Annual newsletter 2020

All-Ireland BUMBLEBEE Monitoring Scheme

2019, Carder bumblebees in trouble

Large carder bee

Common carder bee

2019 was the 8th year of the All-Ireland Bumblebee Monitoring Scheme. Thanks to the combined effort of the schemes expert volunteers, we know that bumblebees remain in a precarious position, with the carder bumblebees showing worrying declines

What is it? The All-Ireland Bumblebee Monitoring Scheme is a citizen science scheme that tracks population trends in Irish bumblebees, detecting the impacts of factors such as land use and climate change on the Irish bumblebee population. It is the only monitoring scheme currently underpinning the All-Ireland Pollinator Plan. It involves walking a fixed route (transect) on a monthly basis from March to October each year, when weather conditions are favorable. The number of the different bumblebee species seen along different sections of each transect are recorded. These recordings are the basic data upon which the analysis is based.

What type of analysis is completed within the scheme? Two separate analyses are undertaken to determine the change (if any) in bumblebee populations. The first is a multi-species index which estimates the overall direction of change in the bumblebee population, as a whole, using Irelands most common bumblebees (8 species). A trend line is estimated from the multi-species index which summarises the overall direction of the population change since the commencement of the recording scheme (ie., 2012). The second type of analysis is the estimation of a trend that tracks the status of the individual species of bumblebees. The multispecies index and the individual species trends are estimated using international best practice methods developed by Statistics Netherlands (TRends and Indices for Monitoring data, TRIM, Pannoeck & van Strein, 2005; Multi-Species Indicators, MSI, Soldaat et al., 2017).

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Key Partners

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2019 at a glance

94 transects (some partially completed)

65 transects included in analyses

73 recorders

922 km walked

500 hrs of effort

10,943 bumblebees

13 species recorded

An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht
An Chomhairle Oidhreachta
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What does the addition of the 2019 data tell us?

- The most important thing it highlights is the phenomenal effort our citizen science volunteers have put in over the years. In 2019, you collectively spent over 500 hours walking 922 km, counting 10,943 bumblebees across 13 species!
- The case simply is that without your generous efforts, we would be largely ignorant of how the populations of this vitally important group of insects are changing.
- The overall count is still down from the scheme average, but was up slightly on 2018. However, you can clearly see the impact of our fluctuating weather. In 2019, bumblebees peaked unusually early in June with the highest abundance ever recorded for that month, but then plummeted in July. Towards the end of the season (Aug-Oct) things picking up again on previous years, but with numbers still coming in below average.
- With only 8 years of data we have to err on the side of caution, but the trends do seem to indicate that bumblebees remain in a precarious position. The current overall trend from 2012-2019 is a year-on-year decline of 4.8%.
- The number of White-tailed bumblebees (*Bombus lucorum* agg.) recorded rose substantially from 2018, with the Red-tailed bumblebee (*B. lapidarius*) and the Garden bumblebee (*B. hortorum*) numbers rising slightly.
- The two carder bumblebees continue to show worrying declines. The Common carder bee (*B. pascuorum*) is one of our most common bumblebees. In a clear indication of how easily 'new normals' can be created - it remains common in relative terms, but the combined transect walk data shows that it is actually now in strong decline.
- Who knows just how abundant our common bumblebees were if we could travel back in time? It is this possibility of continued gradual losses that inspired us to establish the All-Ireland Bumblebee Monitoring Scheme in 2012. By coming together to all monitor bumblebees, you are helping us understand that bumblebees are in difficulties, and hopefully through the All-Ireland Pollinator Plan, we can try to tackle that.

Bombus lucorum

Bombus pascuorum

Bombus lapidarius

Figure 1: Total number of each bumblebee species recorded in 2019

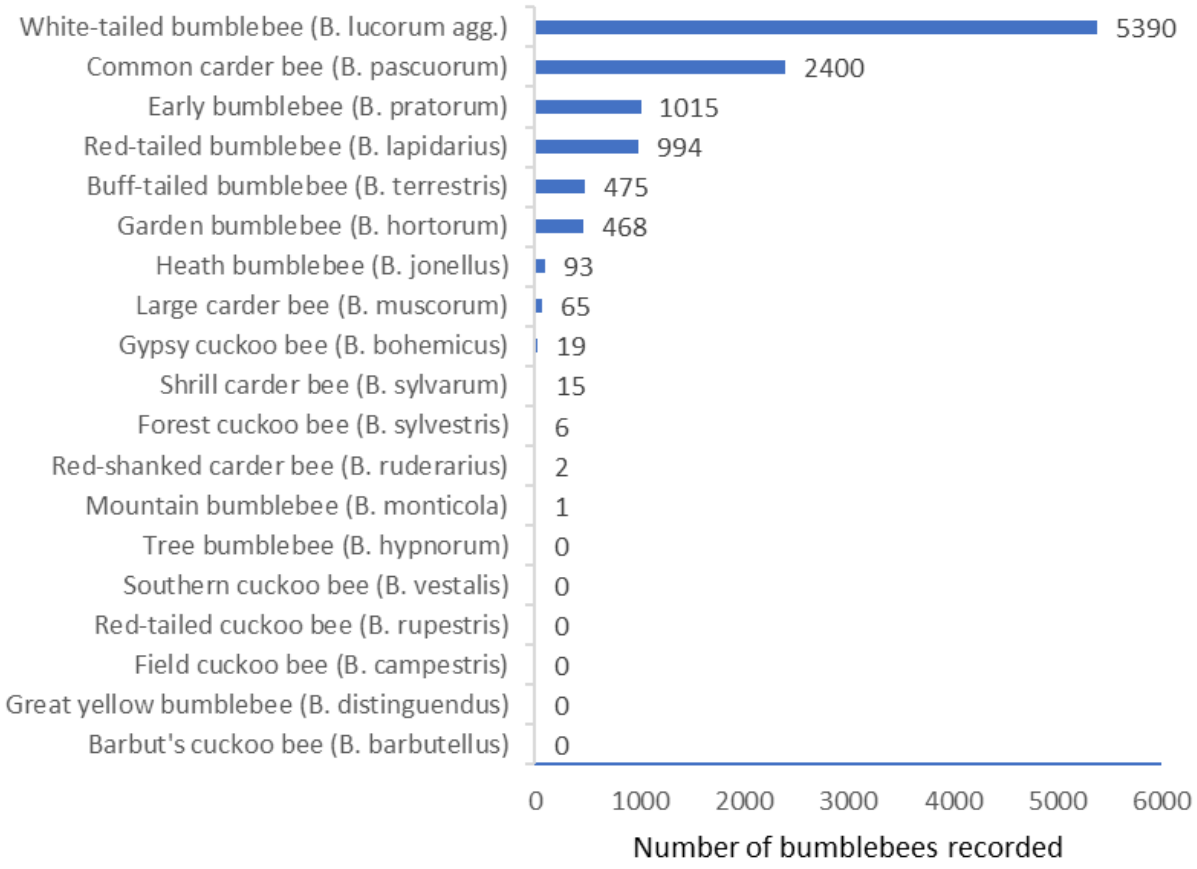
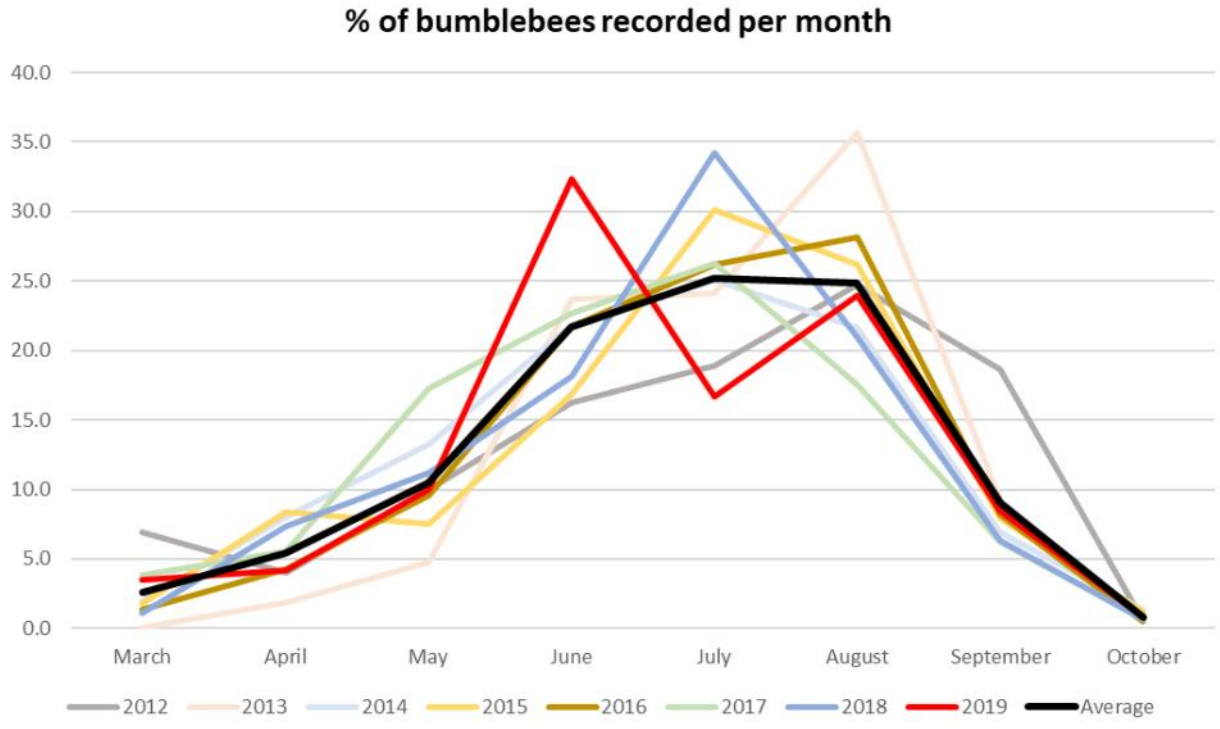


Figure 2: Percentage of bumblebees recorded per month since 2012



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Bumblebee population trends 2012-2019

Multispecies Index of bumblebee population change 2012-2019

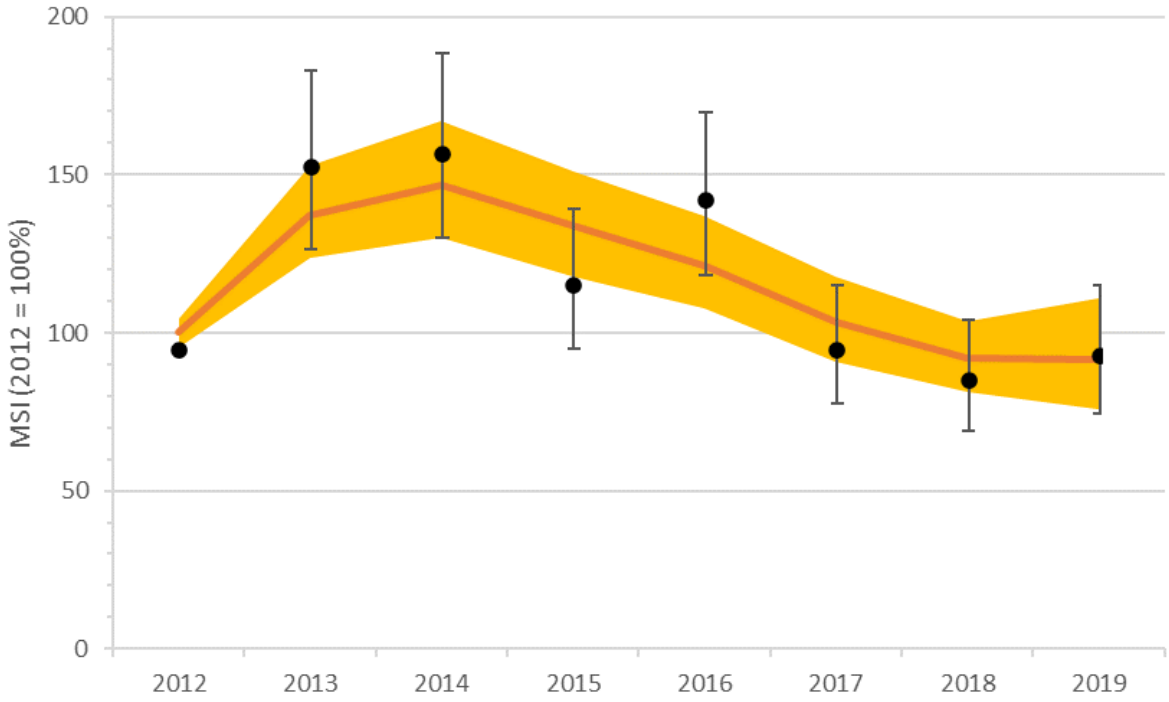

Figure 3: The multi-species index derived from the amalgamation of the population trends of 8 common species of bumblebees from 2012 to 2019. The dark orange line is the smoothed trend line, and the circle markers represent the multispecies index per year. Error bars (on markers) and the shaded area surrounding the trend line are the 95% confidence intervals.

The "multispecies index" of bumblebee population change illustrates our estimates and the level of statistical confidence around those estimates. It is based on the eight species where we have sufficient information to accurately assess changes. This year things have stabilised somewhat in comparison to previous years, but it is still showing an overall loss across populations since 2012. The current overall trend from 2012-2019 is a year-on-year decline of 4.8% (with a 95% confidence interval around our estimate being ± 2.4%).

With only 8 years of data, we have to err on the side of caution in reading too much into these trends. A longer term dataset will be necessary to smooth out the fluctuating impacts of Irish weather. However, things remain precarious for our bumblebees and we can say that some individual species are showing worrying losses. *Bombus pascuroum* has traditionally been one of our most common bumblebees but is now showing a strong decline.

Perhaps less surprising, *Bombus muscorum* is showing a moderate decline. This species is listed as Vulnerable in the 2014 European Bee Red List and as near threatened in the 2006 Irish Bee Red List. Ireland is one of it's strongholds and if can take one immediate follow-up action from these results, it is that we need to encourage local level actions where it still remains to ensure it's long term survival.

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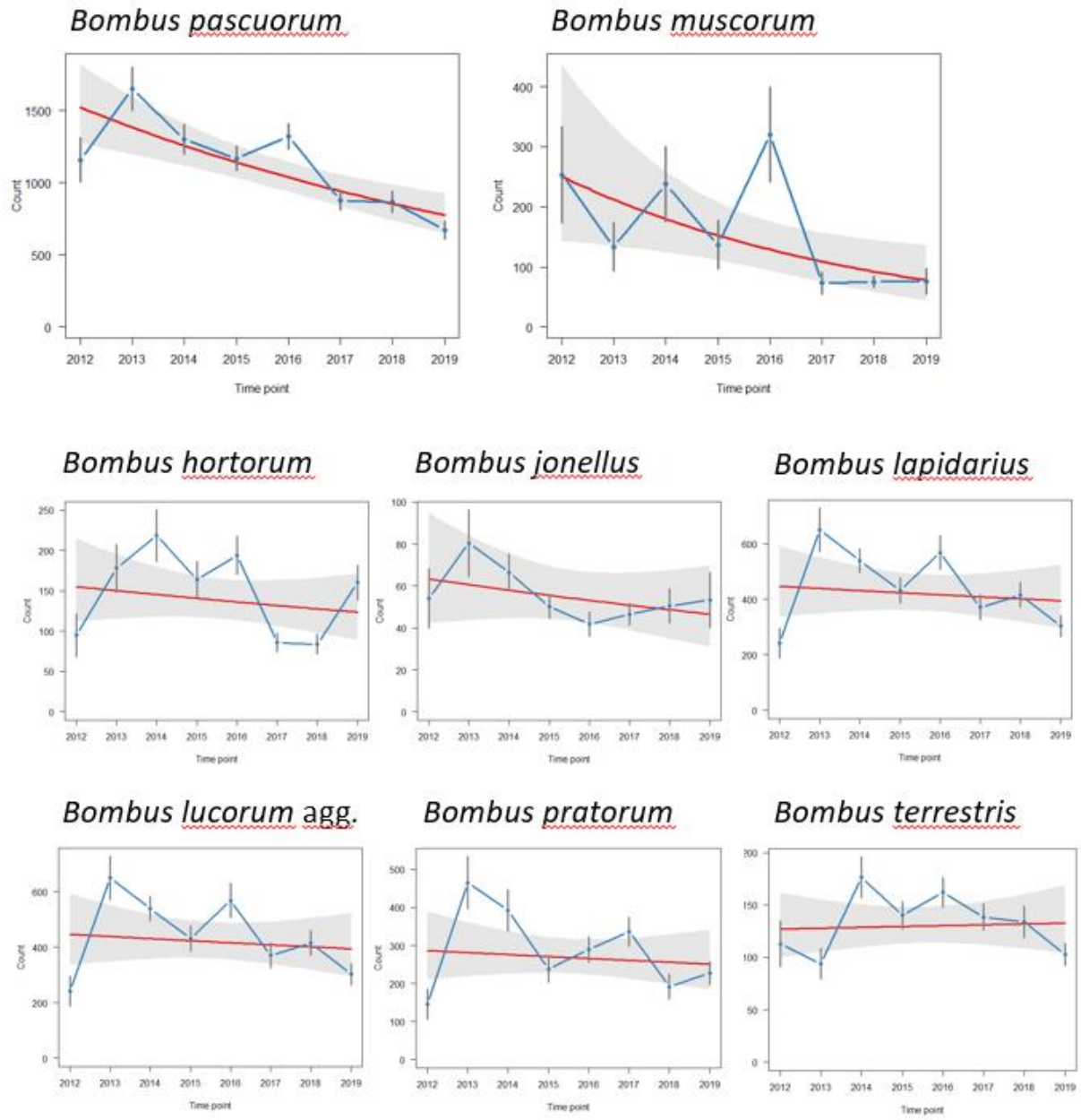
Bumblebee species trends 2012-2019

Species	Change 2012-2019	Statistical Confidence
Bombus pascuorum (Common carder bee)	Strong Decline (< +5% p.a.)	95%
Bombus muscorum (Large carder bee)	Moderate Decline (< +5% p.a.)	
Bombus hortorum (Garden bumblebee)	Uncertain (> ±5% p.a.)	
Bombus jonellus (Heath bumblebee)		
Bombus lapidarius (Red-tailed bumblebee)		
Bombus lucorum agg. (White-tailed bumblebee)		
Bombus pratorum (Early bumblebee)		
*Bombus terrestris** (Buff-tailed bumblebee)*		

* Based on queens



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How do we want to improve the All-Ireland Bumblebee Monitoring Scheme?

1. The most critical thing is that we need more walks. The scheme is reliant on long term walks that are visited at least 6 times a year. Where some months are missed, it is possible to calculate estimated counts using the previous and subsequent counts, but the fewer missed counts the greater the accuracy of the data. Ensuring transects are walked as much as possible, for as many years as possible, will allow us to reap the biggest benefits from that data we are collecting year on year. There is obvious and understandable flux within citizen science schemes like this, so the more walks we have the better!
2. Currently, we are only gathering sufficient data to analyse trends in eight of our most common bumblebee species. Some species are exceptionally rare and will always be outside the scheme, but there are others where a dedicated campaign to encourage volunteers to establish transects in areas where rare species occur would be useful.
3. We need to ensure that the findings are continually translated into action. I think this year, that means that the All-Ireland Pollinator Plan needs to begin raising awareness of actions to help safeguard the Large Carder bee. I also think it means academic partners considering looking into what may be causing the sharp decline in the Common Carder bee.
4. We now have vast quantities of data since 2012. Over the coming years, I hope we can carry out more analyses, beyond the core multi-species index and individual species trends. I think that will help us better understand what is happening. For example, is the *B. pascuorum* decline island-wide or geographically restricted. It would also help us better understand how to improve the scheme and how to better support all of you. I'd also love to see us being able to provide feedback on the individual trends for those of you who have long term walks in the scheme. I hope that by linking with Dr Dara Stanley in UCD, over time some of this will become possible.

THANK YOU!

Most importantly, a sincere thank you to every single one of the volunteers for making this initiative such a success. Without your efforts in walking your transects once per month, double-checking your IDs, sending in photos and ultimately submitting your records to the Data Centre, we simply would lack the evidence-base to protect our pollinators.

Dr Tomás Murray who led the work on the All-Ireland Monitoring Scheme for the last five years, left the Data Centre in 2019 to follow a new career path. Tomás did amazing work in developing the scheme and undertaking very high quality analysis of the data. We miss him enormously and thank him sincerely for all his efforts.

If you would like to reference this document: FitzPatrick, Ú & Stanley, D (2020) '2019, Carder bumblebees in trouble', *The All-Ireland Bumblebee Monitoring Scheme Newsletter* 2020.

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All-Ireland Bumblebee Monitoring Scheme recorders in 2019

Recorder	County	Recorder	County
Áine Fenner (2 walks)	Longford	Karina Dingerkus	Mayo
Áine Fenner	Roscommon	Katy Bell	Fermanagh
Andrew Bergin	Kildare	Kristi Leyden	Clare
Ann O'Connor	Wexford	Laura McCormick	Antrim
Anna McEvoy	Cork	Lee Donohue	Meath
Anthea Southey	Kilkenny	Leif Barry (2 walks)	Dublin
Barry Walsh (2 walks)	Wicklow	Liz Gabbett	Limerick
Bernadette Connolly	Cork	Malachy Martin	Fermanagh
Breda Curran	Kilkenny	Margaret Brennan (2 walks)	Carlow
Caren Carruthers	Offaly	Margaret Synnott	Tipperary
Carol Killarney	Galway	Mary Brennan	Kilkenny
Caroline Stanley	Galway	Mary Foley	Wexford
Catherine Penny	Limerick	Mary Gethings	Wexford
Celia Graebner	Mayo	Mary Montaut	Dublin
Charles Heasman (2 walks)	Dublin	Maureen McGann	Longford
Ciaran Taylor	Wicklow	Mireille McCall (2 walks)	Kildare
Colette Blaney	Limerick	Nabla Rea	Kilkenny
Damien Clarke	Antrim	Nuala Cuffe	Kilkenny
Daniel Clarke	Down	Oisín & Mairead Duffy	Donegal
Daniel Clarke (2 walks)	Antrim	Ben Malone	Waterford
Danielle Shortall	Down	Pat Foley	Offaly
Dara Stanley	Dublin	Patrick Fahy (2 walks)	Mayo
Deirdre NicLochlainn	Donegal	Ralph Sheppard	Donegal
Edward Hill (2 walks)	Kildare	Richard Walsh	Kilkenny
Edward Hill	Dublin	Rob Wheeldon	Leitrim
Emma Stewart-Liberty	Clare	Rose Cremin	Fermanagh
Ernest Mackey	Wicklow	Ruth Maxwell	Westmeath
Gala Natalia Jiménez	Louth	Sallyann Marron	Clare
Geoff Newell (2 walks)	Antrim	Tomas Murray	Waterford
Geoff Newell	Armagh	Sean Forde (3 walks)	Kerry
George McDermott	Donegal	Sharon Parr	Clare
Hugh Lee	Wicklow	Sophia Couchman	Carlow
Irmgard Considine	Clare	Tara Dirilgen	Dublin
Isobel Kurz	Wicklow	Tom Gittings	Cork
Janet Whelehan	Wexford	Tony Miller	Cork
Jeanne Sampier (3 walks)	Galway	Trish McAndrew	Mayo
Jerome Walsh	Laois	Úna Fitzpatrick (2 walks)	Waterford
Joanna Hodghton	Wexford	William Bryan	Waterford
Justin Ivory (3 walks)	Wicklow		

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