Stag Beetle News

The European Stag Beetle Monitoring Network (ESBMN) is an international collaboration to monitor the European stag beetle with a uniform methodology. We aim to assess local and international population changes. If you missed the previous newsletters, find them here. This newsletter can also be found in Spanish.
In this 7th newsletter, you can expect our overview of the 2024 transect walks as well as a total update of all transect walks, conservation outreach work, a promotion video and some interesting research news.

2024 transect walk results

Last year, a total of 138 transect walks were submitted from 39 transects. Transects were walked up to eight times (in Hatherop Road, UK). This resulted in 371 stag beetle observations, a strong increase compared to 2023 (336) and the years before. So the trend that we reported last year continues, less transect walks are registered but they are more focused on the peak period of stag beetle activity resulting in an increase of observations. Also, the number of transect walks without observations further declines, from 123 (2023) to 70 (2024). However, we know that each year after this newsletter is sent, there is a rush to upload some forgotten data from last year (so the results are not final).

Country	No. transects	No. transect walks	Nr. observations

United Kingdom	13	44	11
Belgium	10	35	79
Italy	4	11	127
Slovenia	3	10	17
Spain	2	12	7
Portugal	2	8	8
Netherlands	2	7	14
Poland	1	5	82
Switzerland	1	5	26
Croatia	1	1	0

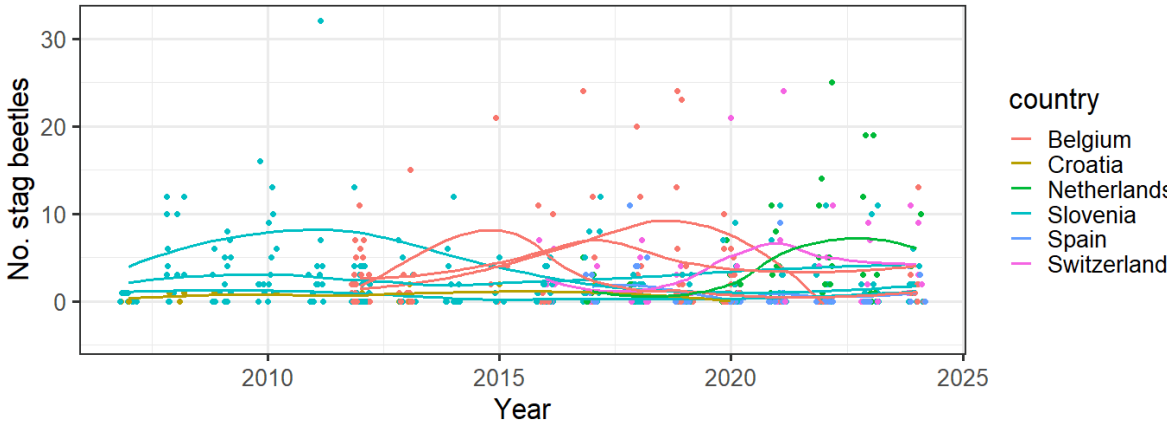
Trendlines from our transect walks

Our network was setup in 2016, only from Slovenia, Croatia and Belgium, we have older transect data. There are quite some countries for which we start to have sufficient data over a long period to start analyzing any trend present. Number of transect walks per country and year:

Country	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**
Spain		40	41	45	136	90	72	59	12	**495**
Portugal	27	3	2		256	61	21	7	8	**385**
Netherlands		23	56	105	90	7	19	14	7	**321**
United Kingdom		14	47	15	26	10	69	84	44	**309**
Belgium	18	9	14	21	37	57	65	33	35	**289**
Croatia		2		58	29	7	6	11	1	**114**
Italy			23	46	32				11	**112**
Slovenia	26	23	18	14	13	13	10	10	10	**137**
Germany	4	18	13	14	31					**80**
Switzerland	7	6	6	6	5	4	5	6	5	**50**
Poland	10					13	16	5	5	**49**
France				6						**6**
Serbia			1							**1**
Total	**92**	**138**	**221**	**330**	**655**	**262**	**283**	**229**	**138**	**2348**

If we look at the transect level, there are 12 transect that have been followed up for 10 years or more, all from Slovenia, Belgium and Croatia. Followed by three transect in Switzerland, Spain and the Netherlands with 7 to 8 years of data coverage. Also, when looking at the number of transect walks, the same transects form the top 20 with 30 transect walks or more.
If we look at some of these well studied transects, we see that the trendline for all of them goes up and down but without a clear overall pattern. However, we

need to look further into the data to see what the reason behind this is. We need to compensate for the effect of the season (early or late transect walks), weather conditions and potentially starting time. If a clear trend is still present after that, then we can be certain that it is a population density change. Work in progress for the coming year.
The graph below gives the number of stag beetle observations per transect walk for 10 example transects. A trendline is added for each transect.

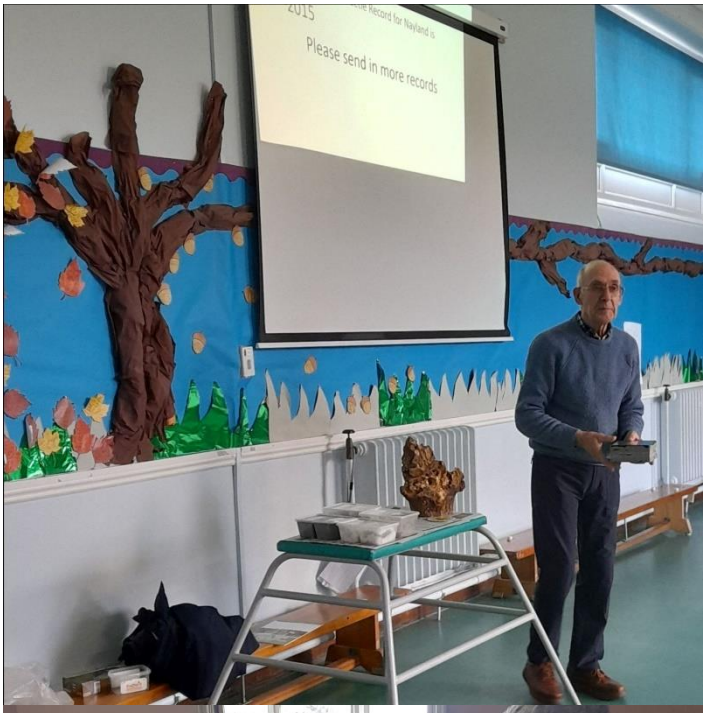


Promote the transect walks in your locale community

To strengthen our network, we always aiming to find new volunteers who are willing to start up a new transect. But how to find these enthusiast volunteers in all the different countries? Recently, we made a promotional video to explain our transect walks and to make people enthusiast to start up their own transect. We will share this video on several social media platforms to promote it. Feel free to share it in your local communities of nature lovers or citizen scientists.

Stag beetle conservation outreach work

Colin Hawes
Reaching out to groups that are interested in learning more about stag beetles and their conservation is extremely important. Still too often, habitats are disturbed unknowingly so educating people is key to make them aware.
For many years, I have been giving talks about this flagship species to promote their recordings and conservation. Weaponed with a PowerPoint presentation, live adults and larvae, I went to Primary Schools, meetings of farmers and other landowners, wildlife trusts and societies, gardening and horticulture societies and more. In 2024 alone, I have given 13 talks. These visits typically begin in March and continue until early September. Telling people about the ecology and life cycle of stag beetles is very rewarding. This citizen science outreach work brings in many new stag beetle sighting records which adds to the distribution map for the County of Suffolk.
People are often quickly mesmerised about this large and fascinating beetle that happen to live just in their backyard. This has encouraged many groups to construct log piles or loggeries (see further in this newsletter) on their land, garden or school grounds. The children are very proud to show their loggeries to others.



Outreach activities by Colin Hawes (© Colin Hawes)

Science news

Stag beetle air force specialists

Based on: Giannetti D., Schifani E., Rolli E., Fior E., Pasquali B., Campanaro A. & Grasso D.A. 2024. Fight or flight alternative mating tactics may explain the iconic male polymorphism of the European stag beetle. Scientific Reports, 14, 24758

Did you ever wonder what drives the big size and shape variability in male stag beetles? Even scientists have wondered about unraveling this intriguing mystery. This Italian research yet solved another part of the puzzle. We knew that larger males have larger mandibles making them better equipped for fighting. Winning more ground fights means better mating opportunities, which makes sense. Smaller males (requiring less food as larvae) have relatively speaking smaller mandibles. So, they deliberately 'chose' to invest less in fighting skills but what do they gain out of it? This Italian study discovered an alternative mating tactic where flying males compete to catch flying females in mid-air. Now the rules have changed and the long mandibles likely only hinder flight performance. Therefore, small males show greater agility in flight: they are the specialised air forces. Smaller males seem to have mating advances in this way. Further research will however be needed to fully unravel this complex interaction between behaviour and morphology. Therefore, we have a question for you, have you ever seen this behaviour where numerous males perform concentric flights in swarms? Let us know and describe your observation so we can give an overview in our next newsletter.

Supporting video of the article with swarming males (© Daniele Giannetti)

How helpful are log piles for stag beetle conservation
Based on: Thomaes A., Christiaens B., Goessens S. & Tagliani, A. 2024. Evaluating log piles as stag beetle conservation measure. Journal of Insect Conservation, 28(4), 811-819

Log piles consist of upright logs buried about half a meter deep in the ground. They are built all over Europe to protect our beloved stag beetles by providing the much needed underground dead wood for the larvae. But how successful are they and how many stag beetles to they 'produce'? To study this, 100 small

log piles were built next to each other in Belgium and followed up by placing an emergence trap about every two years over each log pile. Log piles were colonised already the first year they were built, and beetles emerged up to 13 years later, with most beetles emerging after eight years. The log piles made of oak were more preferred than beech and poplar for colonisation but also the number of emerging beetles was higher. However, the size of the beetles didn't differ between the tree species used. A standard oak log pile with a 2m diameter can produce about 225-250 stag beetles over a period of 13yrs. For beech this would be 25% less and for poplar 50% less. This means that a couple of log piles can quickly double an urban population so let's start building.

New log pile in Belgium (© RLPZ)

Effects of fragmentation on population genetics: a puzzle to be solved
Arno Thomaes & Iwona Melosik
Based on: Melosik I., Lewandowska-Wosik A., Sobczyńska U., Dabert M., Mleczak M. & Baraniak E. 2024. Genetic diversity and population structure of the endangered saproxylic beetle L. cervus in a fragmented landscape. Insect Conservation and Diversity, 17, 616–631

For the stag beetle, the landscape resembles a jigsaw puzzle of habitat patches like forests interspersed with unsuitable areas such as agricultural fields and built-up zones. When stag beetles can no longer travel from one habitat patch to

another, it is called fragmentation, and it can affect their genetic variability. A genetic study was set up to investigate the effects of habitat fragmentation on the genetic structure of stag beetles in Poland. Three recently fragmented populations were studied. Instead of collecting live beetles, researchers analyzed prey remains, minimizing disturbance to the species.
Surprisingly, despite the considerable distances of 37 to 100 km between populations, the genetic study revealed a relatively homogeneous population. The authors were a bit puzzled as a previous study in Belgium did find fragmentation effects over much smaller distance. Could gene flow between Polish populations be higher than expected due to unknown intermediate populations, or have isolation events occurred too recently to be reflected in the genetic structure? Another possibility is that the remaining isolated populations are still large enough to withstand genetic drift (random genetic changes). The smallest populations in this study were comparable in size to the largest population in the Belgian study. The answer remains a puzzle that can only be solved with further research.

Two male stag beetles in Włoszakowice, Poland (© Marek Przewoźny)

Register Here

Do you have any questions for us, any ideas for our Newsletter next year or would you like to share your story? Let us know.

Have you published a scientific study on stag beetles? We would love to share a short overview of it here.

Text written by Arno Thomaes unless mentioned otherwise. This Newsletter was developed by Arno Thomaes, Colin Hawes, Petra Vyncke and Iwona Melosik. Photo in the heading by: Pietro Monteleone.

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