

Phenology and citizen science update their status

ONE ENVIRONMENTAL FIELD OF STUDY THAT HISTORICALLY has relied on laypeople or “citizen scientists” for data collection is now adapting to the ubiquity of global communications technology. Phenology, the study of the relationship between plant and animal life cycle stages and climate, is well poised to capitalize on the widespread availability of computer network, Internet, cell phone, and global positioning system (GPS) technologies for quick, easy, and integrated documentation of natural cycles.

Volunteers’ or enthusiasts’ notations of the date and location of first-arriving migratory birds, green-up of grasses, flowering and fruiting of plants, maximum abundance of migratory species, and insect emergence have contributed to biologists’ understanding of species’ life histories and ecosystem functions for centuries. The new game in town for phenologists is weighing, for example, a bird observation sent in by birdman221@yahoo.com and aggregating it with data from the 6 million bird migration cards written between 1881 and 1970 as part of the North American Bird Phenology Program. Historical records from this program have been incorporated into the USA National Phenology Network (NPN), founded in 2004 and sponsored by numerous governmental and nongovernmental organizations, including the National Science Foundation (NSF), U.S. Geological Survey, and National Park Service.

Already a cornerstone of phenology, the basic trust in data reported by citizen scientists can be improved with the addition of digital photographs and occasional confirmation of anomalous data, as demonstrated by the Cornell Lab of Ornithology’s Project FeederWatch. This ongoing research Web site tracks the winter movements of North American bird populations as reported by the owners of bird feeders. Mayer (2010) writes that FeederWatch’s use of new technologies makes participation more accessible and expedites the process of converting volunteer observations into usable data.

The scientific research community requires data collection standards and the National Phenology Network has developed “protocols for gathering observations,” writes Mayer (2010). Preventive and corrective strategies built into the NPN data system ensure that the data it stores will meet research quality requirements. For example, a citizen scientist cannot mistakenly enter a future date or select a plant species foreign to the region. Similarly to FeederWatch, any questionable data are flagged and additional information is requested. With these back-end measures in place, and with clear instructions given to its participants to begin with,

the National Phenology Network assumes that its “flock” of citizen scientists is flying straight.

An ambitious science program dedicated to collecting ecological and climatic observations and scheduled to begin in 2016 will include a citizen science component and plans to further help verify sightings. Known as the National Ecological Observatory Network (NEON) and funded by the National Science Foundation, this corporate program may use photos from cell phone cameras and GPS coordinates to confirm sightings by its citizen scientists. Its goals are to increase understanding of climate change, biodiversity, disease ecology, and invasive species and to forecast ecological change at continental scales.

Between ambition and practicality, however, there is money. The input of long-term, “legacy” data sets into publicly accessible databases is crucial for developing incisive and relevant conclusions in phenology, but “traditional funding sources, such as grants from the NSF or other government agencies and foundations, are given typically for no more than five years,” according to Mayer (2010). One exception is Project FeederWatch, which requires a \$15 annual fee from each participant and, according to its Web site, is run almost entirely on those funds.

The wide availability of new ways to engage the public in the scientific process can only be a boon to phenology, and some national parks may be able to incorporate nontraditional reporting means into scientific field activities such as bioblitzes and stimulate public interest and participation in park science and information sharing. Who knows, if Henry David Thoreau were alive today, he might be stalking Walden Pond with a wireless hotspot, “tweeting” from his iPhone about the first robin of spring.

References

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