



POLLI:NATION



2016- 2018 Survey Results



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Introduction & Executive Summary

Polli:Nation is a Heritage Lottery funded UK-wide initiative supporting pupils from 260 schools to turn their school grounds and other local walk-to spaces into pollinator friendly habitats. As part of this programme, the OPAL Polli:Nation Survey was developed to:

- Survey their patch using the OPAL Polli:Nation survey
- Make improvements for pollinators on their patch
- See how well it has worked using the OPAL survey to see the impact the improvements have had.

This cross-curricula project is giving participants (aka citizen scientists) direct hands-on experiences; from creating vertical green walls and night-blooming flower beds to lobbying to change school maintenance regimes and debating pesticide use. Citizen scientists will learn about the role pollinating insects play in ecosystem services and be able to contextualise this in the choices and actions they take.

Alongside creating a network of knowledgeable and enthused young activists, the ambition of this programme is to utilise school grounds and other outdoor spaces to form local green corridors and 'stepping stones', enabling species to move between core areas thereby contributing to the overall aim of the project by increasing numbers and sightings of pollinating insects in the UK.

The **aim** of the project is to engage and enthuse children and young people to protect pollinating insect species in the UK.

The **outcome** of the project is to see an increase in the number and diversity of pollinating insect species in school grounds and local community spaces across the UK.

This report summarises the key findings of all three survey seasons (2016-2018).

Polli:Nation is a partnership project with the following organisations:



Imperial College
London





Polli:Nation Survey Method

The Polli:Nation survey is a large-scale national survey that is providing answers to important research questions about the health and status of pollinating insects across the UK.

A core part of the project is to engage pupils and the community in biological recording within school grounds and other local green spaces. The Polli:Nation Partnership designed the survey method to investigate the number of pollinators using different habitats at survey sites. For those registered schools within the Polli:Nation project the survey is also tailored to track the impact of positive changes made to school grounds to encourage more pollinating insects. The survey is structured in two parts:

- A) **Habitats:** This part of the survey looks at what is on offer for pollinators in survey sites (10m x 10m areas selected by participants) within the school ground in terms of providing feeding, nesting and sheltering resources. Participants were asked to map the site onto a grid (see below) and count the number of 1m x 1m squares containing different habitat types and also record which plant species are present.

Guidance Box













Use the **Habitat, Plant and Pollinator Guide** for help identifying which habitat types you have.

Example

Habitat type	
Feeding habitat	Flower beds or pots
	Wildflowers
	Trees
Nesting and shelter habitat	Bare ground
	Man-made homes
	Damp places
Other	Bare walls or fences
	Concrete or tarmac
	Short grass

- B) **Pollinators:** The second part of the survey involves counting the number of pollinating insects visiting flowers in quadrats within the survey sites. For each pollinator survey participants recorded the weather conditions, habitat type, floweriness and most common flowers within a quadrat. The pollinators were recorded in 9 different groups: Bumblebees, Honeybees, Solitary bees, Butterflies, Moths, Hoverflies, Other Flies, Beetles, Unidentified insects. Participants could also take part in the 'Species Quest' by identifying a suite of pollinators from a list of 12 species. →

4 Species Quest If you see any of the **Species Quest** pollinators tick the box and try to take a photo

 <input type="checkbox"/> Red Admiral	 <input type="checkbox"/> Meadow Brown	 <input type="checkbox"/> Brimstone	 <input type="checkbox"/> Holly Blue	 <input type="checkbox"/> Six-spot Burnet	 <input type="checkbox"/> Marmalade Hoverfly
 <input type="checkbox"/> Red-tailed Bumblebee	 <input type="checkbox"/> Common Carder Bumblebee	 <input type="checkbox"/> Ashy Mining Bee	 <input type="checkbox"/> Honeybee	 <input type="checkbox"/> Thick-legged Flower Beetle	 <input type="checkbox"/> Red Soldier Beetle



Summary of Effort and Uptake

Highlights

- 1161 sets of survey results were received from 336 groups over the three years of the Polli:Nation project
- 58% of results were from Primary Schools; 16% from Secondary Schools & 28% from public groups (62% of all groups were Polli:Nation registered)
- The highest number of submissions was 42 from Bryncethin Primary School in Bridgend, Wales
- Being registered and having support from facilitators supports the submission of data
- The busiest survey year was 2016 with 47% of all surveys submitted in 2016, 24% in 2017 and 29% in 2018
- Due to involvement in Polli:Nation, the proportion of groups with previous experience of identifying insects has risen by 22% over the three years of the project.

How many people took part and what experience did they have?

Polli:Nation has been a rolling survey where participants have continued to submit survey data in multiple years. Here we summarise the level of participation each year by Polli:Nation registered schools and other groups (non Polli:Nation registered). Using the submission data we can look at number of groups taking part each year and the number of survey responses that they submitted each year.

Across the three survey years, 336 different groups have taken part in Polli:Nation. Of the total number of groups, 209 (62%) were registered Polli:Nation Schools groups and the remaining 127 (38%) were other groups from the community. Considering schools versus non school-groups, 244 school groups took part in Polli:Nation (209 were registered Polli:Nation Schools).

Over the whole survey between 2016 and 2018, we received 1161 sets of results from surveys (Table 1). Of these surveys, 47% were submitted in 2016, 24% in 2017 and 29% in 2018. Across the whole survey, 77% of results were submitted by Polli:Nation registered schools. The mean number of submissions was higher for Polli:Nation registered groups (2.43 sets of data per group over three years) compared with non-registered schools (1.99 sets of data per group over three years). While 2017 reversed this trend, it could suggest that enrolment on a project and a higher level of support from facilitators can positively impact the amount of data collected.

Table 1: Number of results submissions and mean submissions per group by type of group and year survey took place

Survey year	Polli:Nation School submissions	Mean submissions from Polli:Nation group	Other groups (not Polli:Nation registered)	Mean submissions from non Polli:Nation registered groups	Total submissions
2016	435	2.51	109	1.79	544
2017	171	2.44	110	2.56	281
2018	287	2.31	49	1.58	336
Total	893	2.43	268	1.99	1161

The number of groups taking part each year has decreased since the launch year in 2016 but there was a marked upturn for the number of Polli:Nation schools submitting data in the final year (2018) (Figure 1).

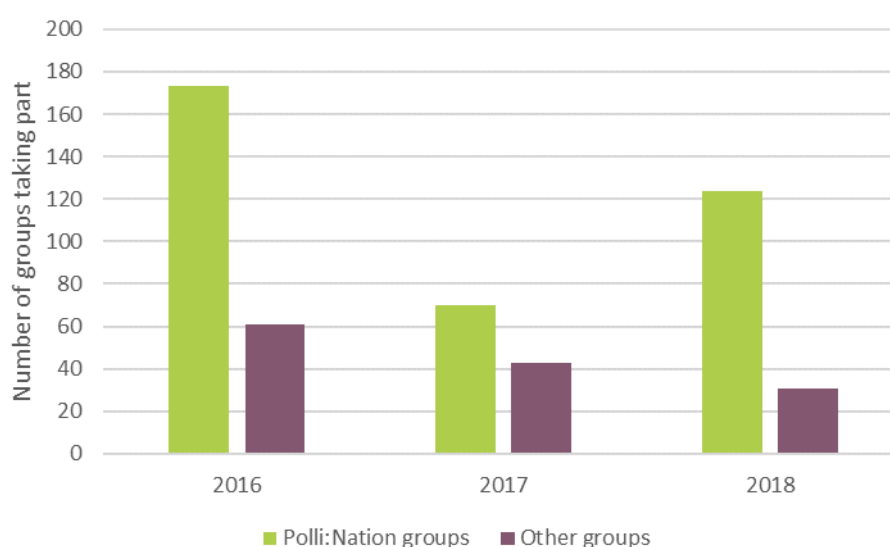


Figure 1: Number of individual groups that submitted results by type of group and year that they took part

Given that the survey was a rolling programme to track pollinator responses to improvements, it is useful to look at the number of years that different groups submitted data. Most groups submitted only one year of data- this was particularly evident for other groups where 94% of groups only submitted one year of data. Whereas for Polli:Nation Schools, 57% of groups submitted more than one year of data (Table 2).

Table 2: Number of different types of groups and the number of years that they submitted data

Number of years data submitted	Polli:Nation Group	Other Groups	Total
1	90	120	210
2	80	6	86
3	39	1	40
Total	209	127	336

Across the whole survey, the highest number of submissions were received from registered Polli:Nation Primary Schools (58%) and Secondary Schools (16%) (Figure 2). The remaining 28% of submissions were received from volunteer groups, family/friends groups, youth groups, colleges/Universities or other. This pattern is reflected in the proportion of different types of groups taking part with 48% of groups registered as Polli:Nation Primary Schools (Table 3). Non-school groups (registered and non-registered) made up 24% of the groups taking part across the three survey years. The higher than expected number of groups other than Primary or Secondary for Polli:Nation registered schools does raise the question about whether participants were accurately answering these questions.

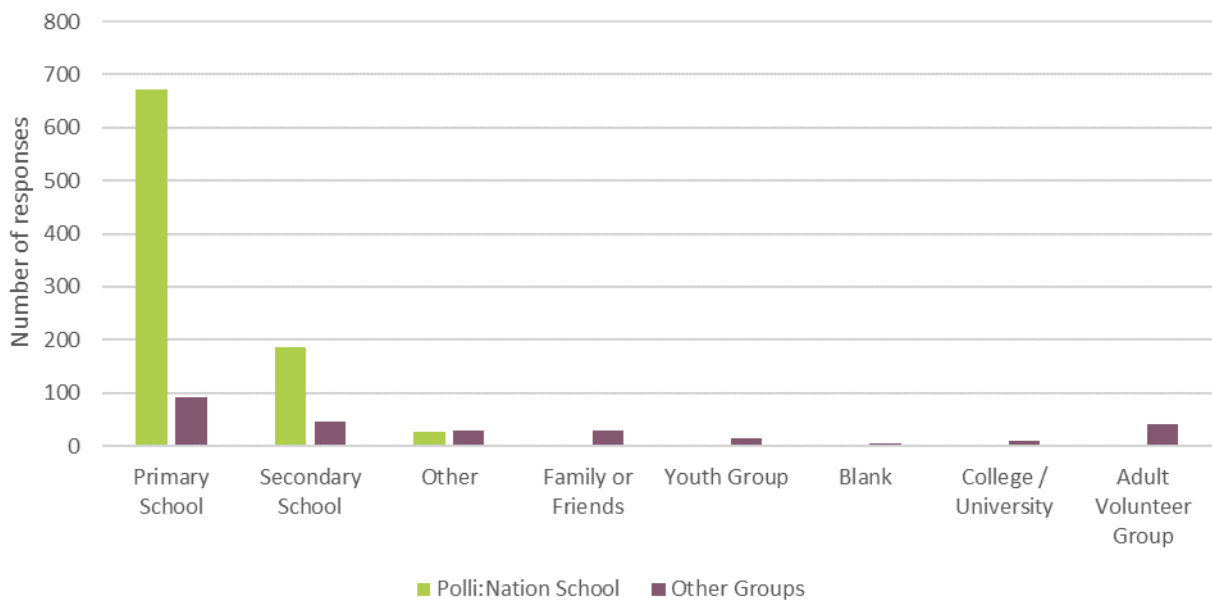


Figure 2: Number of submissions by different groups taking part in Polli:Nation

Table 3: Number of groups taking part by 'type of group' and whether or not they are registered as part of the Polli:Nation project

Type of group	Polli:Nation Group	Other groups (not Polli:Nation registered)	Total
Primary School	161	28	189
Secondary School	44	21	65
Other	12	24	36
Family or Friends	2	23	25
Adult Volunteer Group		15	15
Youth Group	2	12	14
No response	2	5	7
College / University	1	5	6
Total	209	127	336

Considering the number of results submissions per group across the three survey years, 42% of groups submitted one set of results, 18% of groups submitted two sets of results and a further 40%

submitted at least three sets of results (Figure 3, Figure 8 C). It is noticeable that among non-registered groups, 70% of groups only submitted data for one survey. An impressive 57 groups (17%) submitted at least six sets of survey results. The highest number of submissions received so far is 42 (14 in each survey year) from Bryncethin Primary School in Bridgend, Wales (Figure 8 D). The highest number of submissions from a non-registered school was 20 surveys from Wester Overton Primary School, Strathaven, Scotland (Figure 8 D).

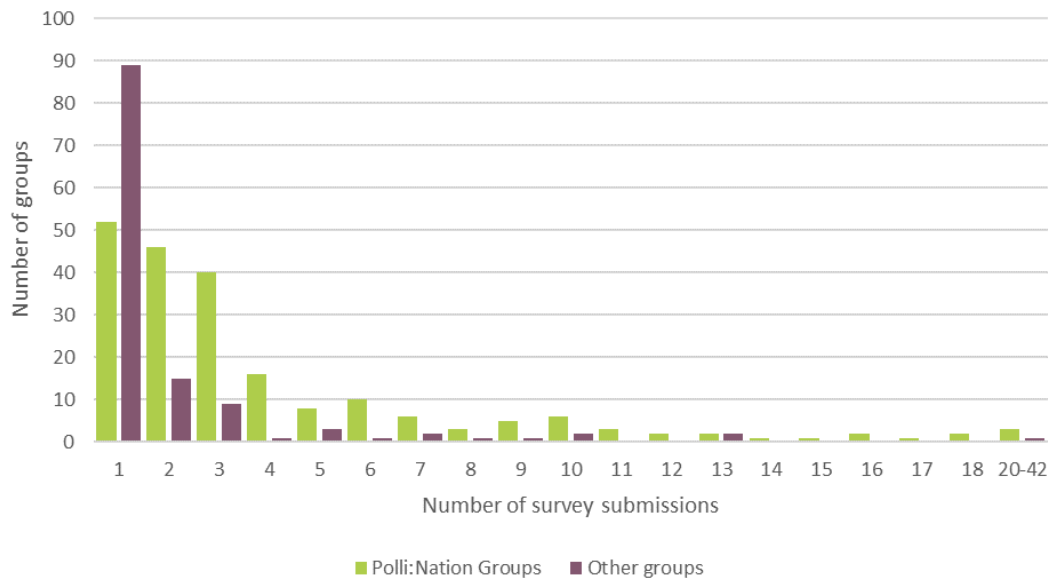


Figure 3: The number of survey submissions per group

As part of the survey, we asked participants to state whether they had previous experience of identifying insects. Now that Polli:Nation has come to the end, it is interesting to see the increase in the number of survey submissions with a positive response to this question over time and also the decline in the proportion of groups without experience of insect ID (Figure 4). These divergent trends are to be expected as merely taking part in Polli:Nation gives participants the experience of identifying insects and therefore the proportion with ID experience has risen by 22% over the three years of the project.

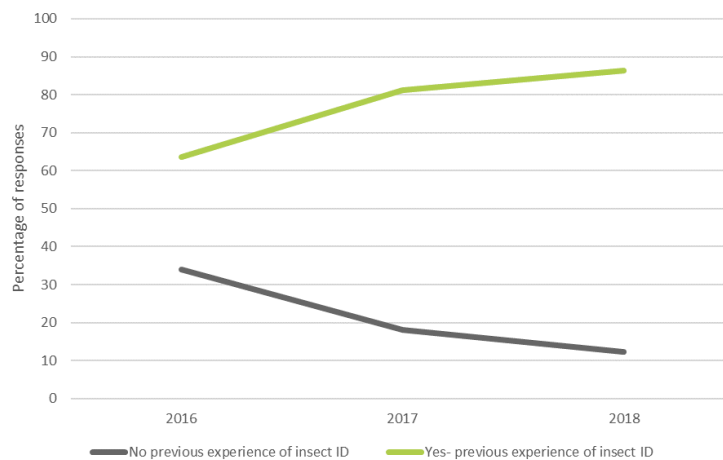


Figure 4: The relative proportions of survey submissions in which respondents stated whether or not they had previous experience of identifying insects

Making improvements

The aim of the Polli:Nation survey is to compare before and after any positive changes are made at a site to investigate how pollinators have benefited.

From the 336 groups that have participated across the three years of the survey, 70% (N= 235) were proposing to make changes to the school grounds. Of these 235 groups, 202 pledged to make positive changes for pollinators through the Polli:Nation project (Figure 5).

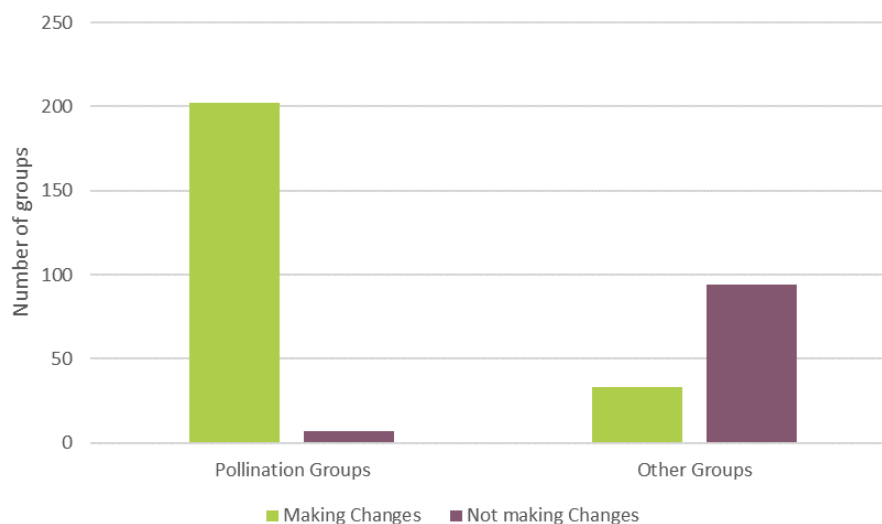


Figure 5: Number of groups planning improvements to their local patch and their involvement with the Polli:Nation project

As part of the survey, participants had to record which kinds of changes they made to their school grounds or community area/garden. According to the data, 148 groups submitted responses after making improvements for pollinators- of these, 132 were registered Polli:Nation schools and the remaining 16 groups made their own changes. These 16 groups included schools but also universities, colleges, adult volunteer groups and groups of families and friends. The number of groups making changes certainly increased over the course of the project, especially for the Polli:Nation registered schools (Figure 6).

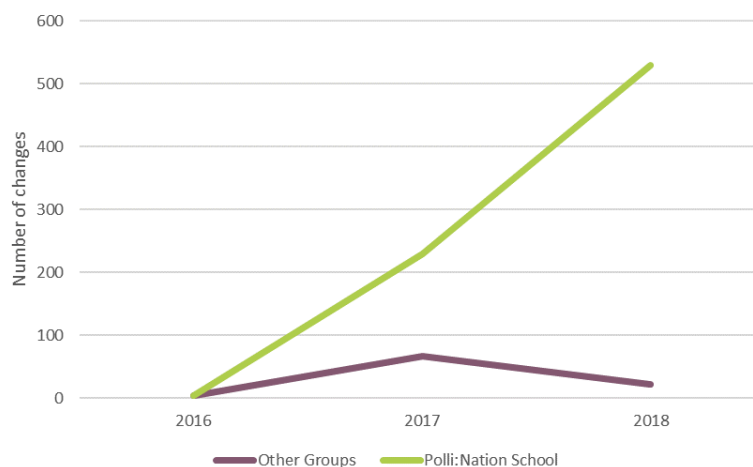


Figure 6: The number of positive improvements made for pollinators by different groups during each year of the project.

Where did the surveys take place?

The Polli:Nation Survey was open to anyone to take part. Polli:Nation Schools were encouraged to take part across Scotland, Wales, Northern Ireland and England. The highest proportion of groups were located in England (48%) followed by 25% in Scotland and 16% in Wales and Northern Ireland (11%) (Table 4; Figure 8).

Table 4: Number of groups participating from each of the UK countries and Ireland

Type of group	Other Group	Polli:Nation Group	Total
England	62	99	161 (48%)
Scotland	29	54	83 (25%)
Wales	26	28	54 (16%)
Northern Ireland	9	28	37 (11%)
Ireland	1		1 (0.3%)
Total	127	209	336



Figure 7: Locations of survey submissions based on whether or not positive changes for pollinators were made

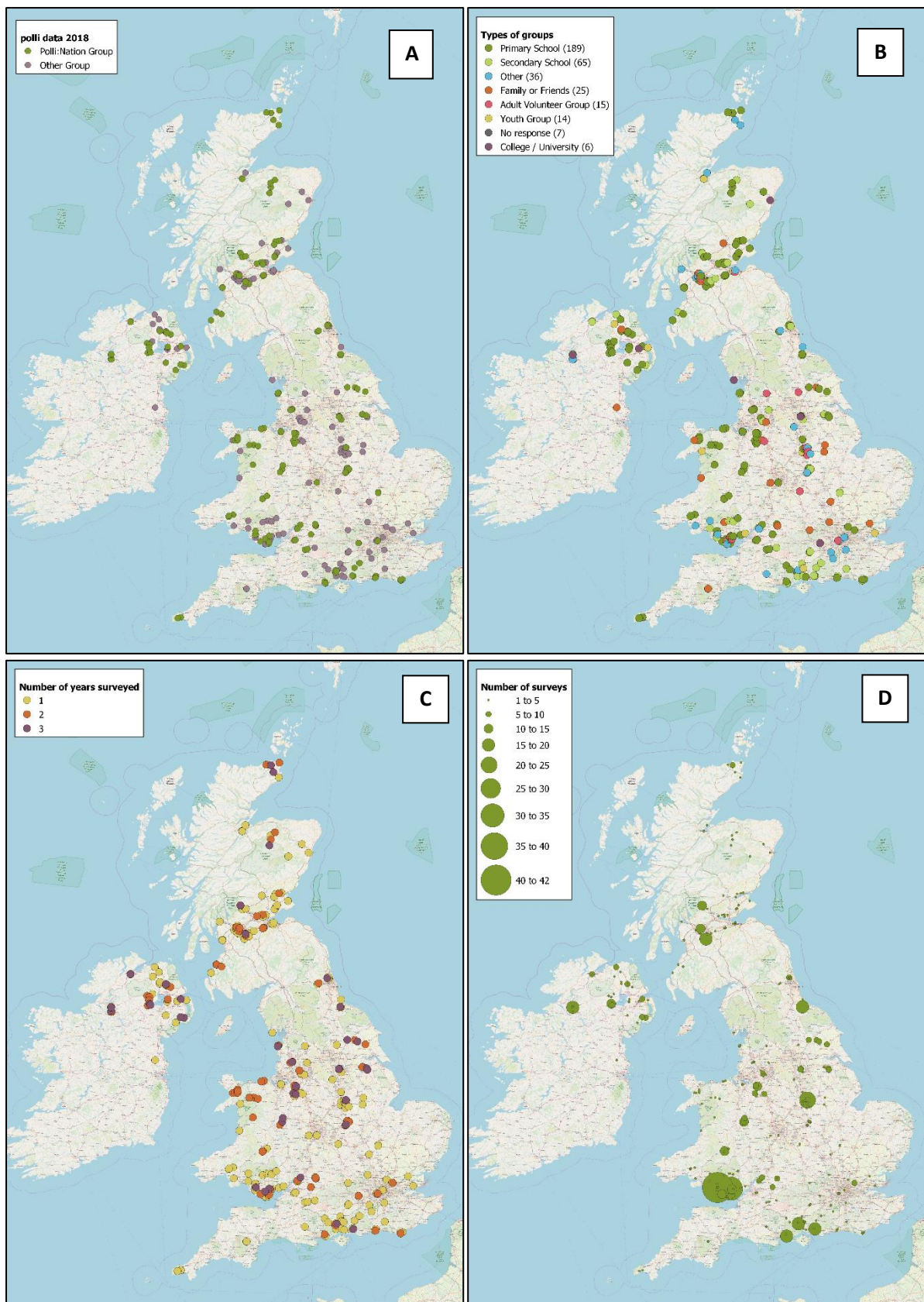


Figure 8: Locations of participants by (A) registered Polli:Nation schools versus community groups, (B) Type of group, (C) Number of years with survey data submitted, (D) Number of surveys submitted over the three years



Part A. Habitat Results

Highlights

- Over 14,500m² of wildflowers were recorded as part of the Polli:Nation survey
- The area of wildflower habitat surveyed has increased over the life of the survey
- The area of short grass surveyed has declined over the 3 years of the survey
- According to the survey submission data, 148 groups recorded that they had made at least one change to their site
- The most popular habitat to create year on year has been to add pots, build raised beds or plant flower beds with 125 groups (84%) carrying out this work. Creating wildflowers meadows/verges was the second most popular (66% carried out this improvement).
- There was a significant increase in the area of feeding habitat (and a significant decrease in the average area of man-made features (bare walls/fences, concrete/tarmac, short grass) following improvements
- There was an increase in observations of woody and wild plants in flower following the improvements for pollinators

Survey site information

Before the actual surveys of the pollinators took place, participants had to choose a 10x10m survey site within their school grounds or 'local patch'. Participants were asked to map the site onto a grid and count the number of 1x1m squares containing different habitat types and also record which plant species were present. This section describes what habitats and flower species were found in the 811 surveys at sites either before any improvements were done or in surveys where improvements were not planned.

Across 811 surveys, (excluding the surveys carried out after improvements were made) over the three years, the most commonly recorded resource type was short grass (Figure 9). The second most common habitat type encountered was wildflowers with 123 survey sites at least 50% covered in wildflowers and at 23 sites the whole area was wildflowers. There has been an increase of 279.5m² of manmade pollinator habitat included in the survey when comparing 2016 with 2018 (bee hotels and bee hives) (Figure 10). In contrast, there has been a huge decrease in the area of short grass surveyed based on the average area surveyed per year (Figure 10). This implies that the focus of the surveys has turned to the new Polli:Nator habitats that have been created. At the start of the

project, schools had more short grass to survey than at the end when more pollinator habitat had been created.

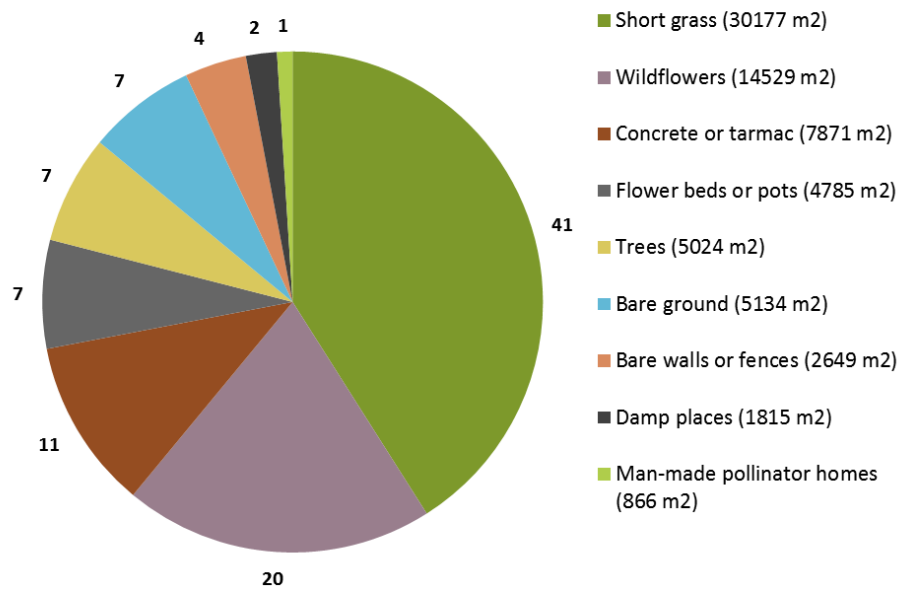


Figure 9: The proportional area of different habitats recorded in the survey sites

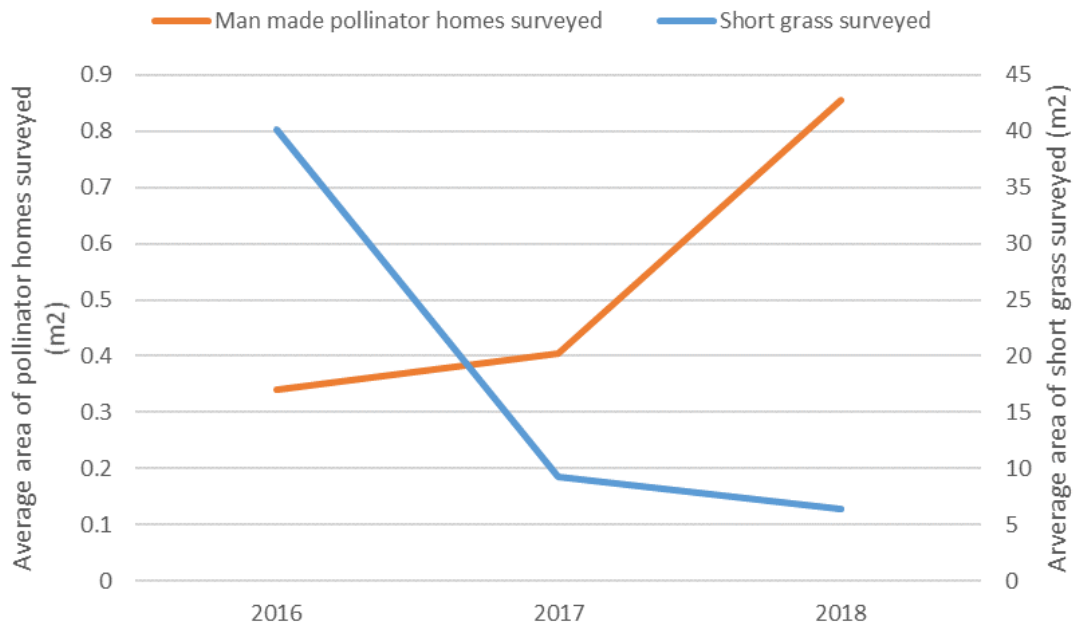


Figure 10: The average area of man-made pollinator and short grass habitat included in the surveys over the 3 years of the Polli:Nation Project (average based on number of surveys per year)

Which species of plant were present and were they in flower?

The types of plants found in survey sites (excluding the surveys conducted after improvements had been made) are described here over the three years of the Polli:Nation Survey.

Considering all 811 surveys classed as 'before or not planning to make changes', 10% of the initial surveys of the plots found that there were no plants in flower at all. For those species in flower the most common level of species diversity was 3 species (17% of submissions) followed by 3 species (15%) (Figure 11).

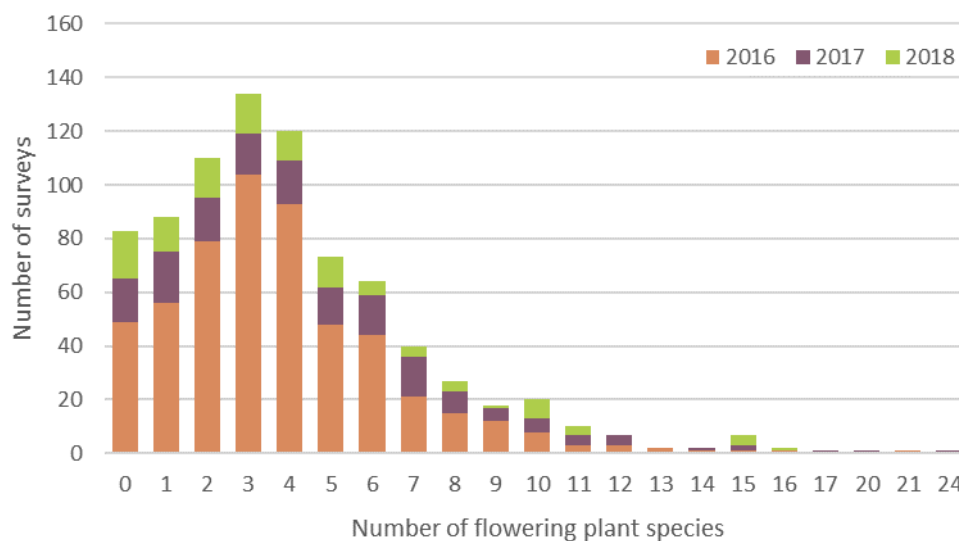


Figure 11: The number of surveys recording different numbers of species in flower in the survey sites in each survey year

From a list of 8 woody plants, 8 garden plants and 8 wild flowers the most frequently recorded species in flower within the survey sites over the three years was the daisy (63% of submissions) followed by buttercup (50%), dandelion (52%) and clover (40%) (Figure 12). The most frequently encountered woody plant in flower was Bramble which was present on 153 surveys (19%) across the whole project and was top in 2016 and 2018 but Buddleia was the winner in 2017 (Figure 13). From the selection of garden plants in the survey, lavender was the most frequently encountered each year with 15% of surveys reporting lavender in flower (Figure 14).

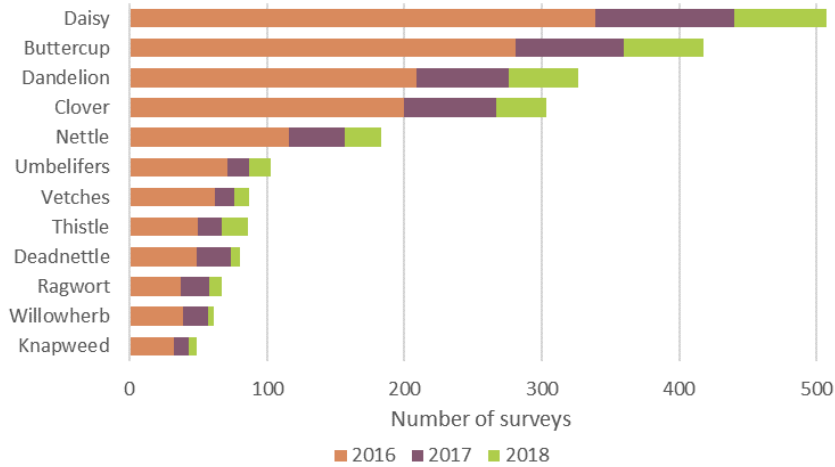


Figure 12: The number of surveys in each year that included flowering species of wild flowers

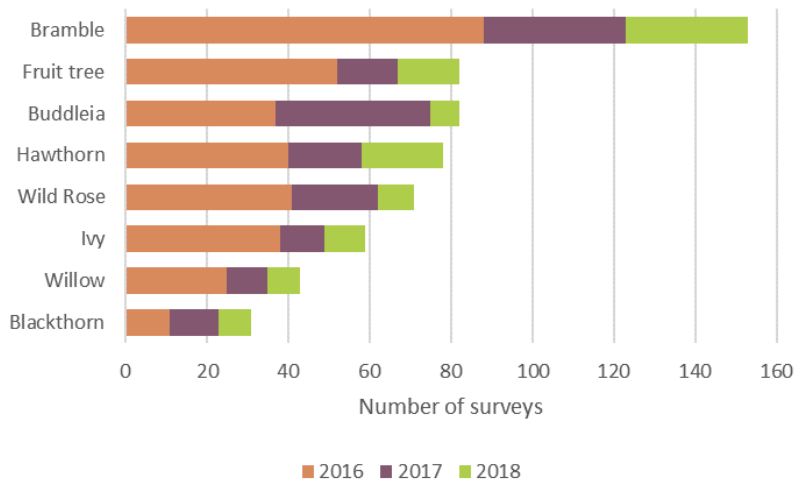


Figure 13: The number of surveys in each year that included flowering species of woody plants

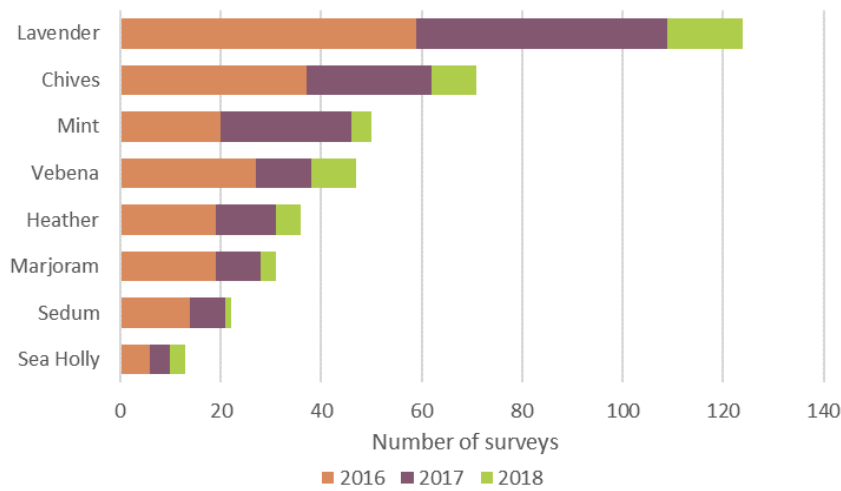


Figure 14: The number of surveys in each year that included flowering species of garden plants

What habitat improvements were made?

The main aim of the Polli:Nation project was to make improvements to the outdoor areas where children learn and people live and work. The survey aimed to track these changes and report on the impact on pollinator numbers and diversity. In this section we look at the impact made by those groups who indicated that they made positive changes for pollinators on their local patch.

According to the survey submission data, 148 groups recorded that they had made at least one change to their site. Most of the groups that made changes were registered Polli:Nation groups (90%) and the remaining 15 groups were making changes on their own.

Among the groups that recorded positive changes, the most popular habitat to create year on year has been to add pots, build raised beds or plant flower beds with 125 groups (84%) carrying out this work (Figure 15). Creation of a wildflower meadow or verge was carried out by 98 groups (66%). From the 148 groups the most popular number of changes made to a site was three changes (40% of groups made three changes) (Figure 16).

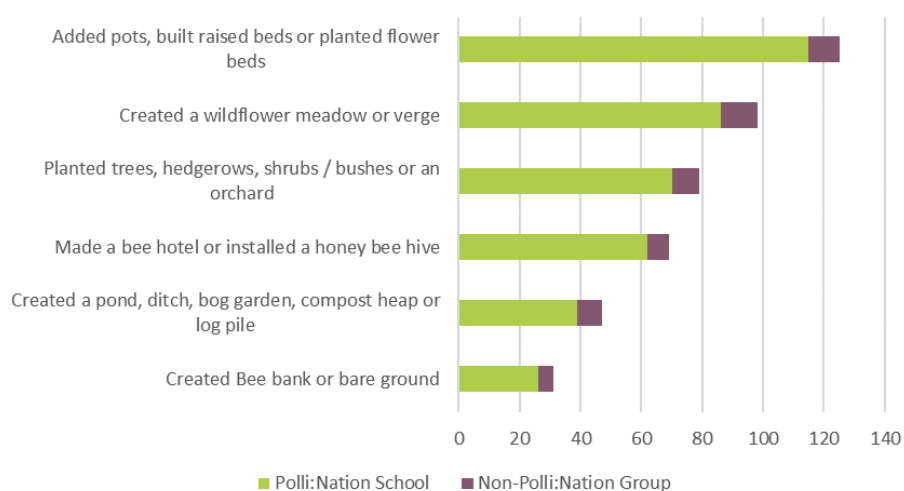


Figure 15: The number of different groups registering different positive pollinator improvements on their patch

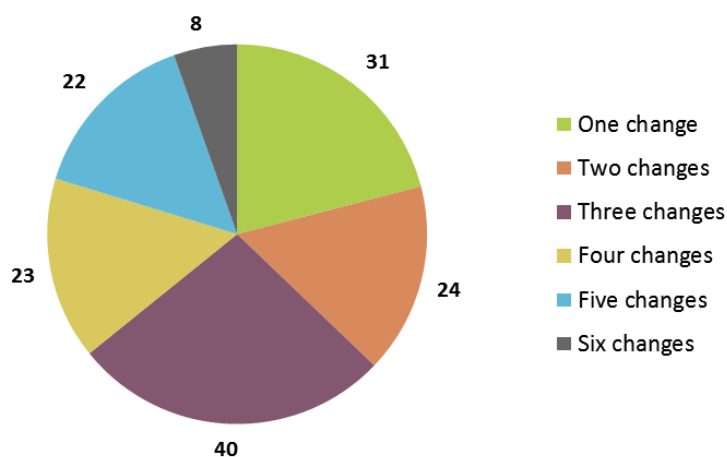


Figure 16: The number of changes made to school/site grounds by the 148 groups

There was an option in the survey to submit a code to indicate surveys that are paired before and after surveys at exactly the same location with respect to a change. When extracting paired comparisons (as indicated by a code), 86 groups (out of 148) submitted 144 paired surveys (288 in total) from to analyse regarding actual change in habitat, flowers and pollinators.

From these 144 paired surveys there is a significant increase in the area of feeding habitat ($t=4.47$, df 143, $P<0.0001$) and a significant decrease in the average area of man-made features (bare walls/fences, concrete/tarmac, short grass) following improvements ($t=3.69$, df 143, $p<0.001$) (Figure 17). There was no significant change in the area of nesting habitat recorded in the 144 surveys before and after improvements for pollinators (Figure 17). The occurrence of different species of plants in flower differed between the surveys before changes were made, compared to the surveys carried out after the changes were made. The most noticeable difference was the increase in observations of woody and wild plants in flower following the improvements for pollinators (Figure 18).

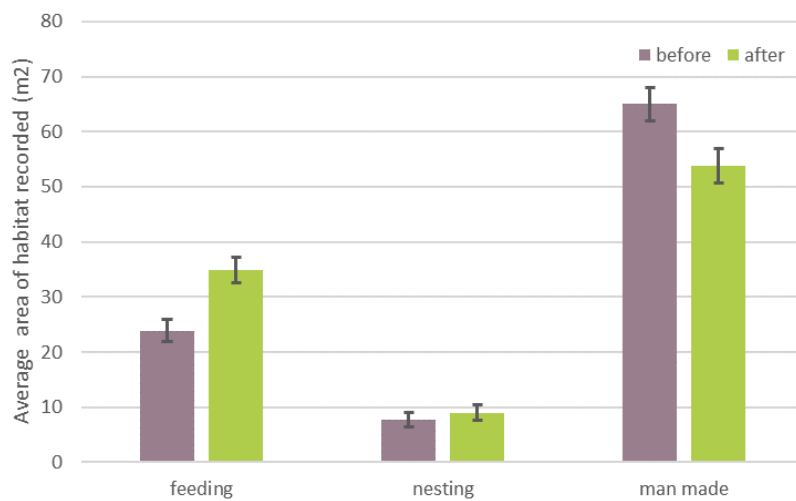


Figure 17: Average area of habitat recorded in paired before and after improvements surveys. Habitat types grouped into 'feeding' (flower beds or pots, wildflowers, trees), 'nesting' (bare ground, man-made homes, damp places) and 'man made/other' (bare walls/fences, concrete/tarmac, short grass).

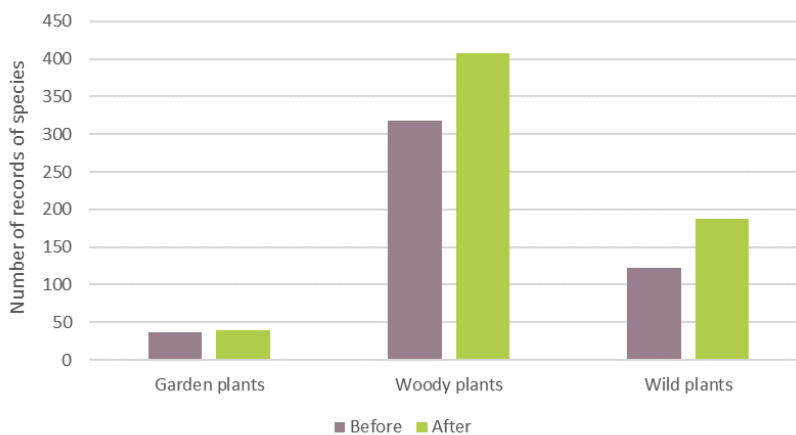


Figure 18: Number of observations of different plant species in flower from the 144 paired surveys – grouped into garden plants, woody plants and wild plants.



Part B. Pollinator Results

Highlights

- Over three years 18,866 pollinators were recorded and there were 2867 two minutes quadrat searches which represented 66 hours of survey time or 20 days of school!
- Most surveys were conducted in June and July
- Overall there were significantly more pollinators found after habitat improvements were made (an average of 7.7 insects per 1m quadrat compared with 4.3 before)
- Statistical analysis indicates there was a significant increased pollinator abundance with the area of pollinator feeding habitat and number of plant species in flower. In addition, more pollinators were found where the quadrat contained more flowers, damp places and wildflowers. In particular hawthorn, thistle, and nettle improved the likelihood of finding insects
- There was decreased pollinator abundance in quadrats with short grass, concrete or tarmac and interestingly lower numbers found near clover, daisy, dead nettle and blackthorn
- In terms of the range of groups found, creating damp places and wildflower areas has a positive effect on total pollinator diversity
- Wildflowers had a positive effect on the number of quest species found whereas short grass had the opposite affect
- 62% of groups recorded at least one species of pollinator
- The greater the area of wildflower the more species recorded
- The Honeybee most commonly found quest species for three years running

The pollinator part of the survey involves counting the number of pollinating insects visiting flowers within a 1m x 1m quadrat over a two-minute period. In this section, the results are investigated at the quadrat level with respect to factors such as weather conditions during the survey, habitat type, floweriness and most common flower.

Summary of the pollinators found

Considering all the data provided from 1161 surveys over 3 years we now have data from 2867 quadrat searches each lasting 2 minutes which equates to over 66 hours of survey time which is

nearly 20 days of school! Across all 2867 quadrat surveys, 18,866 pollinators were recorded. The average number of pollinators encountered before improvements were made was 4.3 and this increased to 7.7 in the surveys carried out after improvements were made for pollinators. A Mann-Whitney-U test was used to compare the total pollinator counts classed as 'before' and 'after' improvements were made which showed that significantly more pollinators were recorded after improvements (Median=5) were made compared to before improvements (Median=3) (U=11.91, P<0.001). The increased number of pollinators seen after improvements were made is observed across the board in all pollinator groups (Figure 19).

Table 5: The total number of pollinators, number of surveys and average number of pollinators seen on surveys classed as before and after improvements were made (not paired surveys i.e. not necessarily on the same site)

Survey type	Number of surveys	Total pollinators seen	Average number of pollinators seen per survey	Median values total pollinators
Before	1233	5308	4.3	3
After	873	6700	7.7	5
Not recorded	761	6858	9	
	2867	18866		

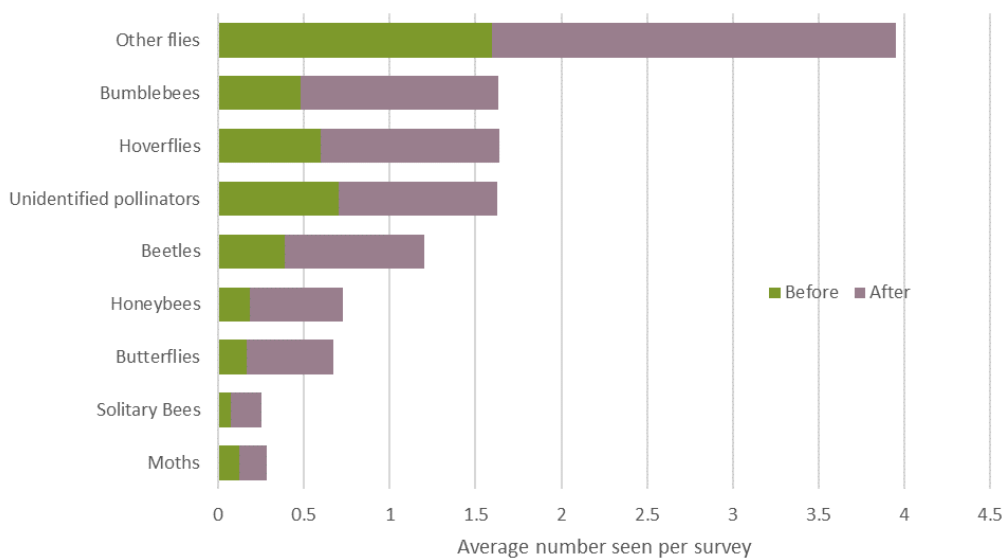


Figure 19: Average number of each species recorded per survey taken before or after improvements have been made across the 3 years of Polli:Nation

Considering the change in time over the life of the project, Figure 20 shows that whilst the peak year in the number of surveys was 2016, the peak year in number of pollinators was 2018 and the highest average encounter rate of pollinators during surveys was 2017 (highest number of pollinators per survey), closely followed by 2018.

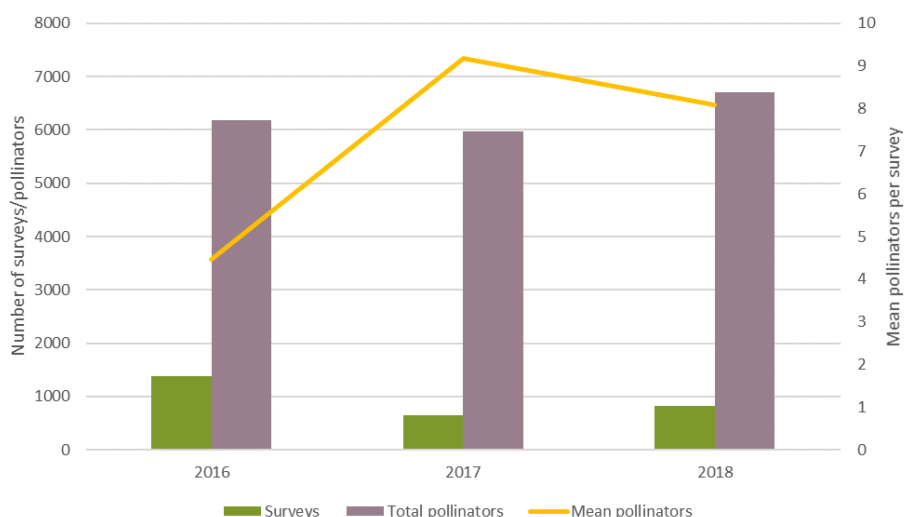


Figure 20: The number of 2 minute quadrat surveys per year and the total and mean number of pollinators counted per year.

Pollinator responses to habitat types and improvements

A Poisson generalised linear mixed model (GLMM) was fitted to assess the effect of area of pollinator feeding habitat, number of plant species present, number of plant species in flower, the year, the floweriness of the survey quadrats, the area of urban land use within 2km of the survey location, and temperature on pollinator abundance.

What affects the total abundance of pollinators seen in the survey?

The GLMM results indicate increased pollinator abundance with area of pollinator feeding habitat and number of plant species in flower (not for pollinator nesting) (the results are summarised in Table 7). Fewer pollinators were seen in quadrats containing mainly short grass, concrete or tarmac. Floweriness of the survey quadrat had a significant effect on the number of pollinators seen. In addition, increased pollinator abundance was seen when hawthorn, thistle, nettle, vetches and bramble were recorded. Similarly, the flower species associated with short grass habitat were associated with decreased pollinator abundance; these flower species include clover, daisy, dead nettle, ivy and blackthorn.

Table 6: A summary of the modelling results to show the impact of the different factors on pollinator numbers and abundance. Effects were classed as significant at the 5% level

Factor affecting pollinator numbers	Results from the analysis
Area of feeding habitat recorded	Positively influenced pollinator abundance. Higher pollinator abundance was recorded in habitats containing damp places and wildflowers and to a lesser extent trees and flower beds and flower pots. Short grass areas and concrete/tarmac had a negative effect on pollinator abundance.
Area of nesting habitat recorded	Did not inform the model- removed
Number of plant species recorded	Did not inform the model- removed
Number of plant species in flower	Positively influenced pollinator abundance
The year of the survey	2017 and 2018 resulted in more pollinator abundance compared to 2016

Factor affecting pollinator numbers	Results from the analysis
Floweriness of the survey quadrats	Pollinator abundance was greater in quadrats that were more flowery
Area of urban land use within 2km of the survey location	The greater the area of urban habitat within 2km the lower the pollinator abundance
Type of flowers encountered in the survey	More pollinators were recorded in quadrats containing hawthorn, thistle, nettle, vetches and bramble
	Fewer pollinators were recorded in quadrats containing clover, Dead Nettle, Daisy and Dandelion

Which of the six improvements for pollinators resulted in the greatest increases in pollinator abundance and diversity?

The response of pollinator numbers to the six types of improvements made as part of the Polli:Nation project was also investigated (Table 7). From the analysis using a Poisson generalised linear model (GLM), planting wildflowers and creating damp places has positive effects on overall pollinator abundance. The effect for planting trees was negative. The positive impact of tree planting clearly takes a number of years to become evident as the trees take time to mature and start to blossom. The same analysis was run using pollinator diversity to compare the effectiveness of the six different types of improvements made by Polli:Nation groups. Creating damp places and planting wildflowers have the greatest positive impact on total pollinator diversity.

Table 7: A summary of the modelling results to show the impact of the different improvements on pollinator numbers and diversity (different types of pollinators seen). Effects were classed as significant at the 5% level

Factor affecting pollinator numbers	Results from the analysis
Creating flower pots	No significant effect on pollinator abundance
	No significant effect on pollinator diversity
Planting wildflowers	Significant positive effect on both pollinator abundance and diversity
Planting trees	No significant effect on pollinator diversity
	Small negative effect on abundance
Creating bare ground	No effect on pollinator abundance or diversity
Making bee hotels	No effect on pollinator abundance or diversity
Creating damp places	Significant positive effect on both pollinator abundance and diversity

Species Quest Pollinators

In addition to pollinator group counts, participants were encouraged to record the presence of any species from a list of 12 key, easily identifiable pollinators. From the 1161 surveys, 39% (448 surveys) generated records of at least one species. Taking into account multiple species observations, across the whole survey, 891 individual species records were created. Given that there were multiple surveys at each of the 336 survey locations (schools or groups), locations with no species recorded or species quest not completed only constituted 38% with the remaining 62% of groups recording at least one species. Over the course of the survey, five schools reported at least eight species from the species quest list (Figure 21). The peak time for submission of species quest records was May to July, with the highest number of recorded sightings in July (Figure 22). The most frequently recorded species was the Honeybee (223 records), followed by the Red Soldier Beetle (134 records and close behind was the Marmalade Hoverfly (131 records) (Figure 23). The species quest species with the

lowest number of sightings across the whole three years was the Six-spot Burnet Moth (10 sightings) (Figure 23)

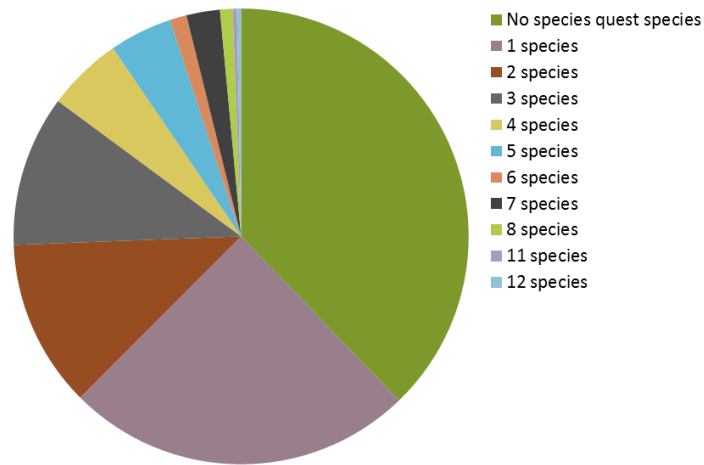


Figure 21: Number of species quest species recorded per local patch (N=336 in total)

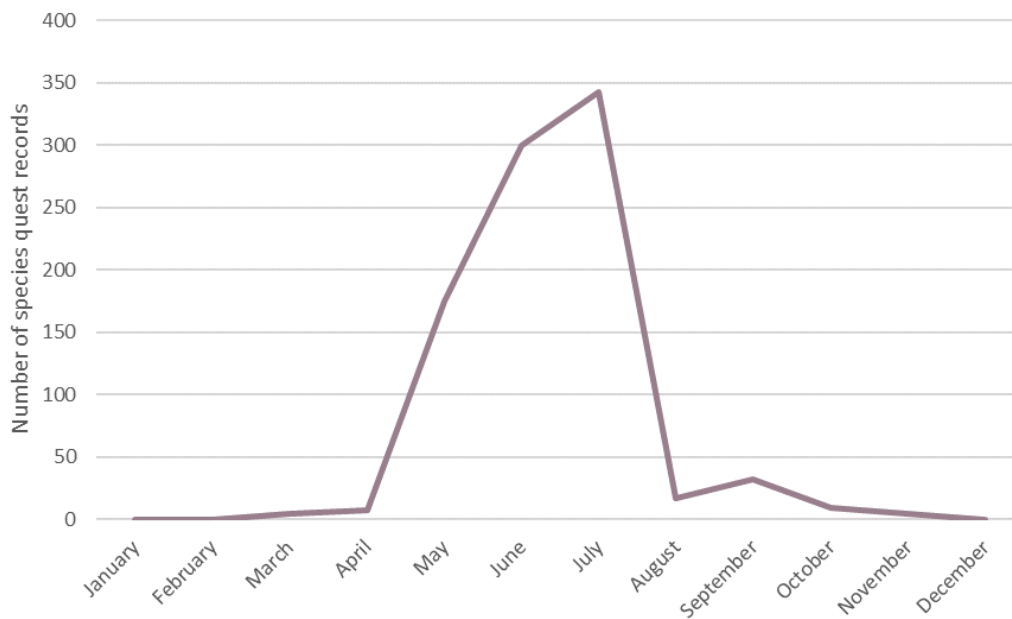


Figure 22: Species quest records by month across the three survey years of Polli:Nation

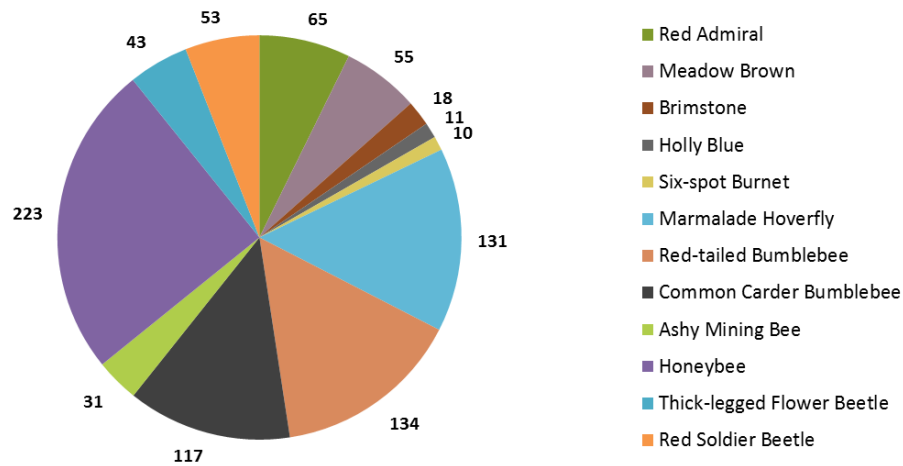


Figure 23: The number of records of each of the species quest species across the 1161 surveys over three years

When considering the number of species quest encounters with respect to the habitat type surveyed, the greater the area of wildflower habitat, the higher the number of species quest sightings. Similarly, on sites with a high proportion of ‘short grass’ habitat, the average number of sightings from the list was lower (Figure 24).

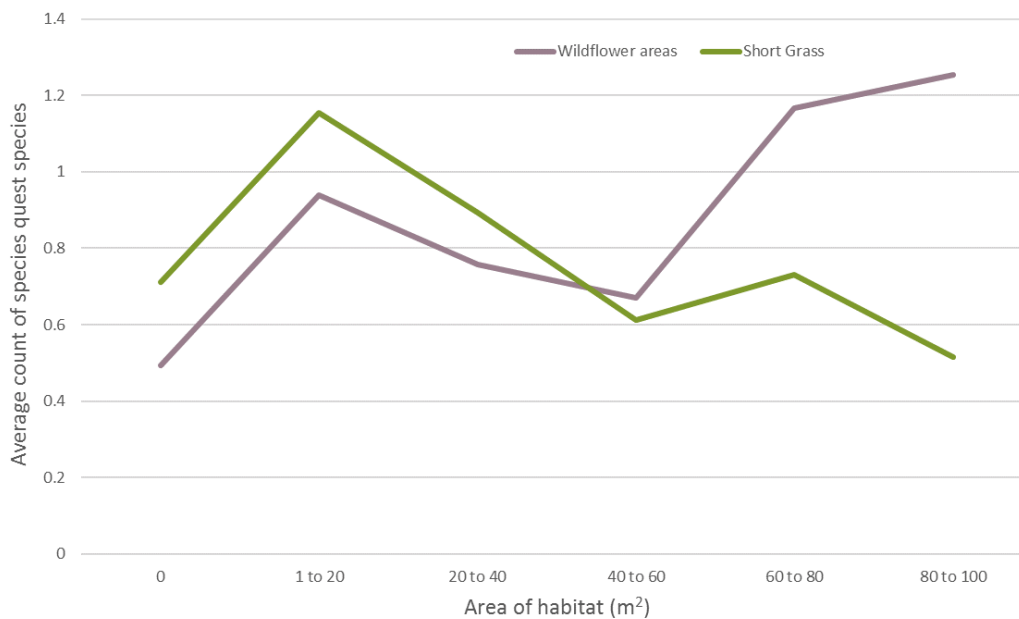


Figure 24: The average encounter rate of all pollinators from the species quest list by area of wildflower and short grass habitat recorded in the survey

Deconstructing the habitat trends for species quest sightings into species the declines in average encounter rate as the area of short grass increased, was notable for Honeybee, Common Carder Bee and Red Soldier Beetle (Figure 25). The contrasting increases for species are apparent when considering the increase in the area of wildflower habitat (Figure 26).

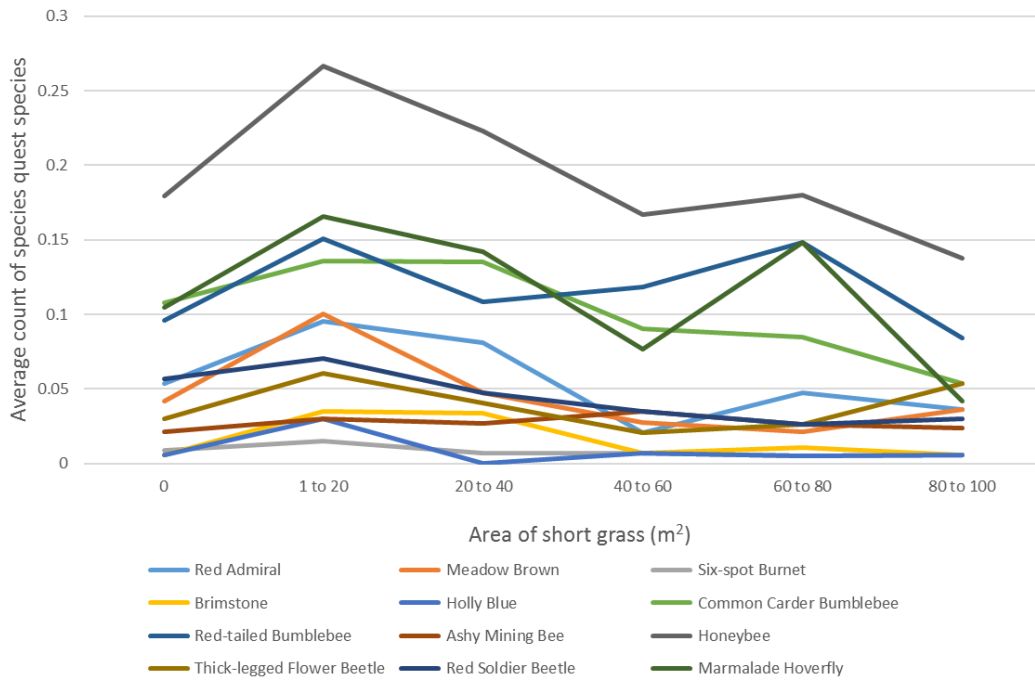


Figure 25: The average encounter rate of pollinators from the species quest list by area of short grass habitat recorded in the survey

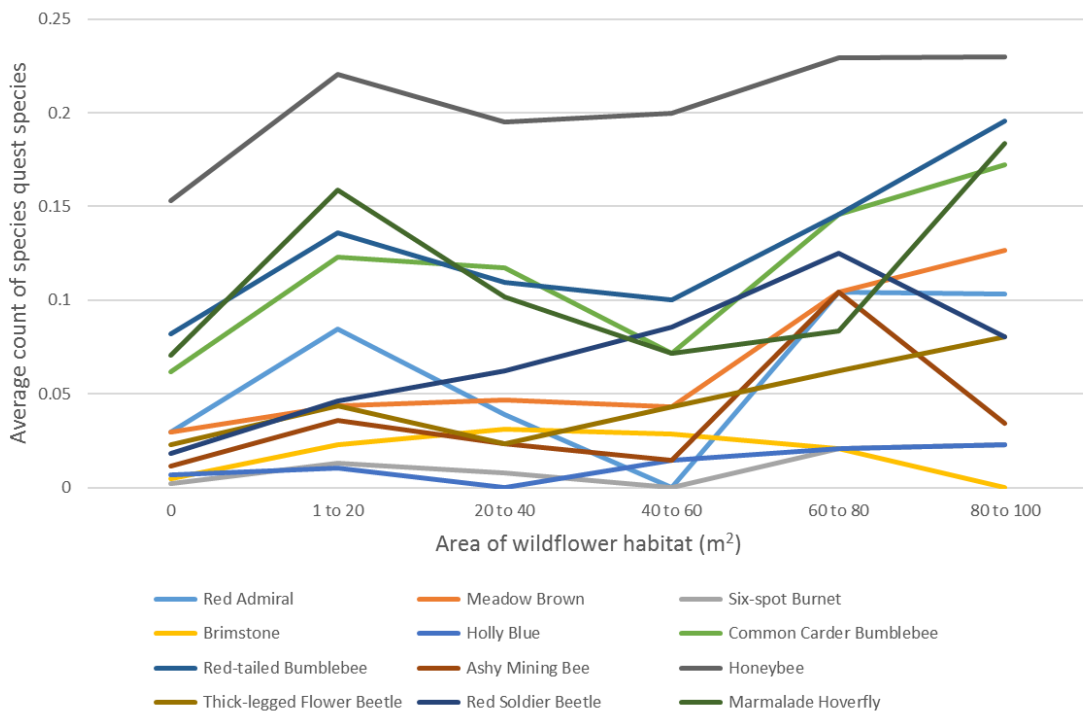
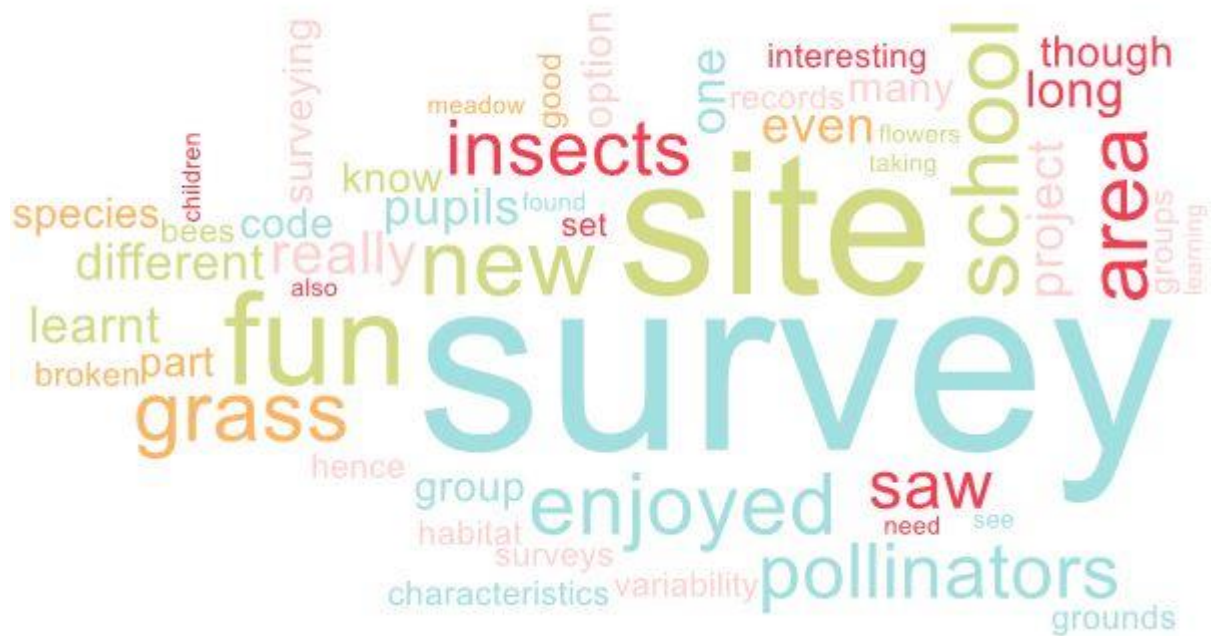


Figure 26: The average encounter rate of pollinators from the species quest list by area of wildflower habitat recorded in the survey

Feedback from Participants

A comments field was provided as part of the online data entry system. A word cloud has been created using entries into the comments field. Some excellent comments were received about the survey, which are reflected in the word cloud.





Key Findings

Uptake

- 1161 sets of survey results were received from 336 groups over the three years of the Polli:Nation project
- 58% of results were from Primary Schools; 16% from Secondary Schools & 28% from public groups (62% of all groups were Polli:Nation registered)
- The highest number of submissions was 42 from Bryncethin Primary School in Bridgend, Wales
- Being registered and having support from facilitators supports the submission of data
- The busiest survey year was 2016 with 47% of all surveys submitted in 2016, 24% in 2017 and 29% in 2018
- Due to involvement in Polli:Nation, the proportion of groups with previous experience of identifying insects has risen by 22% over the three years of the project.

Habitat

- Over 14,500m² of wildflowers were recorded as part of the Polli:Nation survey
- The area of wildflower habitat surveyed has increased over the life of the survey
- The area of short grass surveyed has declined over the 3 years of the survey
- According to the survey submission data, 148 groups recorded that they had made at least one change to their site
- The most popular habitat to create year on year has been to add pots, build raised beds or plant flower beds with 125 groups (84%) carrying out this work. Creating wildflowers meadows/verges was the second most popular (66% carried out this improvement).
- There was a significant increase in the area of feeding habitat (and a significant decrease in the average area of man-made features (bare walls/fences, concrete/tarmac, short grass) following improvements
- There was an increase in observations of woody and wild plants in flower following the improvements for pollinators

Pollinators

- Over three years 18,866 pollinators were recorded and there were 2867 two minutes quadrat searches which represented 66 hours of survey time or 20 days of school!
- Most surveys were conducted in June and July
- Overall there were significantly more pollinators found after habitat improvements were made (an average of 7.7 insects per 1m quadrat compared with 4.3 before)
- Statistical analysis indicates there was a significant increased pollinator abundance with the area of pollinator feeding habitat and number of plant species in flower. In addition, more pollinators were found where the quadrat contained more flowers, damp places and wildflowers. In particular hawthorn, thistle, and nettle improved the likelihood of finding insects
- There was decreased pollinator abundance in quadrats with short grass, concrete or tarmac and interestingly lower numbers found near clover, daisy, dead nettle and blackthorn
- In terms of the range of groups found, creating damp places and wildflower areas has a positive effect on total pollinator diversity
- Wildflowers had a positive effect on the number of quest species found whereas short grass had the opposite affect
- 62% of groups recorded at least one species of pollinator
- The greater the area of wildflower the more species recorded
- The Honeybee most commonly found quest species for three years running

Report Reference

Cruickshanks, K., Lakeman Fraser, P., Dennis, E., Bulman, C., Burgess, S., Townsend, S., Evans, L. Jackson, M.(2018) Polli:Nation: 2016- 2017 Survey Results p22. Available at: <https://www.opalexplornature.org/polli-nation>

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