	Do you think that a Botanic Garden could play a valid role in the education of students at your school?
6b	Do you think that a Nature Reserve could play a valid role in the education of students at your school?
7	If you were to use a Botanic Garden for educating your students which three of the following methods of displaying plants would be of most use to you?
8a	If a Botanic Garden displayed plants in the ways you have identified in the previous question would you use such a facility for educating you students?
8b	If Yes, which of the following statements best describes the way you would want to use the garden?
9a	How long would you be prepared to spend travelling in order to visit such a facility?
9b	If an organisation offering the facilities and services you have indicated above was located at Castle Cary, Somerset, would you travel to use them?
10	What times of year would you prefer to use such a facility?

7.2.2 Universities

The target audience for the university survey was lecturers of plant related subjects at universities across the country. In order to increase the likelihood of a response it was desirable to address the questionnaires to a specific person rather than a position. To do this the Universities and Colleges Application System (UCAS) database (UCAS Website 2001) was used to compile a list of universities that offered botany and plant science courses that might use botanic garden facilities. The individual websites of each university were then consulted to ascertain whether they gave the contact details for the course leaders. Using this method a list of 41 lecturers from 26 universities was compiled. These then received a questionnaire distributed with the same method used for headteachers. Unlike the other surveys discussed so far, the university survey was not restricted to universities within a specific distance of Carymoor. Primarily this was because the scarcity of universities would have resulted in a very small sample but, secondly, it was hoped that the results from a wider ranging survey would allow the maximum distance universities would be willing to travel for a botanical collection in Somerset, to be found.

Table 7.3 lists the questions in the university survey. It comprised of a combination of eleven multi-choice, yes/no and free answer questions. The aims of the questions were as follows-

- To categorise the respondents (question 1)
- To establish the use of plant material in that university (question 2)
- To review the amount of plant identification that occurs on the lecturer's courses and whether they believe it to be an important skill (questions 3 & 4)
- To establish what botanical facilities are owned and used by that university (questions 5 & 6)
- To establish what that lecturer would require of a botanic garden (questions 7-11)

Table 7.3 - University Survey Questions
See Appendix 1 for full version

1a	At which of the following levels do you lecture?
1b	On what topics do your lecture?
2	Which of the following types of material are used for courses you lecture on?
3a	Do the courses you lecture on have a formal plant identification module within them?
3b	If Yes, is this module compulsory?
3c	If No (i.e. the module is optional) how would you rank the number of students signing up for this module?
3d	If you ticked either of the last two boxes what do you think is the reason for the attendance not being higher?
4	Do you believe that plant identification is a skill that graduates of your courses should have?
5	Which of the following does your University have?
6	Which of the following facilities are used for courses you lecture on?
7	If you do not use a Botanic Garden which of the following statements describe why not?
8	If you were to use a Botanic Garden for educating your students which three of the following methods of displaying plants would be of most use to you?
9a	If a Botanic Garden displayed plants in the ways you have identified in the previous question would you use such a facility for educating you students?
9b	If Yes, which of the following statements best describes the way you would want to use the garden?
10a	How long would you be prepared to spend travelling in order to visit such a facility?
10b	If an organisation offering the facilities and services you have indicated above was located at Castle Cary, Somerset, would you travel to use them?
11	What times of year would you prefer to use such a facility?

7.2.3 Professionals

The professionals identified as being possible stakeholders are those people that use plant identification skills as part of their professional occupation. The aim of surveying this sector was to establish whether there was a service that a botanic garden could offer professionals, and if so what kind of market there is for it. As Carymoor was planning to concentrate of British plants the target recipients of 'this survey would need to be professionals whose work involves British plants. The Institute of Ecology and Environmental Management (IEEM) was founded in 1991 to "promote and support professionalism in the environment", it now has approximately 1,500 members (IEEM Website 2003). The IEEM produce a directory of their members (IEEM 2000), which was used as the source of names and addresses for this survey. It would not have been financially possible to survey all of the members so 100 that listed ecological consultancy in Britain as one of their main activities were chosen.

The surveys were distributed using the same methodology described for the headteacher survey. The survey form consisted of eleven questions (listed in Table 7.4) with the following aims-

- To categories the respondent's company (unnumbered question and questions 1 & 2) are to help categories the respondents company.
- To examine the plant identification requirements of the respondent, the training provided and how it could be improved (questions 3-10)
- To examine this sector's experience of the identification skills of university graduates (question 11)

The last area on enquiry was included following conversations with members of the ecological sector (namely employees at Penny Anderson Associates) in which the view was expressed that the plant identification skills of graduates are not good enough to start work in this sector without further training. This question will be compared with the perceived needs of the university students as expressed by the lecturers in the university survey.

Table 7.4 - Professionals Survey Questions
See Appendix 1 for full version

	Number of staff employed
1	In which of the following areas does your company conduct surveys?
2	If your company conducts habitat surveys which of the following techniques are used?
3	Which of the following do your employees need to be able to identify to carry out their work?
4	For which of the following does your company provide identification training?
5	On average, how often does an employee of your company attend a plant identification course?
6	Which of the following training methods does your organisation use?
7	Are you satisfied with the results of these training methods?
8	Which of the following statements describe why the staff at your organisation do not attend more plant identification courses?
9a	If your staff were to attend a plant identification course, what is the longest you would you be prepared for such a course to last?
9b	If an organisation offering plant identification courses was located at Castle Cary, Somerset, would you consider using them to train your staff?
10	What times of year would you prefer to send your staff on training courses?
11a	Has your company employed or considered employing a university graduate in the last 3 years?
11b	If Yes, were you satisfied with their plant identification knowledge?
11c	If No, was your reason for not employing this graduate because of a lack of plant identification skills?

7.2.4 Public

The public differ from the other groups covered by this research in that it has a large number of members that could be sent questionnaires, combined with no discernable way of selecting a meaningful and more manageable sub-set. For these reasons postal surveys to this group were not deemed feasible, instead an alternative method was needed. Every year Carymoor hosts an open day, when the public is invited to see what they do. This is supplemented with other activities and stalls related to Carymoor's work. The event naturally attracts people who already have an interest in the environment or in taking interesting days out, and thus delivers a selection of the public that may well also be interested in a botanic garden. It was therefore decided to produce a questionnaire that could be filled in by visitors to the open-day.

As the questionnaire was to be completed whilst the public were at an event the form was purposefully made shorter than the postal surveys, only 9 questions, in an attempt to encourage people to complete it. As well as asking for their name, address etc the respondent was also asked for their profession. The purpose of this was to use this to give a rough indication of the demographic of the respondents. Their address would give an approximate idea of how far this group was willing to travel, although some respondents may not have travelled directly from home that day. Questions 1 & 2 gauge the respondent's garden visiting habits. Question 3 looks more closely at this topic, focusing on botanic gardens. Questions 4-7 examine what the public would require/expect from a botanic garden and last question, question 9, attempts to assess what sort of response their would be to a request for volunteers to work in the garden.

The questionnaires were placed, with pencils and clipboards, on an unmanned stand, which had a poster describing the aims of the Somerset Plant Collection project and why the visitor's input was needed as well as a box for completed questionnaires.

Table 7.5 - Public Survey Questions
See Appendix 1 for full version

	Profession
1	How often do you visit gardens?
2	What did you enjoy most about your last visit to a garden?
3a	Have you ever visited a *Botanical Garden* before?
3b	If Yes, approximately when was your last visit?
3c	Which Botanic Gardens have you visit?
4a	Which of the following courses would you be interested in attending?
4b	Which of the following courses have you attended?
5	From the list below pick the three services that you think would be of the greatest use to you starting with the one you would make the most use of.
6	Select the 3 methods of displaying plants that you would like to be used on a collection of British plants.
7	How long would you be prepared to spend travelling in order to visit a botanical garden?
8a	Bearing in mind that the up keep of plant collections takes a lot of money what sort of admission charge do you think there should be?
8b	In your opinion what is a fair admission charge?
9a	Would you be interested in volunteering at a botanical garden in Castle Cary?
9b	If you were to volunteer which of the following would you be interested in doing?

7.3 Survey Return Data

The responses received in the returned questionnaires were logged into a Microsoft Access database for future analysis. In addition to this, when legible the date on the postmark of the return envelope was also recorded. This information and the knowledge of how many surveys were sent out initially were used to assess the effectiveness of the survey methodology. The public surveys are not included in the following discussions because they were not posted and their distribution methodology does not give any indication as to how many people attended the open day, or read the questionnaire and decided not to answer it. In total, only thirteen people answered the public survey, which is not a large enough sample to be used statistically. However, for the sake of completeness the results are discussed below.

7.3.1 Speed of Return

Survey	Date Survey Sent	Date of Postcard Reminder	Date of First Reply	Date of Last Reply	Duration of Reply Period
Headteacher	21/11/01	27/11/01	23/11/01	14/12/01	22 days
Teacher	21/11/01	Not Sent	23/11/01	17/01/02	53 days
University	21/11/01	27/11/01	23/11/01	14/12/01	22 days
Professionals	26/11/01	03/12/01	27/11/01	20/12/01	24 days

Table 7.6 – Speed of return of the four market research postal surveys

The table above gives the dates that the first and last replies for each survey were received. It is interesting to note that the university, headteacher and professionals surveys all took approximately the same time (22 days) for all responses to be received. The teacher survey took more than twice as long but these delays can be explained by a combination of two factors. Firstly, delays will have been caused by time taken by the headteacher to pass on the surveys to the relevant teachers. Secondly, the survey was conducted near the end of term, and from notes written on the returned forms it is clear that some teachers only got around to completing their forms whilst preparing, after the Christmas holiday, for the following term.

7.3.2 Return Rate

Survey	No. of Surveys Sent	No. of Responses	% Return Rate
Headteacher	137	51	37.2
Teacher	411	99	24.1
University	41	21	51.2
Professionals	100	56	56.0

Table 7.7 – Return rate of the four market research postal surveys

As can be seen from the results in the above table the response rates for the surveys varied from between a quarter to over a half of all surveys being returned. Despite having the largest number of surveys sent out, the teachers survey produced the lowest return rate; the lack of names and addresses of specific people to send the surveys to, combined with the reliance on someone else to pass them on was probably the cause.

7.4 Headteacher Survey

Surveys were sent to the headteachers of 137 schools in Somerset, Wiltshire and Dorset. Of these, 51 schools responded (a response rate of 37%) each responsible for educating between 44 and 1,700 students with a total of 30,562 students between them (equivalent to 32.7% of the 93,588 people aged between 5-19 living in Somerset (based on figures given in '*Somerset Interactive Area Profiles County, Districts and Wards*' (Williams 2004)). The ages of the students ranged between 3 and 19 years old and, as can be seen in the chart below (Figure 7.1), which shows the number of schools with children of that age, the age groups 4-18 were well represented across this range by this survey. There appears to be an especially high number of schools with eleven year olds however this is an anomaly caused by this being the age at which pupils change schools which results in them being counted twice, i.e. once in the school they are leaving and once in the school they are going to.

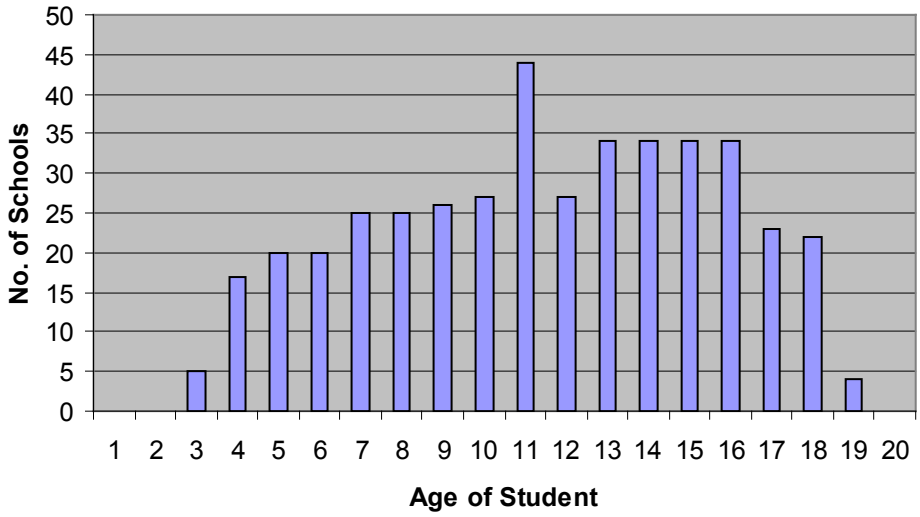


Figure 7.1 – Age range and frequency of students taught in schools that responded to the headteacher survey

Question 2 & 3a

The headteachers were asked about the trips that their schools already conduct, of them, the majority of schools would appear to take their students on between 2 and 3 trips per year. They were more or less split evenly when asked whether they would like to increase the number of trips, 26 (51%) saying that they would like to offer more trips whist 25 (49%) saying that they would not.

Question 3b

To assess the reasons why respondents who stated that they wanted to increase the number of trips had not, they were then given thirteen possible obstacles preventing them and asked to choose as many as were appropriate to them or to add their own. The reasons that were given have been ranked below and show that there are two main problems; firstly the curriculum, both the amount of work and the curriculum's structure, and secondly, financial, schools feel that taking students on more trips is too expensive.

Reasons for not taking students on more trips	**No. of Times Chosen**
Due to the pressures of completing the curriculum there is not enough time.	19
Transport costs are too high.	17
Your school ca not spare enough staff to take the trip.	16
Cost of providing the required staff is too high.	10
The curriculum is structured in such a way as to make it difficult to include trips within it.	7
Entrance charge in to place of visit is too high.	7
Those locations that are within your area are not suitable because they ca not cope with the number of students you would want to take.	4
The locations are not suitable because they lack certain essential facilities.[α]	3
Staff wanting to take trips has not approached you.	3
Within your area there are no locations for your students to visit.	2
Other [β]	1
The people who would be taking the trip feel that they would not know enough about the place being visited to make the trip worthwhile.	0
They are not suitable because they do not cover the right topics.	0

Table 7.8 – Reasons given for not taking students on more trips

[α] - All three respondents cited wheelchair access as being a problem.

[β] - Respondent expressed anxiety about risk assessment, particularly with regard to overseas trips.

Question 1

The headteachers were then asked which departments within their school take students on educational day trips. In total 25 subjects are taught with the aid of a trip somewhere. The most popular of these were geography and history with biology ranked 3rd= with art (Figure 7.2).

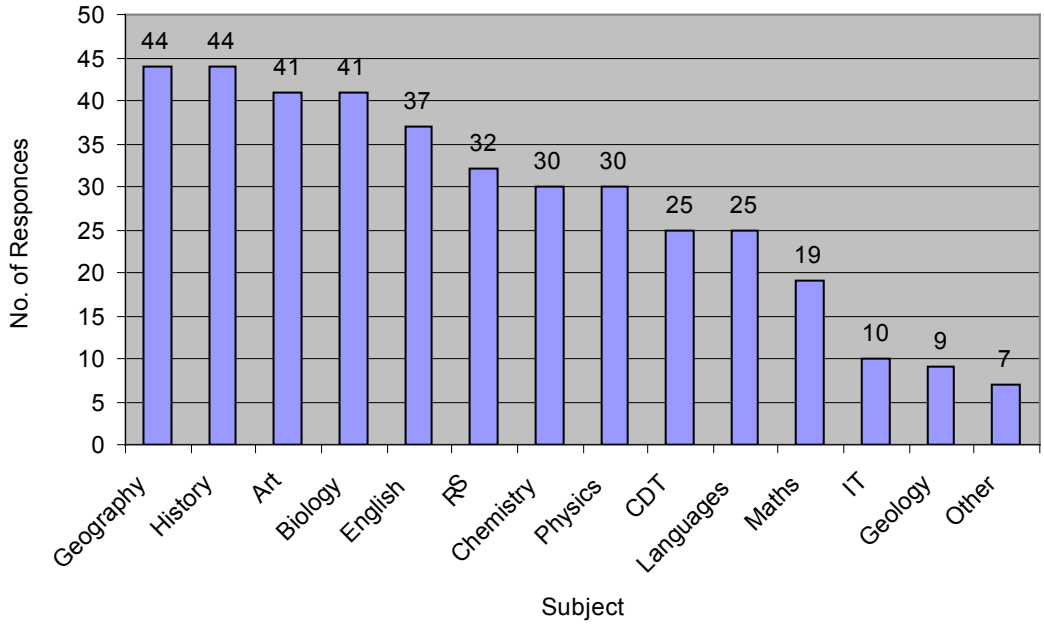


Figure 7.2 - Number of respondents that indicated that a certain department takes students on an educational trip

Youth award, drama, music, PSHE, life skills, communications, sociology, business, health and social care, leisure and tourism, psychology, and environmental science were all volunteered as 'other' subjects that take trips.

Question 6a

The headteachers were asked whether they believed that a botanic garden could play a valid role in the education of students at their school and, as can be seen from the Table 7.9 below, 90% believed they could but worryingly the remaining 10% were certain that a botanic garden could not play a valid role in the education of their pupils.

Answer	No.	%
Yes	40	89
No	5	11
Did not Answer	2	-
Ticked Both	4	-

Table 7.9 – Headteachers views on whether botanic gardens can play a valid role in education of the students at their school

Question 6b

To give these figures something to be compared with the headteachers were then asked whether a nature reserve could play a valid role in the education of their pupils. As can be seen in Table 7.10, there is slightly more confidence in the validity of nature reserves as an educational tool. Perhaps this is to do with a combination of the curriculum focusing more on environmental issues and a possible misconception of what a botanic garden can offer.

Answer	No.	%
Yes	47	96
No	2	4
Did not Answer	0	-
Ticked Both	2	-

Table 7.10 - Headteachers views on whether nature reserves can play a valid role in education of the students at their school

Question 7

The respondents were asked to indicate how often a student at their school gets taken on a trip to a botanic garden by ticking the box next to the most appropriate description. All 51 respondents answered this question. Table 7.11 shows that only 4% of pupils at the schools surveyed are taken to a botanic garden regularly, and 61% never go at all.

Frequency	Description	No.	%
Low	Never	31	61
	Less than once a year	17	33
	Once a year	2	4
	Twice a year	0	0
	Once a term	0	0
High	More than once a term	1	2

Table 7.11 - Frequency with which students from the respondents school are taken to botanic garden

Question 8a

When asked whether they would like to increase the number of visits their students made to botanic gardens the head teachers responded as shown in Table 7.12. It is promising to see that almost three quarters of the respondents want to increase the number of trips to botanic gardens they make. It is also interesting to not that this is more than wanted to increase the number of trips a student makes, suggesting that some of them feel that a trip to a botanic garden would be more beneficial than at least one of the trips that the students are presently taken on.

Answer	No.	%
Yes	32	73
No	12	27
Did not Answer	2	-
Ticked Both	5	-

Table 7.12 - Headteachers views on whether they would like to increase the number of trips their students go on

Question 8b

To investigate whether the reasons for not increasing the number of trips to botanic gardens were the same as for not increasing the number of trips in general the headteachers were asked to choose from eight possible reasons or to add their own. The Table 7.13 below shows the results. As with the previous question, asking them why they did not increase the number of trips, the responses showed that they felt restricted by the curriculum and a lack of finances both featured highly (ranked 2nd and 4th respectively) but this time they were joined by two others. The highest-ranking reason was that staff wishing to take a trip to a botanic garden had not approached the headteachers; this is probably strongly linked to the 3rd ranking reason, which was that there is not a botanic garden close enough.

Reasons for not taking students on more trips	**No. of Times Chosen**
You have not been approached by staff wanting to take a trip to a Botanic Garden.	23
The curriculum is structured in such a way as to make it difficult to include a trip to a Botanic Garden.	16
There is not a Botanic Garden close enough to visit.	15
Entrance charge to the Botanic Garden is too high.	5
The people who would be taking the trip feel that they would not know enough about the Botanic Garden being visited to make the trip worthwhile	4
Botanic Gardens within your area are not suitable because they ca not cope with the number of students you would want to take.	1
Botanic Gardens within your area are not suitable because they lack certain essential facilities.	1
The Botanic Gardens within your area are not suitable because they do not cover the right topics.	1
Other[α]	1

Table 7.13 - Reasons given for not taking students on more trips to botanic gardens

It is also interesting to note that in response to this question four headteachers indicated that the people who would be taking a trip felt that they did not know enough about the botanic garden being visited to make the trip worthwhile. This option was included in the same question asked about trips in general but was not chosen. All four of the headteachers giving this response thought that, regardless of this, a trip to a botanic garden could be beneficial for their pupils.

Question 4 & 5

To gauge when headteachers prefer to have their school trips, they were asked two questions, one about which day or days of the week best suit them, and the second about which month or months of the year they preferred. The results show that 21% of respondents were happy to conduct trips on any day of the week, whilst 40% showed a preference for only 5 days mostly avoiding trips at the weekend. As can be seen from Figure 7.3, when all the results are combined there is a slight tendency to arrange trips for the middle of the week.

[α] - Transport costs

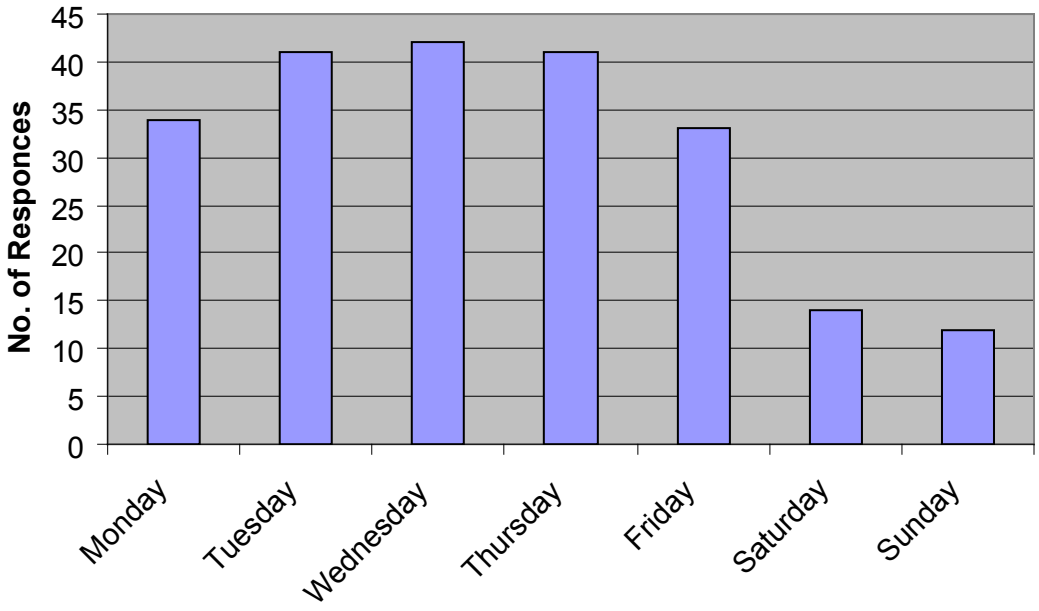


Figure 7.3 - Headteachers preference for which day a trip should occur on

With regard which months of the year they favoured, 19% stated that they would happy for an educational trip to occur in any month, whereas the majority of schools restrict trips to falling within 6 months of the year or less. Figure 7.4 shows the combined month preferences from all the respondents and shows that June and October are preferable whilst very few trips happen in August.

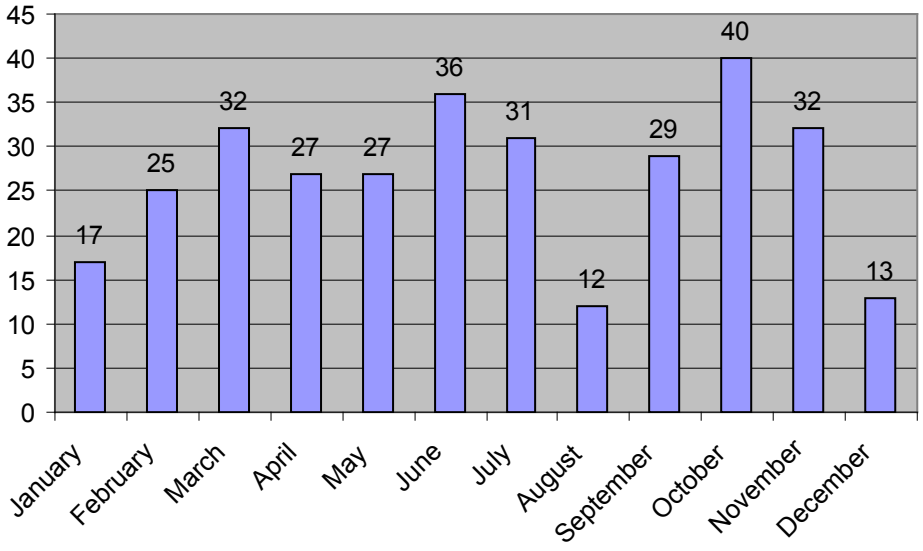


Figure 7.4 – Headteachers preference for which months(s) trips should occur in

1.1 Teacher Survey

Question 1a & 1b

99 teachers from 58 different schools responded. On average each respondent teaches at two of the levels shown in Figure 7.5 below. The graph also shows that there is a fairly even representation of all the teaching grades from Key Stage 1 through to A-level. Between them, the respondents, teach approximately 29 different subjects but the most common is biology, being taught by 80% of the respondents (Figure 7.5).

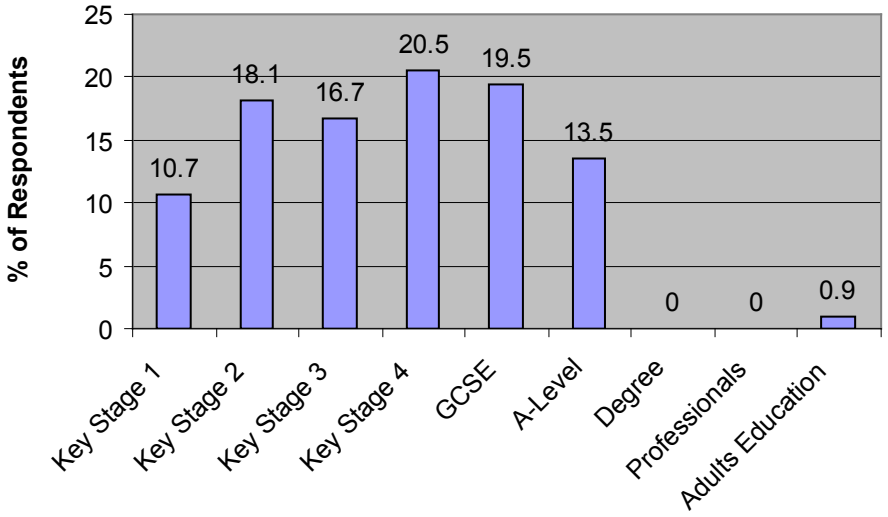


Figure 7.5 – Level at which teachers responding to the survey teach

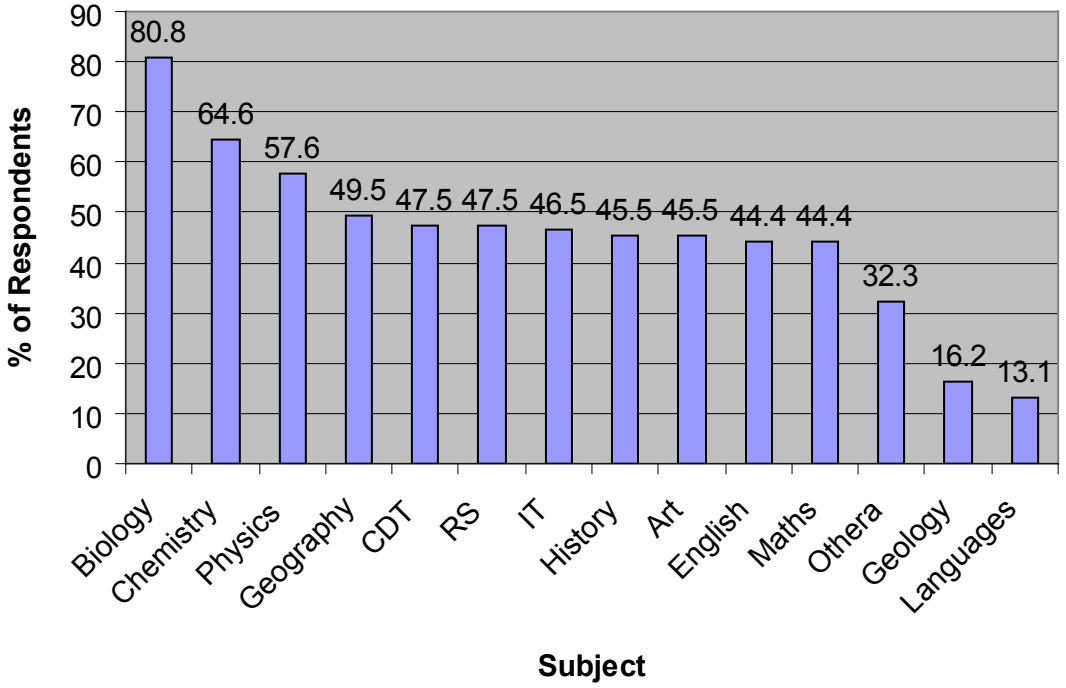


Figure 7.6 - Subjects taught by responding teachers

Question 2a & 2b

The first part of the survey concentrated on the teachers' use of plant material within the classroom. The results showed that 89 of the 98 respondents, or 91%, that answered this question use, plant material for education. They were then given four ways of using plant material (kept alive, living plant destroyed, plant parts from a living plant, and dried plants) and asked to indicate which they used (Table 7.14). The most popular choice was that of a plant kept alive, dried plants, and parts off living plants with quickly followed this with the destruction of living plants being the least favoured method but still used by just under 60% of respondents. The majority of teachers use three or four of these types of plant material.

Plant Material Used	**No.**	**%**
Plants kept alive	84	94.4
Dried plants or plant parts	73	82.0
Material removed from living plants	72	80.9
Plants destroyed	53	59.6
Did not answer	10	-

Table 7.14 - Teachers' use of plant material within the classroom

Question 3

89% of these teachers source this material from the schools own grounds and 58% reported that their school had its own growing facilities which they use, unfortunately the questionnaire did not explore this aspect of the question further and as a result it is unknown what these growing facilities consist of.

Question 4

With such a large number of teachers using live plants during their classes it is surprising that when asked which facilities, from a list of six, they use "plant collection" comes second, with 25%, to "nature reserve", with 84%.

Question 5

As with the headteachers, the teachers were asked how often they used a botanic garden as part of their work and, probably unsurprisingly, the teachers' results are similar to those given by the headteachers (see Table 7.15).

Frequency	Description	No.	%
Low	Never	62	65.3
	Less than once a year	23	24.2
	Once a year	7	7.4
	Twice a year	2	2.1
	Once a term	1	1.1
High	More than once a term	0	0

Table 7.15 - Frequency with which teachers use a botanic garden for teaching

Question 6a & 6b

To compare any difference between teachers and headteachers attitudes towards the use of botanic gardens for education the teachers were asked the same yes/no questions as to whether they thought that botanic gardens could play a valid role in the education of students at their school. This was followed by the same question again but with regard to nature reserves. A comparison of the results, shown in Table 7.16 and Table 7.17, show that, as with the headteachers, there is a small minority of people who believe that botanic gardens can play a less valid role in education.

Botanic Garden		
Answer	No.	%
Yes	85	93.4
No	6	6.6
Did not Answer	5	-
Ticked Both	3	-

Table 7.16 – Teachers views on the usefulness of botanic gardens for education

Nature Reserve		
Answer	No.	%
Yes	93	98.9
No	1	1.1
Did not Answer	3	-
Ticked Both	2	-

Table 7.17 - Teachers views on the usefulness of nature reserves for education

Question 7

The next few questions in the survey endeavoured to establish what the teachers would want a botanic garden to have, if they were to use one. The teachers were given a list of eleven common methods of plant display used in botanic gardens and asked to pick their three preferred choices and rank them in order of preference. The design of this question was probably a little complex as 17 people either did not answer the question or did so incorrectly. These entries were removed from the data before the results were calculated. The outcome was that the most popular choice for displaying plants was to show them in their own habitats, this was followed by displays of evolution and then plant/animal interactions. When all the data is totalled and ranked, habitat displays get 28% of the votes, evolution 16% and plant/animal interactions is in joint 3rd place with display of plant families (12%). Surprisingly, given the preference for the use of nature reserves, conservation as a display method only got 10% of the votes and is ranked 5th favourite.

Question 8a & 8b

The next question asked whether the teachers would use a botanic garden, if it used the methods of displaying plants that they had highlighted in the above question. The same number of people (85) said they would, these were then asked about the manner in which they would like to use a botanic garden. They were asked to choose from courses run by the staff at the garden, teacher training days prior to bringing the students, or no training. The results, shown in Table 7.18, indicate that at the very least teachers would prefer a botanic garden to advise them on how best to conduct their visit and a large amount are happy for botanic garden staff to supervise the whole visit.

	No of Responses	% of Responses
Centre Staff Lead Courses	35	46.1
Teacher Training Days	28	36.8
No Teacher Training	13	17.1

Table 7.18 – Teachers preferences for method of using a botanic garden

Question 9a

The final set of questions endeavoured to establish how far teachers would be willing to travel for a school tip and what times of year they would want to conduct them. Table 7.19 shows that 75% of the teachers would be willing to travel for half an hour to one hour for a school trip. This equates to roughly a 30-mile radius.

Maximum Travelling Time	**No. of Responses**	**% of Responses**
10mins or less	0	0
11-30mins	19	20
½ hr – 1hr	51	54
1hr – 1 ½ hrs	20	21
1 ½ hrs – 2hrs	1	1
2hrs – 3hrs	4	4
More than 3hrs	0	0

Table 7.19 – Preferred travelling time to reach trip destination

Question 10

The teachers were also asked to choose which month or months they would prefer to take their trips in. When Table 7.20 is compared with the headteachers results to the same question, June is the most popular in both sets of data, as is August the least popular. More teachers would prefer to take trips in May and June than headteachers.

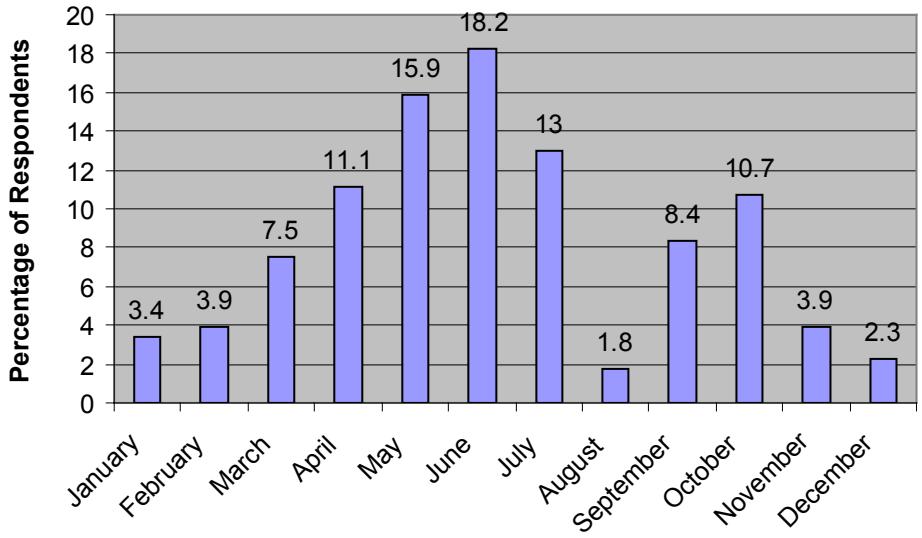


Table 7.20 – Teachers preference of month for taking a trip

7.5 University Survey

Question 1a & 1b

21 University lecturers, representing 12 universities, responded to this survey. Of them, the majority teach at under-graduate and post-graduate levels (81% and 71% respectively). Between them they lecture on the 43 topics listed below

Biodiversity	Genetics
Biodiversity Conservation	Global Ecology
Biogeography	Habitat Management
Biological Impact of Pollution	Marine Pollution
Biological Recording	Molecular Biology
Biology	Natural Resources
Botany	Nature Conservation
Commercial Practice	ND - Science
Community Ecology	Physiology
Conservation Biology	Plant Anatomy (1st Year)
Ecological Assessment	Plant Biochemistry
Ecological Genetics	Plant Ecology
Ecological management	Plant Identification
Ecology	Plant Knowledge
Ecosystems & Communities	Plant Production
Environmental Impact Assessment	Plant Studies
Environmental Sciences	Pollution Studies
Ethnobotany	Soil Ecology
Evolution	Wastes Management
Foundation Biology	Water Resources
Garden Centre Organisation	Wildlife Conservation
General Ecology	

Question 2

As with the teacher survey, the lecturers were questioned about their use of plant materials for education. They were asked to choose, from a list of five options those that apply to them; the results are shown in Table 7.21. Compared with the teachers the overall use of plants by university lecturers would appear to be lower. They also seem to find more use for material removed from living plants and less use for living plant specimens.

Plant Material	No. of Responses	% of Responses
Plants kept alive	13	68.4
Dried plants or plant parts	13	68.4
Material removed from living plants	14	73.7
Plants destroyed	10	52.6
No plant material used	0	0
Did not answer	3	-

Table 7.21 – Lecturers use of plants for education

Question 3a, b, c, d, & 4

61% of lecturers stated that the courses they lecturers on had a formal plant identification module, and of these, 66% said that that module was compulsory. Of the lecturers whose identification modules are not compulsory, the majority 83% believed that the correct number of students chose to take the module. They were then asked to choose from a list of possible reasons, which they thought were the reasons that attendance was not higher. Of the seven people who answered 36% believed that it was because students were intimidated by plant identification, 29% thought that they felt it was not an interesting subject, and 21% considered that it was not a skill they needed. This last reason was explored more thoroughly in the following question where all the respondents were asked whether they believed that plant identification was a skill their students required. Table 7.22 shows that almost 90% believe that it is a skill they require.

Answer	No.	%
Yes	17	89.5
No	2	10.5
Did not Answer	2	-
Ticked Both	0	-

Table 7.22 – Lecturers views on the whether plant identification is a skill needed by their students

Question 5

The lecturers were questioned on which facilities their establishment had and what they used for education. From the 18 responses to this question duplicates, from lecturers at the same universities, were removed. Which left results from 16 establishments that answered as follows (Table 7.23).

	Nature Reserve	Botanic Garden	Living Collection	Herbarium	Spirit Collection	Seed Library	Image Library
No. who have this facility	6	9	8	6	1	0	2
% who have this facility	37.5	56.25	50	37.5	6.25	0	12.5
No. who use this facility	15	8	3	5	0	1	3
% who use this facility	93.8	50	18.8	31.3	0	6.3	18.8

Table 7.23 – Availability and use of various botanical facilities

From this data it would appear that 56% of universities have a botanic garden and of this 50% use them but in fact when the data is examined more closely it is found that, of the nine lecturers that reported that their establishment had a botanic garden, only four actually use it, the remainder of botanic garden users are made up by establishments that must be using botanic gardens elsewhere. This is not the case with living collections where seven universities have them, four use their own and only 1 makes use of someone else's. It is interesting to note that university botanic gardens, herbaria, living collections and spirit collections are being under used, while nature reserves, and seed and image libraries have to be sourced from outside of the university. The perceived decline in the use of

botanic gardens compared to the popularity of nature reserves are probably both linked to the recent change in the type of university courses offered, with traditional taxonomic studies being replaced with environmental courses (Smith 2002).

Question 7

Those lecturers that stated they did not use botanic gardens were asked to choose from a list of reasons. No specific option was given to indicate that a botanic garden was not needed for their course, although this could have been included as an "other" choice as one person did. Table 7.24 indicates the results received.

Reason	No. of Responses	% of Responses
Local botanic garden does not cover suitable topics	4	50.0
Local botanic garden lacks facilities	3	37.5
No botanic garden close enough	2	25.0
Other	2	25.0
Transport costs to high	1	12.5
Local botanic garden to small	0	0.0
Entrance fee to high	0	0.0

Table 7.24 – Reasons given by lecturers for not using a botanic garden

The facilities cited as being absent are a scientific collection, native plants and labelling. The topics cited as not being covered are management, natural plant communities in the UK and identification of native species in-situ.

Question 8

The last section of the questionnaire was dedicated to establishing what lecturers expect of a botanic garden and how they would want to use it. To ascertain what method of displaying the plants they preferred they were given a choice of the same 11 choices offered to the teachers in their survey, and the opportunity to add their own (Table 7.25).

Method of plant display	No. of Responses	% of Responses
Habitats	17	85
Adaptation/Evolution	14	70
Families	13	65
Genetic Variation	8	40
Conservation	6	30
British Uses	5	25
Medicinal Uses	3	15
Edible	3	15
Plant/Animal Association	3	15
Bedding	3	15
Garden Use	3	15
Other	1	5

Table 7.25 – Desired methods of plant display in botanic gardens

Question 9a & 9b

When then asked whether they would use the botanic garden they had described 88% of respondents said they would. Their responses to question 9b (Table 7.26) show that they are much more confident about using botanical gardens than teachers, much preferring to allowing the students to do their own research or use the garden without prior teacher training.

Methods of using a BG	No. of Responses	% of Responses
Teacher Training Before Visit	4	28.6
Visit Without Teacher Training	7	50
Centre Staff Run Course for Students	4	28.6
Students Do Their Own Research	6	42.9

Table 7.26 – Desired method of using a botanic garden

Question 10a

With regard travelling time to get to a botanic garden, university lecturers are likely to spend slightly longer travelling than teachers, but are also prepared to include a visit as part of a longer field trip that is much further away from the university.

Maximum Travel Time	No. of Responses	% of Responses
10mins or less	0	0
11-30mins	1	7.1
1/2hr - 1hr	6	42.9
1hr - 1 1/2hrs	6	42.9
1 1/2hrs - 2hrs	0	0
2hrs - 3hrs	1	7.1
More than 3hrs	0	0

Table 7.27 – Time willing to be travelled to visit a botanic garden

Question 11

The lecturers expressed a strong preference to use a botanic garden in May and October, although March and April were also popular months and, as with the other academic surveys, August and January were the least popular months (Figure 7.7).

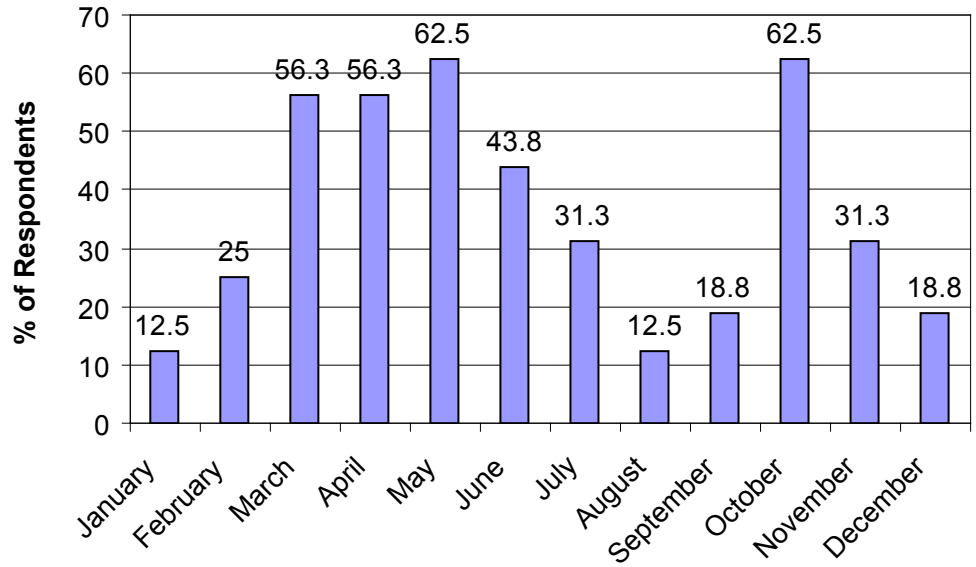


Figure 7.7 – Preferred month(s) for taking a trip to a botanic garden

Question 10b

When asked whether they would use the facilities they described if they were located at Castle Cary, Somerset, 5 people ($^1/_3$) said they would, another 5 said they would not and the remaining $^1/_3$ did not answer the question.

7.6 Professionals Survey

56 people, representing 53 different companies replied to the questionnaire. The companies ranged from employing one person through to having thousands of employees. The average number of employees is 503 and the median 15, but due to the range of results these are not very useful representations of the data shown in Table 7.28.

No. of Employees	No. of Respondents
20000	1
2000	1
1200	1
600	1
400	1
300	1
100	3
80	2
60	2
50	2
48	2
40	1
38	1
37	1
35	1
30	1
20	2
18	2
12	2
11	2
10	2
9	2
8	2
5	3
4	1
2	3
1	8

Table 7.28 – Numbers of staff employed by companies that responded

Question 1

Respondents were asked to identify, from a list of thirteen organisms, which their companies survey. As can be seen in Table 7.29 the results show that trees, other plants (i.e. not grasses) and habitats are surveyed the most, followed by grasses. Mosses, lichen and fungi are surveyed the least.

Survey Topics	No. of Responses	% of Responses
Trees	47	92.2
Other Plants	47	92.2
Habitats	47	92.2
Grasses	44	86.3
Birds	41	80.4
Small Mammals	38	74.5
Butterflies	35	68.6
Large Mammals	33	64.7
Reptiles	33	64.7
Other Insects	28	54.9
Mosses	23	45.1
Lichen	19	37.3
Fungi	17	33.3

Table 7.29 – Types of survey conducted by companies that responded

Question 2

If they did habitat surveys, they were then asked which of the following techniques they use (Table 7.30). The majority indicated that they conducted Phase 1 Habitat Surveys, which is a quick method of roughly classifying habitats that does not require very detailed plant knowledge, and National Vegetation Classification (NVC) surveys, which require greater plant identification skills. A large proportion of these people do other surveys as well as these two, a list of which can be found in Appendix 4 along with the other data from this survey.

Survey Techniques	No. of Responses	% of Responses
Phase 1 Habitat Survey, NVC and Other	22	40.7
Phase 1 Habitat Survey and NVC	15	27.8
NVC and Other	1	1.9
Just Phase 1 Habitat Survey	6	11.1
Just NVC	3	5.6
Just Other	7	13.0

Table 7.30 – Types of survey technique used by companies that responded

Question 4 & 5

The survey asked the person completing it to identify which, from a list of organisms, their employees need to be able to identify, and which their company offers identification training for. The results (Table 7.31) to both questions show similar patterns. Unfortunately, the question investigating whether identification training was offered for any of the groups did not include a nil option, and as a result, no distinction can be made between those that ticked no boxes because no training is offered and those that just failed to answer the question. The results do show that, with the exception of 'other plants', a lower percentage of companies provide training than require the employee to be able to identify that group.

	Total No. of Respondents	Fungi	Lichen	Mosses	Trees	Grasses	Other Plants
No. that need to be able to identify that group	47	13	13	22	46	43	47
% of respondents		27.7	27.7	46.8	97.9	91.5	100.0
No. that offer ID training for that group	27	5	4	7	22	24	27
% of respondents		18.5	14.8	25.9	81.5	88.9	100.0

Table 7.31 – Need for identification of various groups compared with training offered for identification

Question 5

Respondents were asked how often an employee of their company goes on a plant identification course. The results (Table 7.32) show that 30% go annually; another 30% go biennially whilst the majority of the remainder go less frequently than this.

Frequency of Course	No. of Responses	% of Responses
Never	6	13.6
Every Five Years	8	18.2
Every Three Years	6	13.6
Every Other Year	14	31.8
Once a Year	13	29.5
Twice a Year	3	6.8
More than Twice a Year	3	6.8

Table 7.32 – Frequency of staff attendance on a training course

Question 6

To ascertain where this training was being done question 6 of the survey asked the respondents to identify whether their training was carried out in-house, externally or both. The results (Table 7.33) show that while both is the most popular choice, almost a third of companies use only external trainers.

Answer	No.	%
Just In-house	6	12.0
Just External	14	28.0
Both	30	60.0
Did not Answer	8	-

Table 7.33 – Origin of identification training offered by the responding companies

Interestingly, when the number of employees of each company making a particular training choice is averaged and compared with the average employees of companies choosing other ways of training their staff, it can be seen (Table 7.34) that, on average, the higher the number of employees the more likely that company is to use external training rather than in-house or none at all.

Choice of Training	**No. selecting that option**	**Average No. of employees**
Just External	28	190
In-house and External	13	111
Just In-house	5	20
Neither	4	1

Table 7.34 – Comparison of origin of training with average number of employees

Question 7

Those respondents that use externally run courses for plant identification were asked to list which organisations run the courses they use and whether they were satisfied with them. 44 people responded saying they were happy with the course, no one responded to say they were not happy although 30 people did tick both yes and no, suggesting that there may be some uncertainty about their satisfaction. The suppliers of plant identification courses used by respondents are listed below.

Suppliers of plant identification courses used by respondents

FSC
IEEM
University of Bristol
AWTC (Association of Wildlife Trust Consultancies)
CEHEN
Kingcombe Centre, Dorset
Losehill
Surrey Wildlife Trust
Flora Locale
Nottinghamshire Biological & Geographical Records Centre
RSPB
Royal Horticultural Society
Lancaster University
English Nature
Wildlife Trusts
Countryside Training Services
University of Birmingham
DERC (Dorset Environmental Records Centre)

Question 8

Table 7.35 shows the reasons given for not attending more courses were spread fairly evenly across those given for them to choose, although staff not requesting them or not needing them ranked slightly higher than financial considerations such as cost and time. These followed by a much lower group of respondents who said that it was due to a lack of courses in their area or a lack of desirable topics being offered. Three topics were cited as not being available; these were fungal identification, rare arable plants, and vegetative sedges.

Reason for not attending more courses	No. of responses	% of respondents
Staff have not requested it	17	43.6
Ca not afford the of time	12	30.8
Ca not afford the cost of the courses	12	30.8
Staff do not need further training	13	33.3
No courses in your area	9	23.1
Topics you require not offered	6	15.4

Table 7.35 – Reasons for staff not attending more identification courses

Question 9b

The next section of the professionals survey dealt with how and whether the respondents would be interested in using plant identification courses if they were held at Castle Cary. 40 people (74%) said that they would consider using a course at Castle Cary while 14 (26%) said that they would not (Table 7.36).

Answer	No.	%
Yes	40	74.1
No	14	25.9
Both	5	-
Did not Answer	7	-

Table 7.36 – Response to whether they would attend courses held at Carymoor

Question 9b

The respondents were queried over their preferred duration of a course and indicated in their responses (Table 7.37) that they felt a half-day course was not worth-while and much prefer a one or two day course. Some respondents showed interest in longer courses, up to one week long.

Preferred Length of Course	No. of Responses	% of Responses
Half Day	0	0
Full Day	14	29.8
2 Days	18	38.3
3 Days	10	21.3
1 Week	7	14.9

Table 7.37 – Preferred duration of an identification course

Question 10

With regard which month or months they would prefer to attend courses, the results (Figure 7.8) show that respondents seemed to have no strong preference for any one particular month. The comments that accompanied the answers to this question reveal that while from a business point of view the respondents would prefer to attend courses in the winter months they are aware that the very reason that makes winter a slow period for them (i.e. the dormancy of many plants) also makes it impractical to offer courses at that time; so they resign themselves to having to attend courses during their busy work periods.

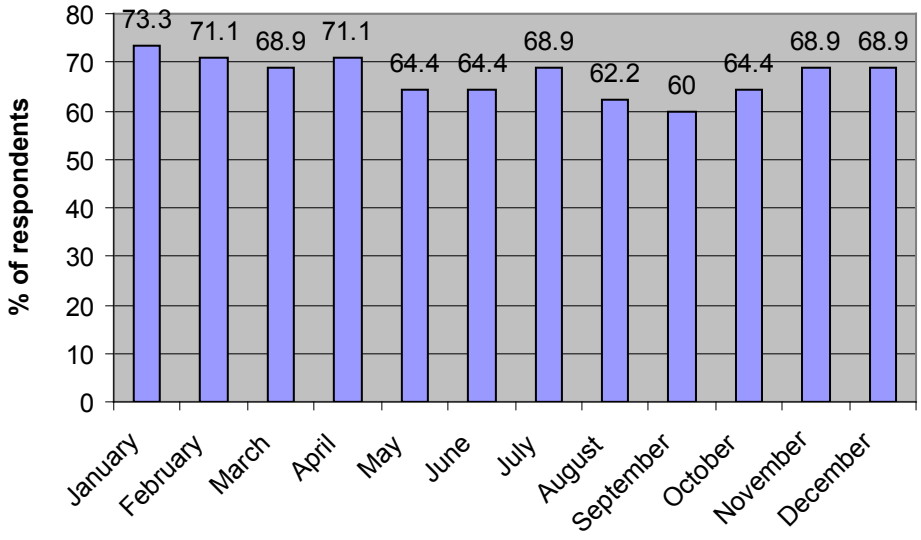


Figure 7.8 – Preferred month(s) for attending identification courses

Question 11a, b & c

The results to the last question showed that just under three-quarters of respondents (72%) had employed a university graduate in the last three years. Of these, 70% were not satisfied with the plant identification skills of that graduate and of those people that had not employed a graduate 29% gave poor plant identification skills as being their reason for not doing so.

7.7 Public Survey

The number of completed questionnaires obtained from the open day was disappointing and was not enough to provide a sample that would produce a meaningful set of data, however, the results are included here for the sake of completeness. The significantly lower response rate, compared with the other three groups, is probably due to the different methodology used to distribute the questionnaire rather than a disinterest in the project on behalf of the public. Dillman (2000) reports that the inclusion of a financial incentive with postal questionnaires increases the return rate. With the public survey there was little incentive for visitors to fill out the forms. Publicising that each complete form was eligible for inclusion in a prize draw, or alternatively employing someone to solicit the visitors to fill in the form may have remedied this.

13 people responded to this survey, their professions are shown in Table 7.38 below. It can be seen that of these 6 (46%) are professionally involved in education at various levels. This highlights that this sample cannot be considered a representative cross-section of the general public.

Profession	No.
Accountant	1
House Wife	1
Lecturer	1
Lecturer in Ecology/Botany	1
Pre-school Supervisor	1
Retired	2
School Assistant	1
Student	1
Teacher	2
Tourism Assistant	1
Volunteer Coordinator	1

Table 7.38 - Occupation of respondents

Question 1

The respondents were asked how frequently they visited gardens. As can be seen (Table 7.39) the most frequent choice was between two and five times a year.

Frequency of garden visits	No. of responses	% of responses
Less than once a year	1	7.7
Once a year	0	0.0
2-5 times a year	6	46.2
6-11 times a year	4	30.8
Once a month	2	15.4
Once a week	0	0.0

Table 7.39 – Frequency of garden visits

Question 2

They were asked what they enjoyed most about their last visit to a garden. The full transcript of their answers can be found in Appendix 4 but in general plant displays form a strong theme throughout the replies both for recreation and as an aid to the design of the visitors own garden.

Question 3a & 3b

Of those that responded three quarters of them said that they had visited a botanic garden before and gave the dates of their last visit as follows. As can be seen in Table 7.40 from these many had done so in the last two years but others had not been to a botanic garden in the last 10-13 years.

Year of last botanic garden visit	Month of last botanic garden visit
2001	May
2001	April
2001	May
2000	August
2000	February
2000	October
2000	July
1998	Unknown
1990	Unknown
1987	Unknown

Table 7.40 – Year and month of last visit to a botanic garden

Question 3c

These visits included trips to gardens such as Adelaide, Bristol, Cambridge, Chelsea, Kew, Ness, Oxford, Singapore, Wakehurst, the National Botanic Gardens of Wales, The Orchid Foundation in Jersey, and the Eden Project.

Question 4a & 4b

The next set of questions examined what the respondents expect from a botanic garden. The first looked at what courses they had taken and what they would like to take. Amongst the results, shown below in Table 7.41, are some unexpected results including the popularity of conservation and ecology courses as well as the low ranking of British plant identification and garden history.

	No. of responses that had taken a course	% of responses that had taken a course	No. of responses that would like to take a course	% of responses that would like to take a course	Combined total of responses	% of combined total
Wildflower Gardening	1	10	4	40	5	25
Garden Design	1	10	4	40	5	25
Conservation	2	20	2	20	4	20
Ecology	2	20	2	20	4	20
Photography	1	10	3	30	4	20
Botany	2	20	1	10	3	15
Organic Gardening	0	0	3	30	3	15
Grass ID	1	10	2	20	3	15
Botanical Illustration	0	0	2	20	2	10
Garden Plant ID	0	0	2	20	2	10
British Flower ID	1	10	1	10	2	10
Garden History	1	10	0	0	1	5
Flower Arranging	0	0	1	10	1	5
Lichen ID	0	0	1	10	1	5
Watercolour	0	0	0	0	0	0
Basket Weaving	0	0	0	0	0	0
Fern ID	0	0	0	0	0	0
Moss ID	0	0	0	0	0	0

Table 7.41 – Past attendance and desired future participation in plant related courses

Question 5

The respondents were asked to choose which services, from a list of seven, that they would like to be offered at a botanic garden. The result (Table 7.42) was that plant sales was the most popular choice. More surprising was that the sale of garden equipment was in second place and therefore more sought after than a restaurant, which comes third. This result may be an anomaly caused by the low sample rate of this survey.

Services	Total No. of responses	Total % of responses
Plant Sales	9	27.3
Garden Equipment sales	7	21.2
Restaurant	6	18.2
Book Sales	5	15.2
Souvenirs	3	9.1
Art Sales	2	6.1
Facilities for private functions	1	3

Table 7.42 – Preferences for services

Question 6

The respondents were asked to pick their top three preferred methods of displaying plants. Table 7.43 ranks the results in order of preference and indicates that plants displayed by habitat is the most popular choice followed by three methods that demonstrate how we use plants (medicinal, garden use and ethnobotanical). It was unexpected that conservation and bedding should not receive any votes as conservation is a topic that many people are now interested in, especially those that attend Carymoor's open days, and bedding display are popular features of many existing gardens that are much admired by the public when they visit.

Type of Display	Total No. of responses	Total % of responses
Habitat	7	21.2
Medicinal	6	18.2
Garden Use	5	15.2
Ethnobotanical	4	12.1
Families	3	9.1
Edible	3	9.1
Genetic	1	3
Adaptation	1	3
Plant Animal Interaction	1	3
Bedding	0	0
Conservation	0	0

Table 7.43 – Preferences for method of plant display

Question 7a

Question 7a asked the respondent how long they would be prepared to travel to visit a garden. Table 7.44 shows that 31% of respondents said they would be willing to travel two hours or more and 60% would travel for one-and-a-half hours or more to visit a garden.

Travelling Time	No. of responses	% of responses
10mins or less	0	0
11-30mins	2	15.4
1/2hr-1hr	0	0
1-1 1/2hrs	3	23.1
1 1/2hrs-2hrs	4	30.8
2-3hrs	2	15.4
More than 3hrs	2	15.4

Table 7.44 – Time willing to travel to visit a garden

Question 8a, b & 9a

As with all the other groups surveyed, the general public questionnaire asked the respondents whether they would use a botanic garden located at Castle Cary. 11 of the 13 people (92%) polled said they would. This was followed by two questions on admission, the first of which, asked the respondent to pick one admission scheme from a range of four (free admission for all, voluntary charge, no charge for schools, and finally a charge for everyone). No one opted for the "free for all" option. The majority chose an admission fee for everyone including schools, although the second most popular choice was the option that charged everyone but schools who entered for free. This was followed up with a question that asked those that believed that there should be a charge to name what they believed to be a fair price. Twelve people answered this question and their suggestions, when averaged, give an entrance fee of £2.35, although some did suggest much higher figures, as can be seen in the Table 7.45 below.

Admission Price	£1.00	£1.50	£2.00	£2.50	£3.00	£3.50	£4.00	£4.50	£5.00
Frequency	3	1	5	0	2	0	0	0	2

Table 7.45 – Results of the question asking respondents to set a fair price for admission

Question 9b

The final questions asked of the public were about volunteering. Three people (27%) expressed an interest in volunteering at a botanic garden in Castle Cary. They were then asked to select from a list which tasks they would be interested in doing. Two people answered this part of the question, both showing an interest in seed cleaning, one also expressed an interest in gardening whilst the other was interested in doing administration work.

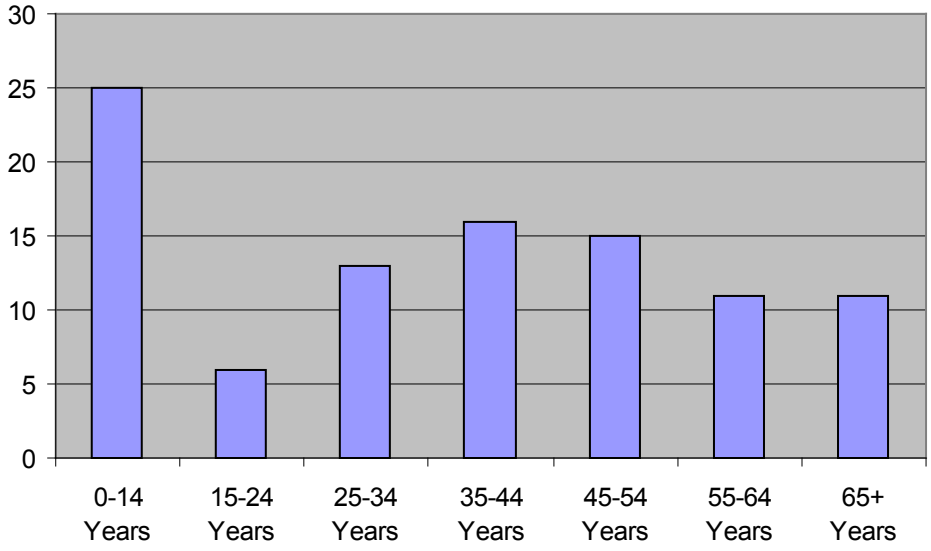
The public survey above lacked enough respondents to be considered a true representation of the public sector. However, information that may help build a profile of visitors is available from other sources, especially those dealing with tourism. For example, the '*Somerset Leisure Visitor Survey 1997*' (Somerset County Council 1998) indicates that, of the visitors that come to Somerset, 61% were staying away from home, 39% were day-trippers. Of those that are staying away from home, 27%

are from the South East, 20% West Midlands, 14% South West and 8% from abroad (5% Europe 3% rest of the world). The majority (77%) stay for 7 nights or less. The table and accompanying chart below (Table 7.46 & Figure 7.9) show the age distribution amongst the visitors. These would seem to suggest that most visitors fall into to the 35-54 categories and are probably accompanying children in the 0-14 category. The 15-24 age group is particularly underrepresented.

Age Group (Years)	0-14	15-24	25-34	35-44	45-54	55-64	65+
% of Visitors	25	6	13	16	15	11	11

Data from Somerset County Council (1998)

Table 7.46 – Age demographic of visitors to Somerset



Data from Somerset County Council (1998)

Figure 7.9 - Age demographic of visitors to Somerset

It was hoped that data gathered from a question in the public survey, which asked about their last visit to a botanic garden, could be used to evaluate the preferred time of year for this group to visit, but unfortunately the low numbers of respondents prevents this. Whilst this specific data may not be available from other sources, other surveys have recorded data about the preferred time for tourists to visit Somerset, which could be used as an indication as the more tourists there are the more people there are who may be interested in visiting a botanic garden. One example of a survey that recorded this information is '*Tourism in Somerset: The facts, Research and Intelligence Document*' (Somerset County Council 2001). This document gives the monthly bed occupancy rates for a range of different types of habitation on a month-by-month basis (see Table 7.47). The monthly figures for the different habitations can be averaged to give a figure that represents the overall monthly fluctuations in visitors to the county, the results of this process can be seen in Table 7.48.

	1-3 Rooms (%)	4-10 Rooms (%)	11-25 Rooms (%)	26+ Rooms (%)	Static/Chalet Units (%)	Holiday Homes (%)	Camping/ Touring (%)
January	17	36	22	26	1	34	0
February	16	32	24	37	3	42	0
March	19	34	28	47	18	40	1
April	28	40	38	45	40	65	17
May	39	42	48	45	52	77	23
June	39	50	51	54	70	82	23
July	48	56	51	57	71	86	49
August	50	55	55	60	96	89	69
September	43	50	57	53	89	85	29
October	30	42	40	49	53	60	16
November	23	33	31	42	33	35	16
December	19	25	25	24	20	28	0

(Adapted from Somerset County Council 2001)

Table 7.47 - Monthly bed occupancy rates for a range of different types of habitation in Somerset, given on a month-by-month basis

	Average % of Beds Occupied
January	19
February	22
March	27
April	39
May	47
June	53
July	60
August	68
September	58
October	41
November	30
December	20

Table 7.48 – Average monthly bed occupancy rates for a range of different types of habitation in Somerset, given on a month-by-month basis

7.8 Discussion of Survey Results

The aim of these surveys was to investigate four groups that had been identified as possible users of a botanic garden at Carymoor (schools, universities, professionals and the public) and establish if they were actually potential users, and if so, what they would expect to find, and how they would use the garden?

There are a set of issues regarding botanic garden use that are common to all four survey groups that can be compared. In addition to these each group has its own individual requirements. The common issues are; what method of plant display does each group prefer, how does each group want to use the garden, how far is each group willing to travel, and finally, what time of year would each group prefer to visit?

7.8.1 Preferred Methods of Plant Display

The questionnaires to schools, universities and the public all contained an identical question asking the respondents to indicate which method of plant display they would most like to see in a botanic garden. Table 7.49 shows how each group ranked each of the options given to them. Professionals were not asked this question because it was felt that, unlike the other three groups, their motivation for using a garden was focused solely on education in plant identification and therefore the botanic garden is acting as a supply of relevant plant material and a source of knowledge and that these requirements could be achieved without a specific plant display.

All three groups are unanimous in having habitat displays as the most desired method of plant display. It appears that two groups can be identified who do not share the same methods for choices for 2nd, 3rd & 4th place; group 1, consisting of the schools and universities, is interested in examining plant adaptation, classification, genetics and interactions with animals, whilst group 2, consisting of the public is more interested in their relationship with plants through medicinal or other ethnobotanical uses or through how they can be used in their own gardens. The public seem to have little interest in seeing plants of conservation importance, ranking it 11th, unlike the schools and universities who both rank it as their 5th most desirable display. It is also interesting to note that displaying plants by their families, a method that is considered by many to be outdated, still scores reasonably highly with the two groups, being ranked 3rd and 5th.

	Schools	Universities	Public
1st	Grouped by Habitat	Grouped by Habitat	Grouped by Habitat
2nd	Displays showing the adaptation & evolution of plants	Displays showing the adaptation & evolution of plants	Plants with Medicinal Uses
3rd	Grouped According to Families	Grouped According to Families	How Plants can be Used in the Garden
4th	Associations between plants & animals	Genetic Variation in Plants	Displays of how British plants have been used
5th	Plants of Conservation Importance	Plants of Conservation Importance	Grouped According to Families
6th	Genetic Variation in Plants	Displays of how British plants have been used	Edible Plants
7th	Edible Plants	Plants with Medicinal Uses	Genetic Variation in Plants
8th	Plants with Medicinal Uses	Edible Plants	Displays showing the adaptation & evolution of plants
9th	Displays of how British plants have been used	Associations between plants & animals	Associations between plants & animals
10th	How Plants can be Used in the Garden	Bedding Plant Displays	Bedding Plant Displays
11th	Other	How Plants can be Used in the Garden	Plants of Conservation Importance
12th	Bedding Plant Displays	Other	Other

Table 7.49 – Comparison of preferences for method of plant display between respondents from schools, universities and the public

7.8.2 Preferred Use of the Garden

Of the four groups, schools and universities were questioned on how much contact they wanted with staff and when. The question was not posed to the professionals group because the majority of their survey discusses plant identification courses and by indicating that they would be willing to attend a course at Carymoor it can be assumed that this course would follow the structure of similar courses run by other organisations, the requirements for which are already known. The public were not asked about their interactions with centre staff, instead their survey concentrated more on the sorts of facilities that they would expect to find.

The results reveal a distinct difference between the ways universities and schools prefer to run their trips. Schools are keen to make use of the gardens staff, the most popular option being that the garden-staff take an active role in the day. The second preference was for the teachers to attend a teacher-training day prior to the visit to prepare themselves. This contrasts with the preferences of the university lecturers, the majority of whom were happy to have no contact with the staff, instead allowing the students to do their own research.

7.8.3 Travel Preferences

In the teacher, university and public surveys a question was included that asked the respondent how far they would be willing to travel to visit a botanic garden. The results for each group can be manipulated to express the data as the percentage of visitors that would have travelled for a given amount of time; this is what Figure 7.10 shows. This method also allows the data to be read backwards off the graph so that a statement such as "75% of public visitors will have travelled for 70mins or less to get to the garden" can be made. What this statement means is that if you draw a circle, or isochron, around the garden with a radius equivalent to 70mins travel time, 75% of the visitors will have come from within this circle.

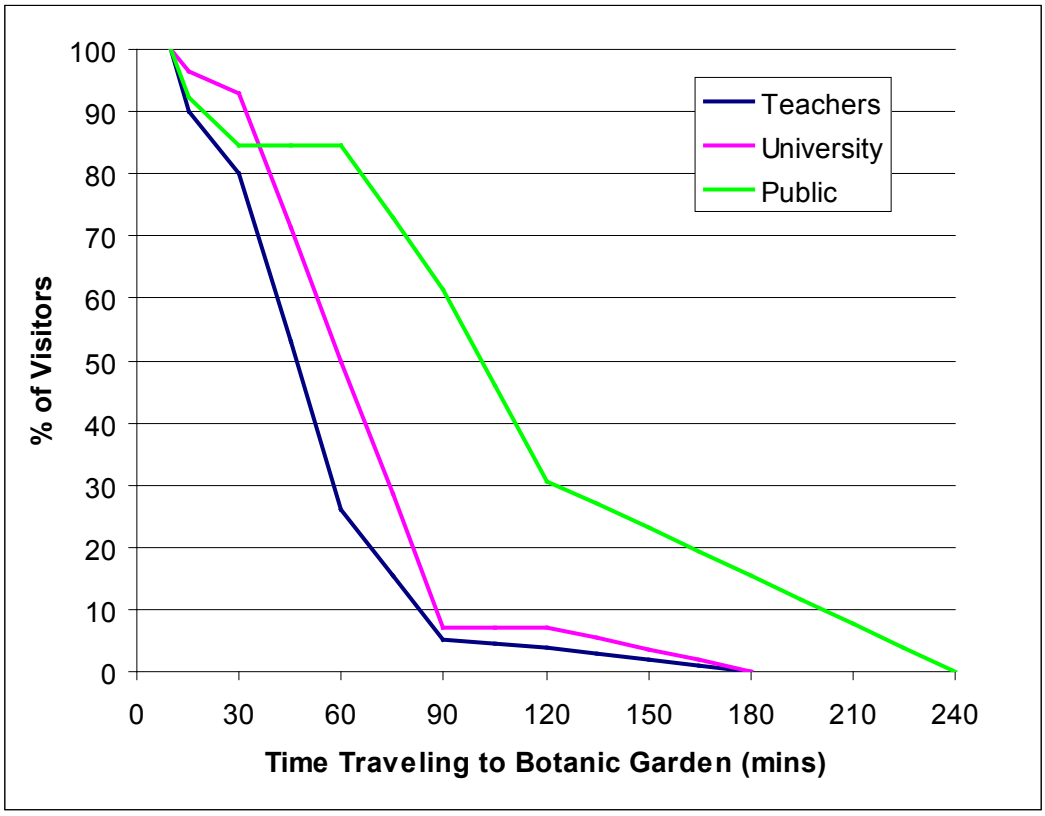


Figure 7.10 – Comparison of time willing to travel between respondents from schools, universities and the public

Using the graph above to create these statements for 100%, 75%, 50% & 0% for each of the three groups asked this question the circles of influence for each group can be compared. Figure 7.11 shows the results of this process. Straight away it can be seen that the outer limit of the public's circle of influence, the boundary beyond which people feel it takes to long to travel so do not visit, is much greater than that of universities and schools. Whilst the universities' outer limit is about the same as that of the schools, the schools' other boundaries are much smaller. For example, 50% of schools willing to use a botanic garden at Carymoor are within 45 minutes of the centre, whereas 50% of the universities willing to use the garden are with 60 minutes, equivalent to an extra 7½ miles.

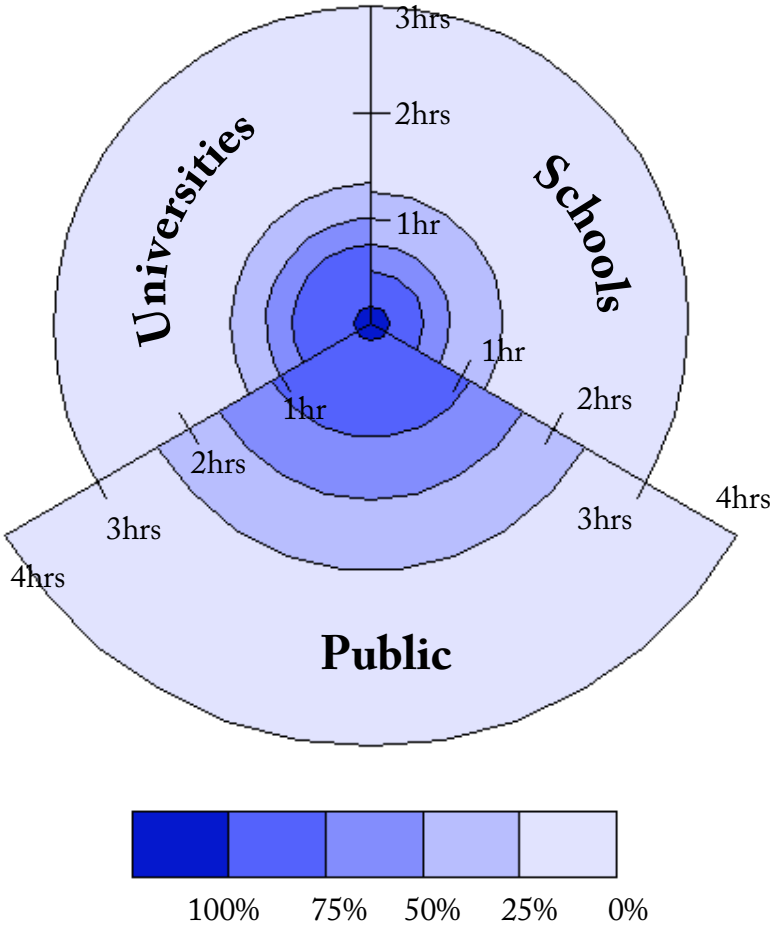


Figure 7.11 – Comparison of circles of influence for universities, schools and public visitors

7.8.4 Optimum Time of Year

Schools, universities and professionals were asked which months they would prefer to use a botanic garden. The results of these questions were converted to a percentage of the number of respondents to that question and are displayed in the graph below (Figure 7.12) along with the percentages calculated from the tourist bed occupation figures. Yet again, when the data for the groups are compared, it can be seen that schools and universities have similar preferences, while professionals have their own. It can also be seen that the winter months (November, December, January and February) are not popular choices; this is probably due to a combination of not wanting to be outside in bad weather and the Christmas holiday period. The summer holidays are almost certainly responsible for the sharp decline in the desire to use the garden the month of August. It is interesting to note that there is a difference between the responses of headteachers and their teachers, with many more headteachers than teachers preferring trips in May and teachers preferring to take autumn term trips in September whilst headteachers favour October.

These results show that, while schools and universities do not want to use a botanic garden for education during August, there is a rapid increase in the number of tourists staying in the area who may wish to make use of it for more recreational purposes.

The professionals results would suggest that there is a desire to use a botanic garden throughout the year but this may be misleading. The answers given in the survey, and in particular the additional comments added to this question by many respondents, suggest that the professionals would prefer to use a botanic garden during the winter months when their work load is less but begrudgingly understand that most plant identification courses rely on plant material that is only available during the summer months.

It is tempting to average the results to give an overall impression of how numbers would fluctuate throughout the year. However, the data only show how numbers will fluctuate within each group and, because it is not known what proportion of these would be interested in visiting a botanic garden, this is not possible

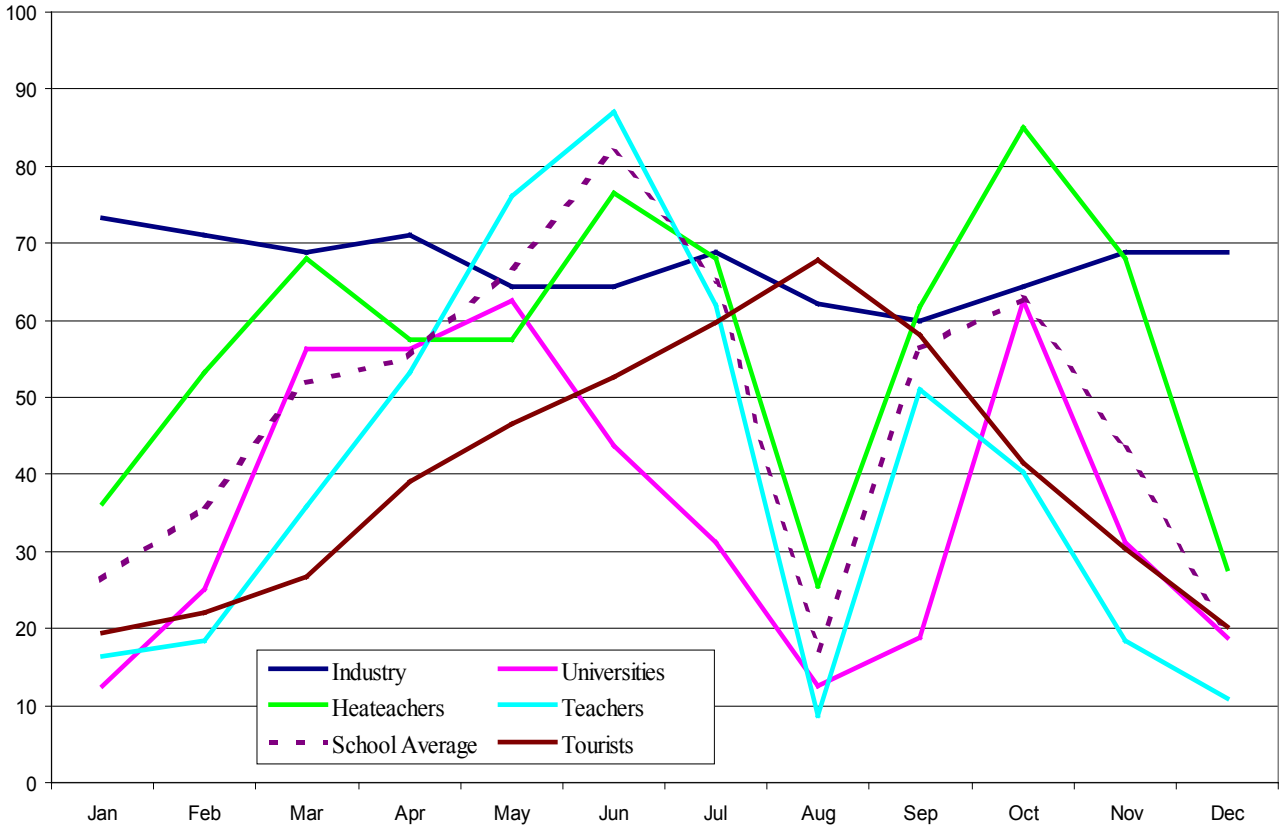


Figure 7.12 – Comparison of preferred months of visit for each group surveyed

7.8.5 The Individual Requirements of Each Group

Many respondents from each of the groups surveyed added additional comments to their survey forms. These were recorded along with the answers and can be found in the appendices containing the results for each group (Appendix 4). Interesting points raised in the comments are discussed in the following sections.

7.8.5.1 Schools

Of all the groups surveyed, schools were the only ones to express a need for good wheelchair/disabled access and plenty of shelter. They stated that it was a problem that had been encountered by them on other trips. A number of the surveys returned appear to have come from schools catering specifically for children with special needs and this probably explains why a point was made to highlight this. Two respondents expressed their desire to take a hands-on approach to using the garden. As has already been mentioned in the results section, one of the main reasons that schools do not take trips is financial. One of the teachers cited this and suggested that the botanic garden provide an outreach programme that would bring plants and an explainer into the classroom. Along similar lines, another teacher enquired as to whether the garden could provide plant material such as leaves from plants of different habitats. This issue of schools not being able to spare their staff for financial reasons was behind one comment that said that although they would like a teacher-training day it was not possible but perhaps the garden could provide written guides for the teachers to use.

7.8.5.2 Universities

The university comments do not highlight any areas not covered by the answers to the survey question.

7.8.5.3 Professionals

The professionals survey achieved the highest return rate of all the surveys, a result probably due almost entirely to the strong opinions expressed by the respondents to the last question on the survey, which solicited their opinion of graduate identification skills. This was conveyed in their comments that highlighted a lack of university training in plant identification, something universities themselves seem to be unaware of. The only other point, raised by three respondents, was a lack of identification course in aquatic and wetland plants.

7.8.5.4 General Public

The low response rate to surveys for this group means that only one suggestion was made and that was for a season ticket option for garden entrance

7.9 Ramifications for Botanical Collections

7.9.5.1 Professionals

For ecological professionals, their primary concern is that the collections are able to provide a comprehensive representation of the group on which the course is to be offered. Invariably the most popular courses will be those concentrating on groups of plants that are similar and difficult to distinguish, for example grasses or sedges. Holding a collection of this sort would require a high standard of botanical horticulture to ensure that the collection remains labelled correctly and that it does not become contaminated with hybrids. In addition to the horticultural/botanical staff, someone with the relevant botanical and educational skills would also be needed lead the course.

The feedback from the surveys shows that the professionals recognise that courses have to run at a time that fits in with the plants lifecycle, although there was a desire to have courses in the winter when they were less busy. If the collections could find a way of offering courses at this time, either by

growing plants out of season, in glasshouses, or perhaps utilising models or preserved specimens, a niche market could be found.

75% of professional respondents said they would use a collection if it offered the facilities they had described. Unlike the other groups surveyed, members of this group are used to travelling around the country to do the jobs they do. As a result they are willing to travel a greater distance to attend training courses. This means that the catchment area for this group is a lot larger. Responses saying that they would use a facility at Carymoor were received from companies in the following areas; Buckinghamshire, Wiltshire, Somerset, Cornwall, Gloucestershire, Cambridge, Worcestershire, Dorset, Oxfordshire, London, Derbyshire, West Midlands, Nottinghamshire, Sussex, Hertfordshire, Devon, South Wales. The minimum required length of any course being held for those from the ecological survey sector is a full day and more than 70% would prefer a two-day course or more. This means that in order to attract these stakeholders the botanical collection should either provide facilities for overnight stays or there should be adequate facilities available nearby.

The aim of the professionals' courses is to provide them with the skills to identify plants in the wild. It would therefore be advantageous to have examples of the plants growing naturally in the wild close to the botanic garden so they could be visited in addition to the work done at the botanic garden.

7.9.5.2 Universities

The responses from the universities showed that primarily they would like to see plants displayed in habitats but in addition to this they also had an interest in displays of adaptation and evolution as well as displays of plant families. Further questions established that their reluctance to use botanic gardens was due to a lack of facilities and a failure to cover topics needed for teaching ecology, plant identification and conservation. Instead they seem to be using nature reserves to fulfil these needs.

Both habitat and family displays require a certain level of botanical horticultural skill in order to ensure that the plants do not drift from one habitat to another and that the plants growing correspond to the labels.

Universities are relatively scarce. This combined with the fact that most already have some kind of botanical collection or are sited near to an existing botanic garden means that the desire to use facilities at the Carymoor site was low. However, as the results of the professionals survey showed, there is a lack of confidence in the plant identification skills of university graduates, which is resulting in their not being considered for many posts. This suggests that there is a niche market for someone offering a course aimed at university students. Whereas the professionals attending identification courses would require a very comprehensive collection of only a few genera, university students would require a much broader collection that would not necessarily need to be so comprehensive.

In general, universities seem to be happy to use a botanical collection without support from staff of the collection. This would reduce one of the more costly elements of using a collection for education. However, if courses were to be offered for students outside of those organised by the university someone with botanical and educational skills would be needed.

The preferred months of use by universities are March, April, May and October. Presumably because of the summer holidays, demand drops significantly in August and September. However, it is during this period that the summer schools that have been discussed would be run, which would help even out this trough.

7.9.5.3 Schools

As with universities, schools appear to be using nature reserves more than botanic gardens. In particular headteachers tend to believe that nature reserves are of greater use than botanic gardens. Research also showed that teachers are not asking headteachers if they can take trips to botanic gardens. It is difficult to determine why this is. It could just be that botanic gardens do not have good collections of British plants or it could also be a lack of large-scale habitats. As conservation is ranked by teachers much lower than habitat displays it could be assumed that the use of nature reserves is more likely because they are convenient examples of British habitats, rather than actually using them as examples of conservation practice. Schools want plants to be displayed in the same ways as universities. They want to see plants displayed primarily in habitats and then adaptation and evolution followed by families.

Schools have three main problems that prevent them from taking more trips. The first is that they feel pressured to complete the national curriculum and that visiting museums, botanic gardens etc. will detract from this. If they can justify taking a trip they then encounter problems with the cost of transport and paying staff to cover lessons as well as the availability of staff to supervise the trip. It may be possible to lighten the schools staffing requirements by providing 'classroom' assistants to keep an eye on the pupils and aid in the interpretation of the garden.

Unlike universities, the majority of teachers who replied stated that they wanted to have some sort of interaction with botanical collection staff, be this on a training day or having visits lead by them.

The middle of the week is the favoured time for schools to conduct trips. This suits a garden that is open to the public, as this avoids the weekends, which are the busiest days for visiting members of the public during term time.