

## Brooklyn Botanic Garden

New Interpretive Signage in

the Tropical Pavilion

Summative Evaluation



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# Table of Contents

Table of Contents.....	1
Executive Summary.....	3
Background.....	5
New Signage System.....	7
Purpose of Summative Evaluation.....	7
Method.....	8
Results and Discussion.....	9
Participant Characteristics.....	9
Signs’ Attracting and Holding Power.....	9
Observation: Introductory Panels.....	9
Time Spent.....	10
Overall Appeal.....	10
Effect on the Visitor Experience.....	12
BBG’s Central Message.....	14
Tropics’ Effect on Daily Life.....	16
Primary and Secondary Interpretive Themes.....	17
Themes visitors notice.....	17
Strongest Themes for Visitors.....	19
Themes Visitors Want to Know More About.....	20
A Memorable Experience.....	20
Conclusions and Implications.....	23
Overall, the new signage system succeeds in its goals.....	23
Visitors notice the signs, read them and remember content they find engaging.....	23
Signage conveys the primary Gardenwide theme, “Plants are essential to Life”.....	24
Signage conveys the Gardenwide subthemes effectively.....	24
The Tropical Pavilion signage affected the visitor experience positively.....	25
This approach may be effective at other locations in the Garden.....	26
Appendix A. Demographic Data.....	27
Appendix B. Visitor Interview Instrument.....	30

## **Executive Summary**

This report represents the results of a summative evaluation study of visitor response to new interpretive signage in the Brooklyn Botanic Garden's Tropical Pavilion. The evaluation aims to reveal the extent to which the new signage succeeds in providing the outcomes for the visitor experience identified in the Garden's Interpretive Master Plan (IMP). Visitors were interviewed study on January 21, 2008, several weeks after the signage was installed.

The installation of the Tropical Pavilion signage concludes a four-year institutionwide project, launched in 2004 with the support of a grant from the Institute of Museum and Library Services. While summative evaluation marks the end of the planning process, it heralds the beginning of a new phase as well: the new interpretive signage has been envisioned as a prototype to inform the subsequent implementation of the IMP throughout the Garden.

### **Project Goals:**

The IMP's overarching goal is: "to create interactions and experiences with visitors of all ages and backgrounds which are rich, enjoyable, personally relevant, and communicate the key message, 'Plants are essential to life.'" The following content goals were developed specifically for the Tropical Pavilion:

- Everything living in tropical areas is connected to each other and to you (Main theme)
- Things tropical rainforests provide for life in other areas of the world
- The importance of conserving a variety of plants in tropical areas
- How plants are used for food, medicine and shelter
- The role of plants in human cultures
- The Brooklyn Botanic Garden's work with plants

The installation's hierarchy of signage types aims to create interpretation that can reach audiences representing a variety of skill and ability levels, including visitors with a sustained relationship to BBG.

## Major Findings

Overall, the new signage system succeeds in its goals:

- Visitors notice the signs, read them and remember content that they find engaging.
  - Two thirds of respondents estimated that they had read at least half of the signs. Half of those respondents estimated that they had read almost all of them.
  - Results suggest that each of the existing themes holds interest for a particular segment of visitors. The topic that interested visitors most was plants' use in food, medicine and shelter (36%).
- The Tropical Pavilion signage affects the visitor experience positively.
  - The vast majority of respondents said the signs affected their experience (86%) and almost always positively. The most frequently cited effect was that the signs provided information they would not have known without them (61%). The second most prevalent effect was that the signs helped visitors focus on the plants (37%).
- The new signs effectively communicate the primary Gardenwide theme, “Plants are essential to Life” as well as the Gardenwide sub-themes:
  - The two most frequently mentioned central messages were 1) global dependence on the tropics and 2) origin of products we use. The need for conservation was the third most frequently cited central message, however the related idea—the necessity to conserve plant *diversity*—was not as strong for visitors.
  - Tropical plants' effect on daily life was a strong theme: more than 8 in 10 visitors (83%) said they saw information in the Pavilion about how tropical areas and their plants affect daily life.
- The Tropical Pavilion interpretation is achieving its goals for enhancing the visitor experience.
  - Some of the things visitors said they wanted to remember about their Pavilion visit fall in the affective realm: 1) the feeling of being in the tropics, the experience of peacefulness; and 2) the beauty of the plants, the esthetic experience of being in a tropical garden. This suggests that the interpretation is fostering affective experiences that have been identified as critical to fostering conservation awareness.

The success of this prototype suggests that the approach may be effective at other locations in the Garden.

## Background

In 2004 the Brooklyn Botanic Garden launched an institutionwide Interpretive Master Planning project supported by a grant from the Institute of Museum and Library Services. In Phase I of this project, the Garden's Interpretation Committee worked with a team of consultants—Main Street Design and Jane Clark Chermayeff Associates—to create an Interpretive Master Plan (IMP) to be used by the Garden as a comprehensive “‘road map’ of actionable steps.”

The IMP identified “Plants are essential to life” as the Garden's core interpretive message. Four Gardenwide themes were chosen to elaborate on this “big idea”: 1) plants are essential for their ecological services (clean air and water, healthy soil and contribution to climate); 2) for economic contributions of food, medicine and fiber for clothing and shelter; 3) for their role in human society and culture; and 4) that conservation and sustainable practices are vital to preserve plant diversity which enables life to flourish. In addition, Garden staff wanted visitors to understand BBG's role in research and conservation. The BBG overall project goal was described as: “to create interactions and experiences with visitors of all ages and backgrounds which are rich, enjoyable, personally relevant, and communicate the key message, ‘Plants are essential to life.’”

Toward the end of Phase I, BBG decided to create new interpretive signage in the Tropical Pavilion as a prototype for potential Gardenwide use. Front-end research, conducted in April 2006, provided exhibit planners with information about BBG visitors' expectations and interests in plants and the Garden experience. The research investigated visitors' reactions to the “the big idea” underlying all future interpretation, “Plants are essential to life” as well as the secondary themes cited above. Particular attention focused on specific issues relevant to the Tropical Pavilion in order to inform the prototyping phase of the IMP.

During Phase II of the project, Thinc Design worked with BBG staff to create a hierarchy of interpretive signs that 1) communicates the fundamental role tropical plants play in visitors' lives, and 2) conveys the core conservation concepts that drive the Garden's work. Because front-end audience research had suggested that the communication goals were a bit dry and impersonal, the messages were softened at this point but not changed significantly. The initial core interpretive message, “Plants are essential to life,” was further defined as “Plants are

essential to Life (Life with a capital ‘L,’); Life signifying the biosphere, where all living things rely on plants and plants rely on all living things.”

The new content goals were rephrased for the Tropical Pavilion prototype as follows:

Main theme

Everything living in tropical areas is connected to each other and to you

Secondary themes

Things tropical rainforests provide for life in other areas of the world

The importance of conserving a variety of plants in tropical areas

How plants are used for food, medicine and shelter

The role of plants in human cultures

The Brooklyn Botanic Garden’s work with plants

Prototypes of new signs installed temporarily in the Tropical Pavilion were tested to ensure 1) their appeal for visitors and 2) their ability to convey content goals. Lessons learned from formative evaluation were applied to subsequent phases of interpretation. Formative evaluation was done in two iterative sessions: first in October 2006 and again, building on those findings, in April 2007.

Signage in the Tropical Pavilion is meant to serve as a prototype for the IMP’s implementation. The interpretive content and strategies explored in this prototype may subsequently be implemented in each of BBG’s gardens, zones, areas and programs. The signage system tested in this prototype may be adapted when signs are developed for the other two pavilions in the Steinhardt Conservatory or for a new Visitor Center as well as for orientation and wayfinding signage throughout the Garden. The goal is to create interpretation that can reach audiences representing a variety of skill and ability levels, including visitors with a sustained relationship to BBG.

## **New Signage System**

The signage hierarchy developed for interpretation is as follows:

- Introductory panel located just inside the Pavilion doors, orients the visitor to the tropical rainforest and its plants and introduces the interpretive approach.
- Cluster/group labels introduce larger concepts, such as pollination and the water cycle, and emphasize plant relationships.
- Focus ID labels feature specific plants and stories about them. They are conceived as interactive, 3-sided devices that visitors turn for more information.
- Fun facts about individual plants that visitors can read quickly.
- “Point out” labels with no content designed to guide the visitor’s eye toward specific plants.

## **Purpose of Summative Evaluation**

Summative evaluation aims to use indicators to reveal the extent to which the new signage succeeds in providing the desired outcomes for the visitor experience in the Garden. Specifically,

- Do visitors notice and read the new signs? Can they remember something from the text? Do they find the signs engaging?
- Do they come away with some sense of the overarching theme, “Plants are essential to life”?
- Does the signage convey the subtopics and their relevance to tropical plants? Which of the topics has the strongest appeal?

To find out, exit interviews with visitors to the Tropical Pavilion were conducted on Monday January 21, 2008.

## Method

The Martin Luther King, Jr. birthday holiday was selected because of the likelihood that a large number of visitors would be coming to the Garden for programs or leisure activities as schools and many offices were closed. This proved to be true: there was a constant flow of visitors in the Pavilion from just before 11:00 am until 4:00 pm.

A continuous random sampling method was used: a data collector stood near the entrance to the Tropical Pavilion and asked the first adult visitor who approached for an interview after he or she had finished viewing the Tropical Pavilion. This “cued” approach was selected because visitors who know they will be questioned after experiencing an exhibition typically provide better feedback than those who are approached when they exit. Because visitation is low during the winter months and “time was of the essence” for this summative evaluation, we needed to collect as much pertinent data as possible on this one day; therefore we decided against relying on the good will of exiting visitors and what they might have remembered.

Each visitor who accepted the invitation to participate was given a card and told to return it to the data collector when leaving the Pavilion in order to be directed to one of the interviewers. The data collector wrote the time (without “:” so it would be less recognizable) the visitor entered the Pavilion and the time when the visitor finished. The time visitors spent in the Pavilion was recorded on the interview form. Refusals were also noted.

The introductory panel had originally been slated for the wall outside the Pavilion. During formative evaluation it was determined that visitors were not stopping to read a label in that location. Because the position of this label was significantly changed—it was moved inside the Pavilion—we decided to measure the extent to which visitors noticed and read it. (Other classes of signage were not moved after formative evaluation, thus there appeared no need to re-examine their appeal to visitors.) A data collector stationed at the entrance observed and noted the number of visitors entering the Pavilion and the number who stopped to read the introductory panel.

All but a few of the cued visitors returned the card and sat down to be interviewed. The evaluators and three interviewers trained by them conducted the interviews.



## **Results and Discussion**

Participation rate was high—83%—and refusals were due mostly to lack of time (visitors wanted to attend a BBG program) or language (non-English speakers).

### ***Participant Characteristics***

Although no effort was made to stratify the interview sample, in effect, it mirrors a snapshot of BBG visitors as outlined in a “Report to the NY Department of Cultural Affairs,” describing the Garden’s core audience in the 2005 BBG Master Plan. The report found that most BBG visitors are Brooklyn residents; the interview sample includes 77% Brooklyn residents. The report found that 66% of BBG visitors are female; the interview sample is 61% female. The report states that 1 in 4 visitors come with children under 18; the interview sample includes 1 in 5 visitors (22%) with children younger than 18 years old. The report noted that 36% of BBG visitors visit 5 times per year; among the interview sample 31% visited the Tropical Pavilion within the past year. (See Appendix A for detailed demographic data.)

Regarding environmental activism, roughly half the respondents described themselves as “active” (46%) and slightly more as “sympathetic but not active” (54%).

### ***Signs’ Attracting and Holding Power***

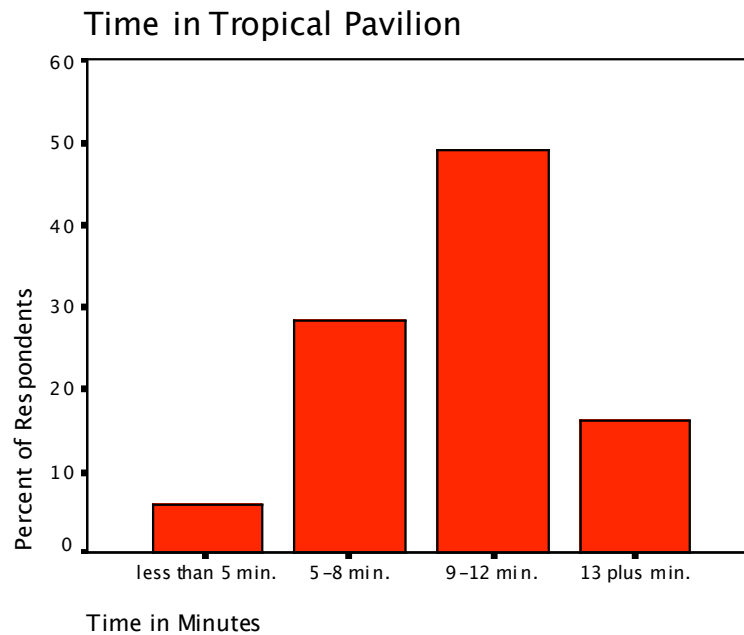
#### **Observation: Introductory Panels**

Some 20% (23) of the 113 people who entered the Tropical Pavilion between 11:00 am and 2:00 pm stopped to look at the Introductory Panels and read part of the information there. This orientation is divided into two separate panels. The first panel, headed “Tropical Rainforests,” features a map of the world showing the regions around the equator where tropical rainforests are located. It includes information about climate, such as average rainfall and temperature. The second panel, headed “Layers of the Rainforest,” focuses on competition among rainforest plants for sunlight. Anecdotal evidence suggests that the second panel has more appeal for visitors. While visitors’ attention to the two panels was not formally measured, data collectors reported observing that more people stopped and pointed to this panel than the other. Supporting evidence can be found in the interviews where visitors quoted the sign’s information about plants’ competition for sunlight.

## Time Spent

Interviewees' time in the Pavilion ranged from 2 minutes to 40 minutes, averaging 10 minutes. Half the respondents spent between 9 and 12 minutes in the Pavilion. Figure 1 illustrates time distribution.

Figure 1.



## Overall Appeal

Respondents self-reported the number of signs they read, as illustrated in table 1.

Table 1. About how many signs did you read?

	Frequency N=72	Percent
All or most of them	24	33
About half	25	35
Just a few	23	32

Interestingly, the number of signs visitors read fell into three almost equal sections and did not depend on the amount of time they spent in the Pavilion.

We asked respondents to think about other botanical gardens they had visited, whether within BBG or other venues, and compare the signs in the Tropical Pavilion to the signs in the other gardens. We asked them to compare the signs with respect to how interesting they were, how esthetically pleasing and whether they seemed to be mainly for adults, mainly for children or for both adults and children. Results follow in tables 2, 3 and 4.

Table 2. Compared to signs in other gardens, the Tropical Pavilion signs are...

	Frequency N=69	Percent*
More interesting	43	62
Less interesting	3	4
About the same	23	33

\*Percents add up to <100 due to rounding.

Table 3. Compared to signs in other gardens, the Tropical Pavilion signs are...

	Frequency N=69	Percent*
More esthetically pleasing	31	45
Less esthetically pleasing	8	12
About the same	30	44

\* Percents add up to >100 due to rounding.

Table 4. Compared to signs in other gardens, the Tropical Pavilion signs are...

	Frequency N=69	Percent
Mainly for children	4	6
Mainly for adults	16	24
For children and adults	47	70

Many visitors spoke highly of the round orange signs placed in among the plants to make identification easier than do the black botanical IDs. A young woman noted, “The orange cards are wonderful. Better than the black signs in the dirt. A few more would be nice.”

The majority of visitors (65%) noticed the 3-sided signs that can be turned to encourage visitor interaction. Of the 46 respondents who said they noticed these signs, almost all turned one or more (85%). This is a vast increase over the findings from formative evaluation, where few visitors noticed or turned the prototypes. Ten of the 46 respondents who noticed the signs were with children and all 10 of these people turned the signs.

The bromeliad sign was the three-sided sign remembered most frequently, followed closely by cacao (chocolate) and vanilla. A number of people said they read a 3-sided sign but did not remember the topic; a few of these described them as “first on the left when you enter” or “first on the right.” Bromeliad was sometimes referred to as “the one about catching water” and cycad as “the common rainforest plant that is being removed.”

Table 5. Relative Appeal of 3-sided Signs

Bromeliad	Cacao	Vanilla	Cycad	Mahogany
15	14	12	4	2

### Effect on the Visitor Experience

The vast majority of respondents said the signs affected their experience (86%). All of these respondents were able to say, in their own words, a way that the signs affected their experience; 10 people cited more than one way their experience was affected. The most frequently cited effect was that the signs provided information the visitors would not have had without them (61%). The second most prevalent effect was that the signs helped visitors focus on the plants (37%). Five respondents had generally positive comments about the signs’ effects and one person said they were easy to read.

Not surprisingly, visitors who reported reading more signs were significantly more likely to perceive the new signs as having an effect on their experience. Of the people who thought the signs affected their experience, 36.1% read all or most of them and 37.7% read about half. Of the people who said the signs did not affect their experience, 10% read all or most of them and 10% read about half.

The following quotes from the interviews illustrate the findings about the signs’ effect on the visitor experience.

#### Provided more information

*You get to learn more. The print is larger and they are higher up. They are better written. (F 35-59)*

*It’s interesting to find out where plants come from; it added context to how plants fit in the ecosystem. (M 18-34)*

*It's nice to see familiar plants and the relationship between animals and plants. (F 35-59)*

*My kids asked questions, the signs illustrate the answers and were interesting to read. And they have pictures. (M 35-59)*

*I grew up with these plants in the tropics so it's good to learn about them. (F 60+)*

*It made me aware of different things in our lives that come from plants. (F 60+)*

#### Encouraged focus

*I might not have looked at the plants without the signs, like [the word] "vanilla" being right there. (M 18-34)*

*They drew my eye to things, made me focus. (F 35-59)*

*Positive – the orange signs were very effective. They caught my eye and were not juvenile. (F 35-59)*

*I looked more closely at things that seemed interesting. Like the coffee, I read that, and then I looked at the coffee bean. (F 18-34)*

*I paid more attention, after seeing the signs, to really look at the plants. It's not just walking around. (F 35-59)*

Only 8 people, (11% of respondents) cited any negative effects, and these comments were usually combined with positive considerations.

#### Negative comments

*I didn't like the round signs that said the name of the plant— too intrusive. Visually kind of screaming at you. For labels, I like the little square black ones, even though the placement can at times be a little confusing. But I think it is good to have the informational ecological signs - great! I didn't read them 'cause I usually find [as a biologist] that I already know what's in them. (M 18-34)*

*Overall they detracted from the nature feeling, pristine feeling - though also it's nice to know what you're looking at, plus more information is a good balance. (M 18-34)*

*They informed me, but I want bigger signs with bigger text and more relevant detail. (F35-59)*

## **BBG's Central Message**

BBG's Interpretive Master Plan cites "Plants are essential to Life" as the Central interpretive message the Garden should convey to visitors. The message was modified slightly in the Tropical Pavilion as, "Everything living in tropical areas is connected to each other and to you." Do visitors perceive a central message in the Tropical Pavilion, and if so, what is it?

The majority of visitors (70%) say yes, the Pavilion does have a central message. Everyone who thought there was a central message was able to formulate it in his or her own words; 13 people's responses folded in two or even three main ideas. Table 6 illustrates visitors' ideas about the Central Message by category.

Table 6 Tropical Pavilion's Central Message

<b>Central Message</b>	<b>Frequency N=50</b>	<b>Percent*</b>
Global dependence on the tropics	21	42
Origin of products we use	18	36
Conservation, preservation	13	26
Interdependence of life within the tropics	7	14
About the rainforest, tropical plants (general)	9	18
Other	3	6

\*Percents add up to >100 due to multiple responses.

The two most frequently mentioned central messages, global dependence on the tropics and origin of products we use, are interrelated in visitors' comments. The interdependence of life within the tropics was noted, but less frequently as the overarching theme. The need for conservation was the third most frequently cited central message; however, the related idea—the necessity to conserve plant *diversity*—was not as strong for visitors. Respondents who said they read all or most of the signs were more likely to say the central message is global dependence on the tropics. When asked where they had seen that in the signs, respondents were usually able to describe the sign or its content. The results indicate that the sign concluding the exhibit attracted visitors and conveyed its message effectively.

The following quotes are grouped by topic as much as possible; the sign(s) where the respondent saw the message follows in brackets.

### Global dependence on the tropics

*The importance of what happens in tropical gardens. All the water we drink comes from the rainforest. [In right hand corner when you enter.] (F 35-59)*

*How central tropical plants are to human life. [All along the exhibit; the sign that concludes the exhibit especially.] (M 18-34)*

*The importance of the rainforest and how we're still discovering it. [2nd half of exhibit after banana tree and vanilla.] (M 35-59)*

*Focused on how tropical forests are useful to us and within that, why it's important to preserve them. [Lots of signs about different plants we can use.] (M 18-34)*

### Origin of products we use

*[The rainforest] exists in our daily lives as products. [Cola, cocoa processing in S. America and Africa] (M 18-34)*

*Plants as part of human life. [Signs on trees] (F 35-59)*

*Understanding the rainforest and things we get from it. In general, humans' interaction. Vanilla and cacao—food plants. (M 18-34)*

*That this is our world, and we should appreciate our world. This is out there to try to connect to everyday familiar plants and show where they come from. [Overall—coffee, cola signs.] (M 18-34)*

When visitors speak about diversity in this context, it refers more to abundance than the need to conserve to protect diversity (see comments below).

*[The message is] pointing out diversity of tropical plants, and ties this in to human consumption, how we use them. [Diversity, a general sense from the number of plants pointed out] (M 35-59)*

*[Have] more appreciation of plant variety and the trees that produce things you eat.[Cacao and banana trees] (M 18-34)*

### Conservation, preservation and the importance of plant diversity

*Biological diversity, conservancy. A general impression I got from descriptions. I expected it whenever I visit these places. (M 35-59)*

*A conservation message (it could be strengthened). [Mahogany harvesting and the beginning overview] (F 18-34)*

*The essential importance of preserving the ecosystem. [Mentioned throughout exhibit] (F 35-59)*

*Biodiversity, interdependence—I saw more than one sign about that. [By the bridge over the water.] (F 18-34)*

*The message is preserving nature; keep it in its original shape, saving it. [They talk about] the water and nutrient cycle and also a lot about interdependence, like the carbohydrates in fruit. [Mentions various signs.] (F 35-59)*

About the rainforest, (general), like “being there”

*It's a good introduction to what you would see if you were there— "Aha, that's what a banana tree looks like." For those of us who come from there, it's a feeling of warmth and home, like going into your bedroom and seeing your own stuff. (F 60+)*

*The tropical area shows the complexity of tropical nature; the fact that it is very full gives you the feeling that it is very profuse. [From the many plants] (F 35-59)*

*Good for children to open their minds to what tropical life is like. [Throughout] (F 60+)*

*The fact that there is so much in the rainforest to see. This was perhaps communicated by the variety of plants, but the new signs may have highlighted this concept by making it more accessible. (F 35-59)*

**Tropics’ Effect on Daily Life**

Tropical plants’ effect on daily life was a strong theme, voiced by more than 1 in 3 interviewees as the Central Message. When asked specifically if they noticed this topic in the signage, more than 8 in 10 visitors (83%) said they saw information in the Pavilion about how tropical areas and their plants affect their daily life. The effects on daily life were cited in respondents’ own words and categorized as illustrated in table 7.

Table 7 Tropical Areas and their Plants Affect Daily Life

<b>Effects on Daily Life</b>	<b>Frequency N=55</b>	<b>Percent*</b>
Food	44	80
Clean Water	21	38
Medicine	10	18
Air/oxygen	8	15
Shelter, furniture (mahogany)	4	7
Climate	1	2
Other	13	24

\* Percents add up to >100 due to multiple responses.

Among respondents who said the tropics affect their daily life, the top answer to how they affect it was food (80%) followed by clean water (38%), medicine (18%) and air/oxygen (15%). This rate of response generally reflects the amount of emphasis the topic was given in the signage: signs focusing on plants that supply food were more abundant than other topics, hence were noticed more often by visitors. In addition, plant food sources such as chocolate, coffee and fruits (banana, papaya, etc.) have personal relevance to visitors and thus are more likely to be read and remembered.



Some 39% (28 of 72) of those interviewed cited at least one effect on daily life related to the global ecosystem (climate, air/oxygen, and/or clean water). While this 39% is lower than the percent of visitors who cited the impact of tropical food and other products on daily life, it is double the percent (19% or 20 of 103) who, when asked a similar question in the front end evaluation study, mentioned the tropics' effect on the atmosphere.<sup>1</sup> This dramatic increase is even more impressive when one considers that responses in the “other” category cited above include ecosystem effects at an even further remove from things commonly thought to impact daily life, such as the carbon, nutrient and water cycles, pollution and decomposition.

Several visitors specifically mentioned “the sign at the end”—“How Do Tropical Rainforests Affect Your Life?” While we did not count visitors who stopped to read this sign, interview responses quoting the text almost verbatim indicate that a high percentage of visitors read it.

### ***Primary and Secondary Interpretive Themes***

To find out the extent to which the primary theme and the subthemes highlighted in the revised version of BBG's Interpretive Master Plan came across to visitors we first showed each respondent a card listing these themes and asked if he or she noticed anything about them in Pavilion signs. Figure 2 on page 13 below lists the topics in order of their relative strength for visitors. If the interviewee said she saw this topic, interviewers asked where she saw it. While a number of visitors could not recall a specific sign, still many of them could recall and identify where, approximately, in the Pavilion he or she had seen the topic mentioned.

### **Themes visitors notice**

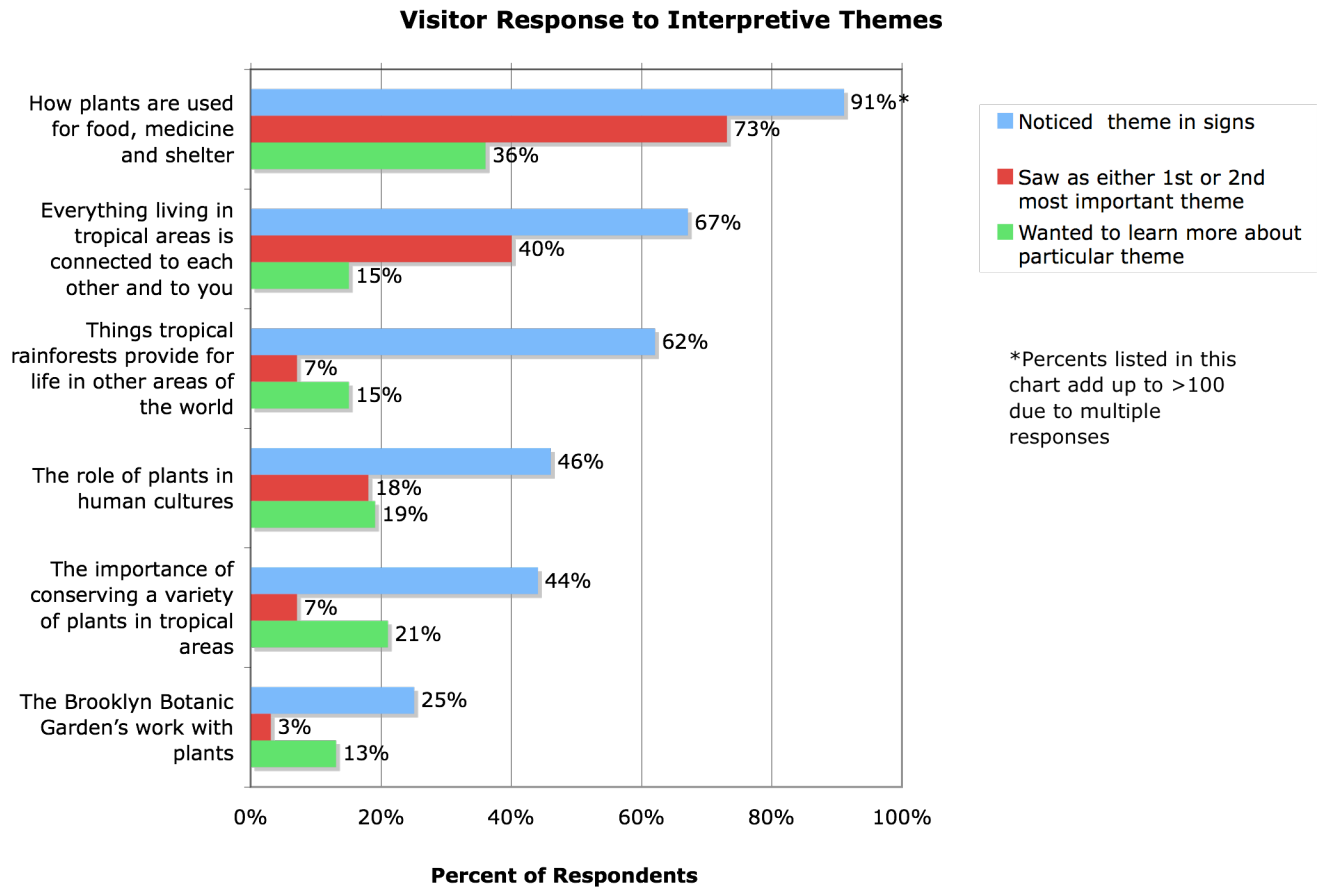
Clearly, the strongest theme visitors take away is the one that relates to plants' economic value—their use in food, medicine and shelter (noticed by 9 in 10 visitors). Some 2 in 3 visitors saw in the signs the topic that comes closest to the IMP's modified overarching theme, “Everything in tropical areas is connected to each other and to you.” The third theme listed above, “Things tropical rainforests provide for life in other parts of the world,” was meant to refer to ecological services plants provide—“things” such as climate, air and fresh water—but the simplified

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<sup>1</sup> Ellen Giusti and Kathleen Condon, *Brooklyn Botanic Garden Interpretive Master Plan Project, Phase I Front-end Visitor Study*, June 2006. While this increase might be due in part to the public's growing awareness of climate change issues, it is quite likely that the new Tropical Pavilion signage played a significant role in visitors' increased interest in the tropics' effect on the atmosphere.

wording led people to think instead of food and medicine and the like. This led to visitors conflating this third theme with the first to some extent, and to seeing the primary theme—“Everything living in tropical areas is connected to each other and to you”— as relating more specifically to ecosystem issues.

Figure 2



Just under half the respondents said they saw two of the other topics featured in the signage: the role of plants in human cultures (46%) and the importance of conserving a variety of plants in tropical areas (44%). Conservation and biodiversity, the more abstract themes, were included in fewer signs, and where they were referenced, the signs tended to be more text heavy. The BBG’s work with plants caught the attention of just 1 in 4 visitors. Some visitors who said they saw this theme said it was apparent in the care they recognized in the plantings themselves and not necessarily something they read in the signs.

When asked where they saw information about the 6 interpretive themes, visitors could recall many of the signs about plants used in food and medicine. Although there was no sign that referred specifically to shelter, furniture made from the mahogany tree could fall under the shelter rubric: the mahogany story was mentioned by a number of visitors. As noted above, the concluding sign—how the rainforest affects our everyday life—was referenced in a number of interviews. Conservation is a powerful message for visitors and resonated with many of them. In addition to seeing this in the mahogany label, a few people recalled the cycad story, how one of the rainforest’s most ancient plants is threatened with extinction due to human activity. Many visitors cited the importance of preserving the rich abundance that tropical plants provide.

As for plants’ role in human cultures, some visitors recalled the story of the African cola tree planted for newborn babies. Cacao/chocolate told another cultural story: A young woman mentioned, “Chocolate is important spiritually and culturally.” A few interviewees recalled the story of how Thomas Jefferson brought vanilla to America.

Regarding BBG’s work with plants, in addition to admiring the horticultural success involved in producing and maintaining the tropical garden, several visitors were fascinated by some of the more arcane facts in the label text. A few people mentioned the signs about pollination, particularly hand pollination of the vanilla plant and the research about the “certain bee” that pollinates a particular orchid. One visitor was interested in the Garden’s research on chloroplasts and DNA.

### **Strongest Themes for Visitors**

We asked respondents which theme came across strongest for them: 62% cited economic benefits (food and medicine) and 22% cited the interconnectedness theme. Citations of the other four themes as *most* important were negligible. We next asked visitors if they saw another theme on the list that came across almost as strongly. Combined responses for the first and/or second most important themes stressed in the signs are depicted in figure 2 on page 13 above. Some 3 in 4 respondents (73%) mentioned economic benefits as either the first or the second most important theme, 40% said the interconnectedness theme was either first or second strongest. The role of plants in human cultures emerged here as the third most important theme with 18% of visitors citing it, primarily as the second most important rather than the first.

## Themes Visitors Want to Know More About

The final question relating to Gardenwide themes asked if visitors would like to know more about any of the topics and if so, which one. Some 8 in 10 visitors said they would like to know more. The percentages of interest in each of the themes varied between 13%-36%, and are noted in figure 2. These results suggest that each of the existing themes holds significant interest for a particular segment of visitors. Again, the topic that visitors were most interested in learning more about was plants' use in food, medicine and shelter (36%). This was followed by the importance of conserving a variety of plants (21%) and the role of plants in human cultures (19%).

Citing “BBG’s work with plants” is ambiguous for visitors, needing clarification of whether we refer to horticulture or botanical research. It is certainly not a topic that would excite the average visitor; however, the fact that 25% of the respondents noticed the topic in the Tropical Pavilion and 13% wanted to know more about it probably reflects the interests of the Garden’s frequent and most knowledgeable visitors.

### ***A Memorable Experience***

The final content-driven question was completely open-ended, asking visitors to reflect on their experience in the tropical garden and complete the sentence, “I would like to remember....”

Virtually all the respondents (68 individuals) were able to cite something (in some cases, more than one idea) that they found memorable. Responses were grouped in categories for quantitative analysis (see table 8).

Table 8. Memorable Experiences

	<b>Frequency N=68</b>	<b>Percent*</b>
Origin of products we use	16	24
Plant names and what they look like (identification)	10	15
Feelings, experience, peacefulness	10	15
Beauty, esthetics	9	13
Global dependence on tropics	6	9
About tropics, rainforest plants (general)	6	9
Interesting factoid	6	9
Interdependence of life in tropics	4	6
Conservation, preservation	3	4
Other	5	7

\* Percents add up to >100 due to multiple responses.

People were fascinated to learn the origins of products they use every day. Since the majority of visitors are from Brooklyn, it is understandable that they have never seen a coffee plant, though they drink coffee daily, or a cacao plant that yields chocolate. The second most memorable topic for visitors was learning the names and how to identify both familiar and exotic plants.

### Origin of products

*I would like to remember the natural state of more processed things we eat. Compare pepper and chocolate [plants] with the final product. The vanilla [plant] doesn't smell like vanilla: after processing it becomes how we know it. (M 18-34)*

*...the group of food plants that entered our culture at the time of discovery of America. (F 18-34)*

*...how tropical plants are used for food, medicine and shelter in different cultures. (F 35-59)*

*...the role of plants in everyday life. We consume the end products. It's interesting to see where they come from and realize how important they are. I saw that kids were interested. (F 18-34)*

### Plant identification

*I would like to remember the scientific names of the plants. (M 18-34)*

*...to identify those plants if I saw them myself outside [in the wild]. (F 18-34)*

*...the names of the flowers hanging from the trees. (F 18-34)*

*...mostly the exotic plants. I would like to remember their image. I would like to have taken pictures of them. (M 18-34)*

The first two items that visitors want to remember fall into the cognitive realm. The next two citations are in the affective realm: 1) visitors want to remember the feeling of being in the tropics (particularly Caribbean-born visitors), the experience and the peacefulness of the garden; and 2) visitors want to remember the beauty of the plants, the esthetic experience of being in a tropical garden. These responses call to mind the background audience research (front-end) where visitors pointed out that they wanted both kinds of experiences at BBG. Visitors want to learn about plants but the urge to find “an oasis in the city” is a powerful draw for BBG visitors.

### Feelings, experiences, associations

*I would like to remember what a lot of plants look like. The lobster claw and the Vanuatu Palm make me remember other experiences in my life, like the time I spent in Polynesia, I was really impressed how big banana trees are here. (M 18-34)*

*...the peacefulness of it (rare in NYC). (F 18-34)*

*...for my mind it's really peaceful, and it's good to escape in your mind. (F 35-59)*

### Beauty, esthetics

*I want to remember the triangular palm tree. The sign explained that this palm was triangular. It was beautiful—before I thought that all [palm trees] were round like the ones we see in Florida. (F 60+)*

*...the visual esthetic. (M 18-34)*

*...the beauty of the mahogany and banana plants. (F 35-59)*

A number of visitors came away with notions of interdependence, both global and within the rainforest ecosystem. In visitors' minds, these topics often conflate the need for conservation and the preservation of plant diversity.

### Global dependence on tropics

*I want to remember the beauty and diversity of the tropical forest and how critical it is to the world. (F 35-59)*

*...the importance of tropical vegetation to human life on earth. (F 35-59)*

*...my day at the garden with the different plants and how rainforest relates to humans. (M 60+)*

### Interdependence and diversity of life in the tropics

*I want to remember how insects, animals and plants become dependent on each other. (M 35-59)*

*...plants that grow on trees and also how the light filters down so that at the bottom layer the leaves are bigger to catch sunlight. Also, information on soil, I noticed there was information on that, but I didn't read it so I would like to come back for that. (F 35-59)*

*...how diverse the tropical rainforest is [from the variety of plants]. (F 18-34)*

### Conservation, preservation

*I want to remember how to conserve plants; not to destroy the planet. (F 18-34)*

*I want to remember not to take the plants for granted. I want to develop better appreciation and knowledge. (F 35-59)*

### Interesting factoid

*I want to remember how much freaking vanilla it takes to make the product we use. (M 18-34)*

*...how papaya grows so fast. (F 35-59)*

*...[the relationship between] orchids and insects (will look up pollination at home). (M 18-34)*

*...how many coffee beans you need for 1 cup of coffee. (F 18-34)*

### Other

*What I still found the most interesting was just seeing the plants. Like the mahogany tree that I've heard of but never seen a living specimen. (M 18-34)*

*I want to remember certain plants and their connection to cultures. (F 35-59)*

*...to come back in another season to see how different the plants may be at that time. (M 18-34)*

## Conclusions and Implications

### *Overall, the new signage system succeeds in its goals*

#### **Visitors notice the signs, read them and remember content they find engaging**

- Installing the introductory interpretive information inside the Pavilion greatly improved its appeal for visitors (from attracting almost no one when placed outside the Pavilion to 20% of visitors when placed inside). In addition, dividing it into two labels remedied its previous text-heavy appearance. Visitors were particularly drawn to the second part, “Layers of the Rainforest,” a topic that is difficult to convey in a conservatory with limited ceiling height.
- The label that was meant as a conclusion had a strong takeaway message—“How Do Tropical Rainforest Plants Affect Your Life?”—and was cited in visitors’ comments throughout the interviews. Many visitors noted how fascinating they found seeing the plant origins of products they use daily, such as coffee, vanilla, chocolate and bananas. Other visitors cited the sign’s information about “the glass of water you drank today” and “the air you breathe.”
- Families with young children—a prime audience for BBG—found the signs helpful and meaningful. Adults said they were able to easily answer their children’s questions and use the signs to engage children, e.g., “Look, that’s where we get chocolate.” The 3-sided turning signs gave children something they could manipulate while learning.
- The circular orange signs with the plant’s common name were highly successful. They answered two of visitors’ primary questions: 1) where products they use daily come from, and 2) how to identify plants by name. These topics surfaced in several questions, first when discussing the signs’ effect on their experience and again when referring to something they wanted to learn more about and last when thinking of things they wanted to remember about their visit. A few visitors complained that these signs interfered with the “natural” feel of the garden, but they were in the distinct minority, often hedging their criticism with positive comments.

- In self-described estimates of the number of signs read, a third said they read all or most of the signs, a third said they read about half of them and a third said they read just a few signs. Interestingly, number of signs read did not vary with the amount of time spent. This reflects the differing agendas visitors have: some spend a long time but are only interested in photographing the specimens; some enjoy reading everything; others enjoy the immersive feeling of being in a rainforest. The challenge is to satisfy visitors' various goals without negatively impacting the experience of other visitors. The interview respondent sample appears to be representative of the BBG audience as described in a 2005 document. Time spent in the Pavilion averaged 10 minutes and half the sample spent between 9 and 12 minutes viewing the rainforest displays.

### **Signage conveys the primary Gardenwide theme, “Plants are essential to Life”**

- About 2 in 3 visitors reported noticing the theme, “Everything in tropical areas is connected to each other and to you,” an idea developed for the Tropical Pavilion as a specific interpretation of the IMP’s main interpretive theme, “Plants are essential to Life.” About 1 in 3 visitors identified this as one of the two strongest themes in the exhibit.
- More than 3 in 4 interviewees took away the idea that they and other people around the world depend on and are thus connected to tropical areas and their plants. This dependence was most commonly understood in terms of the products that these areas provide, but more than a third of the respondents also acknowledged our ecological dependence on the tropics for resources such as a stable climate and clean water.

### **Signage conveys the Gardenwide subthemes effectively**

- Visitors noticed all of the subthemes in the signage. Each of these themes was identified by some of the visitors as a topic they wanted to know more about after leaving the exhibit, suggesting that the themes chosen are effectively serving a variety of interests.
- One subtheme, the economic value of tropical rainforests for the products they provide, more prominently featured in the signs than others, was identified by many as the most important theme of the Pavilion. However, because this theme is somewhat human-centric, it may have provided a bridge for visitors to consider more abstract ecological ideas about the importance



of tropical areas to the biosphere and about the interconnectedness of plants and all living things.

- Many visitors come away understanding the importance of preserving rainforest plants. However, fewer seem to grasp the necessity of conserving the *diversity* of plants. This may be because their focus was on conserving sources of products they use and less on the interdependence of plants and other living things within the tropics. An analysis of multiple themes that visitors perceived revealed that visitors who saw the conservation message stressed in the signs were more likely to have also focused on the signs' messages of interconnectedness. Conversely, those whose focus was on tropical products were less likely to focus on conservation.
- Relatively few visitors see information in the signs about BBG's work with plants. They see it in the horticultural success of the Garden, but few are aware of the Garden's scientific research. One of the Interpretive Master Plan's goals was to convey generally the difference between a botanic garden and a park and specifically BBG's involvement in scientific research. While visitors with particular interest in this topic know the difference between a botanic garden and a park and are aware of the Garden's role in science, interpretation could make these points more strongly for the less knowledgeable visitor.

### **The Tropical Pavilion signage affected the visitor experience positively**

- Visitors' discussion of what they wanted to remember about their visit reflected the duality we found in front-end (background) research, namely visitors' desire for both cognitive and affective experiences in the Garden. Visitors want to remember the information they learned about tropical plants' economic value—many of the foods we eat, various medicines and mahogany for furniture. They want to remember names and how to recognize plants. But they also want to remember the *feeling* of being in a rainforest, the *feeling* of peacefulness. They want to remember the esthetic experience, the beauty of the plants. It is essential that BBG continue to provide both sorts of experiences: information about plants and science as well as the esthetic enjoyment of nature, “an oasis in the city.” The new signage seems to permit both.

***The success of prototype signage suggests that this approach may be effective at other locations in the Garden***

- The effectiveness of the Tropical Pavilion prototype signage suggests that its implementation in the two other conservatory Pavilions—Desert and Temperate—will affect the visitor’s experience positively there as well.
- Once the interpretive installation is complete in all three Pavilions, further evaluation can help determine if the model should be extended to the outdoor gardens and collections.

## Appendix A. Demographic Data

Table 11

<b>Gender</b>	<b>Frequency N=72</b>	<b>Percent</b>
Female	44	61
Male	27	38
Missing data	1	1

Table 12

<b>Age**</b>	<b>Frequency N=72</b>	<b>Percent*</b>
18-34 years	34	47
35-59 years	32	44
60 years and over	6	8

\* Percents add up to <100 due to rounding.

\*\* Visitors were divided between young adults, mature adults and older adults.

Table 13

<b>Residence</b>	<b>Frequency N=72</b>	<b>Percent*</b>
New York City	56	78
NYC suburbs	2	3
Other USA	10	14
International	4	6

\*Percents add up to >100 due to rounding.

Table 14

<b>New York City Borough</b>	<b>Frequency N=56</b>	<b>Percent</b>
Brooklyn	43	77
Manhattan	9	16
Queens	4	7

Table 15

<b>Interest in plants</b>	<b>Frequency N=72</b>	<b>Percent</b>
Grow plants, garden	31	43
General interest	38	53
No interest	3	4

Table 16

<b>Special training in botany, horticulture or related field</b>	<b>Frequency N=72</b>	<b>Percent</b>
No	57	79
Yes: <i>Works for national parks</i> <i>4H class in youth; retired principal whose school partnered with BBG</i> <i>Biology major in college</i> <i>Biologist. Forester for NYC parks and recreation</i>	15	21

Table 17

<b>Visiting with:</b>	<b>Frequency N=72</b>	<b>Percent</b>
With Family	31	43
With friends	24	33
With family and friends	8	11
Alone	7	10
Missing data	2	3

Table 18

<b>Number of children under 18 years in household</b>	<b>Frequency N=72</b>	<b>Percent</b>
None	53	74
1 child	8	11
2 children	8	11
3 or more children	2	3
Missing data	1	1

Table 19

<b>Number of children under 18 years visiting BBG with interviewee</b>	<b>Frequency N=72</b>	<b>Percent</b>
Visiting with 1 child	7	10%
Visiting with 2 or more children	9	12%
Visiting without children	56	78%

Table 20

<b>Member of BBG</b>	<b>Frequency N=72</b>	<b>Percent</b>
No	47	65
Yes	20	28
Missing data	5	7

Table 21

<b>Interest in the environment</b>	<b>Frequency N=72</b>	<b>Percent</b>
Active	33	46
Sympathetic but not active	39	54
Not interested	-	-

## Appendix B. Visitor Interview Instrument

**Brooklyn Botanic Garden interview** Interviewer/# \_\_\_\_\_ / \_\_\_\_\_

*Interviewers: do not read anything on this sheet that is written in italics.*

We are asking people what they think of the Tropical Pavilion. It will take less than ten minutes, and your answers will help the Garden a lot. Your name will not be used anywhere.

Write time visitor entered Pavilion (on card) and current time. **Time:** \_\_\_\_\_ - \_\_\_\_\_

**1** Is this your first visit to the Tropical Pavilion?  Yes  No.

**1a** *If no:* Could you tell me when was the last time you visited it? Was it:  within the past year  longer than 1 year

I'd like to ask you about the signs with information about tropical plants:

**2** About how many signs did you read? Would you say you read.... (*interviewer read choices*)

All or most of them  about half  Just a few  didn't read any (*do not read*) skip to Q 3]

**3** Compared to signs in this or other botanical gardens you have visited, would you say these signs are:

(*If person says s/he has not seen others, skip to #4. Read choices*)

- |  |   |   |
|--|---|---|
| a. <input type="checkbox"/> More interesting           | <input type="checkbox"/> Less interesting           | <input type="checkbox"/> About the same               |
| b. <input type="checkbox"/> More esthetically pleasing | <input type="checkbox"/> Less esthetically pleasing | <input type="checkbox"/> About the same               |
| c. <input type="checkbox"/> Mainly for children        | <input type="checkbox"/> Mainly for adults          | <input type="checkbox"/> For both children and adults |

**4** Did you notice the 3-sided signs that you could turn to see more information?  No  Yes

4a. *If yes:* Did you turn any of them?  No  Yes

4b. *If yes:* Do you remember what it was about?

**5** Did the signs affect your experience in the tropical garden?  No  Yes

5a. *If yes:* Please tell me how they affected your experience:

**6** Do you think the Tropical Garden has a central message for visitors?  Yes  No

**6a** *If yes,* What do you think it is? (*Prompt: Just your impression...*)

**6b** Where did you see that? (*Prompt: take your time...*)

**7** Did you see anything about how tropical areas and their plants affect your everyday life?  Y  N

- |                                   |   |   |
|-----------------------------------|---|---|
| <input type="checkbox"/> Food     | <input type="checkbox"/> Clean water      | <input type="checkbox"/> Vacation, trips to the tropics |
| <input type="checkbox"/> Medicine | <input type="checkbox"/> Air/oxygen       | <input type="checkbox"/> Other: Please specify          |
| <input type="checkbox"/> Clothing | <input type="checkbox"/> Climate          |   |
| <input type="checkbox"/> Shelter  | <input type="checkbox"/> Beauty/enjoyment |   |

8 The next question is about some of the topics in the signs. *Show card*. Tell me if you saw anything about these:

Did you see anything about:	Yes	No	Where did you see it?
a Everything living in tropical areas is connected to each other and to you			
b Things tropical rainforests provide for life in other areas of the world			
c The importance of conserving a variety of plants in tropical areas			
d How plants are used for food, medicine and shelter			
e The role of plants in human cultures			
f The Brooklyn Botanic Garden's work with plants			

8g Which of those topics came across strongest for you? # \_\_\_\_\_

8h Was there another topic that came across almost as strongly? # \_\_\_\_\_

8i Would you like to know more about any of the topics on the card? \_\_No \_\_Yes: \_\_# Anything in particular?

9 Thinking about what you saw and learned in the tropical garden, please finish this sentence:

"I would like to remember..."

10 Now just a little information about you so BBG can know its visitors better:

Respondent is \_\_Male \_\_Female Are you a member of BBG? \_\_Yes \_\_No

<u>Your age:</u> __ 18-34 __ 35-59 __ 60 and over	<u>Your interest in plants</u> __ grow plants, garden __ general interest __ no interest	<u>Your Residence:</u> __ NYC Borough: __ NYC Suburbs __ Other USA __ International	<u>Are you visiting...</u> __ Alone __ With family __ With friends
Do you have special training in botany, horticulture or other plant related field? Please specify:			
How many children under age 18 live in your household?		How many are with you today?	
How would you define your interest in environmental issues: __active __sympathetic but not active __not interested			

Thank you very much!