Global Ecology and Conservation 7 (2016) 39–48

Contents lists available at ScienceDirect

Global Ecology and Conservation

journal homepage: www.elsevier.com/locate/gecco

Original research article

What is in a label? Rainforest-Alliance certified banana production versus non-certified conventional banana production

Angelina Sanderson Bellamy [a,*], Ola Svensson [b], Paul J. van den Brink [c,d], Michael Tedengren [b]

[a] Stockholm Resilience Centre, Stockholm University, SE-10691, Stockholm, Sweden

[b] Department of Ecology, Environment and Plant Sciences, Stockholm University, SE-10691, Stockholm, Sweden

[c] Department of Aquatic Ecology and Water Quality Management, Wageningen University, Wageningen University and Research centre, P.O. Box 47, 6700 AA Wageningen, The Netherlands

[d] Alterra, Centre for Water and Climate, Wageningen University and Research centre, P.O. Box 47, 6700 AA Wageningen, The Netherlands

ARTICLE INFO

Article history:
Received 4 May 2016
Accepted 4 May 2016
Available online 18 May 2016

Keywords:
Banana production
Rainforest Alliance certification
Management practices
Costa Rica
Insect diversity

ABSTRACT

Export banana production in Latin America is pesticide intensive, receiving much negative publicity regarding human health problems and environmental degradation. The Rainforest Alliance (RA) certification scheme was established to certify farms that met a number of social, occupation health and environmental standards set by RA and their certifying body, the Sustainable Agriculture Network (SAN). This study was one of the first, independent studies of the environmental impact of some of the principles set by RA and SAN. The study focuses on insect and bird diversity as an indicator of ecosystem health. Five RA certified farms, six non-RA certified farms, and five organic certified farms were sampled. The data was analyzed with RDA multivariate analyses and Monte Carlo permutation tests. The results showed that RA certified farms had less insect diversity compared to non-RA certified farms and that both farm types had less insect diversity than organic farms. There was little difference between RA and non-RA certified farms with regards bird community composition. Thus, organic farming conserves biodiversity, while alternative environmental labels (e.g. a Rainforest alliance seal) may not have any visible positive effect on in-farm biodiversity. This study points to the need for improvements in SAN certification standards to achieve improved environmental conditions.

1. Introduction

As the impact of human activities increasingly degrade environmental quality, the role of conservation of environmental resources becomes increasingly important. Yet, in agricultural areas, this conservation needs to be balanced with the competing economic needs for agricultural production. Agriculture is a significant activity contributing to environmental degradation, and is one sector in which research has focused on practices that may reduce the level of degradation.

* Correspondence to: 33 Park Place, Sustainable Places Research Institute, Cardiff University, CF10 3BA, UK. Tel.: +44 7505 936341.
E-mail addresses: bellamya1@cardiff.ac.uk (A.S. Bellamy), ola.svensson@su.se (O. Svensson), Paul.vandenbrink@wur.nl (P.J. van den Brink), michael.tedengren@su.se (M. Tedengren).

http://dx.doi.org/10.1016/j.gecco.2016.05.002

In Latin America, and more specifically in Costa Rica, export banana production is one such agricultural commodity whose production significantly degrades the environment. The high-intensity of pesticide use in Costa Rica for the production of export bananas has been well-documented (Stover and Simmonds, 1987; Hernandez and Witter, 1996; Hernández et al., 2000; Marquardt, 2002; FAO, 2002; Bellamy, 2013). Costa Rica is the world's second largest exporter of bananas. Costa Rica also has one of the highest intensities of pesticide use in the world (per agricultural worker) due in large part to their banana production, which accounts for an estimated one-third of the country's pesticide consumption (Von Düszeln, 1988). It is a similar case with banana production throughout Latin America, where export production is dominated by large farms and largely influenced by the three multinational banana companies, Chiquita, Dole and Del Monte, which export an estimated 80% of the bananas produced (FAO, 2002).

Export banana producers have experienced heavy social pressure, initiated by international environmental and other non-governmental organizations, to produce bananas with less pesticide-intensive methods. As a result of both this pressure and the increasing costs of chemical inputs, research within the export banana sector has looked at how to reduce these costs and at the same time improve environmental quality. One such outcome of this has been the role of the Rainforest Alliance (RA) organization in offering certification to farms that comply with a set of standards chosen in order to achieve improvements in both the environmental and social impacts of banana production.

The largest producer to receive RA certification is Chiquita Brand International; every Chiquita farm in Costa Rica is certified and Chiquita is working with RA to certify all of their farms in Central America. RA certification is awarded to farms that comply with a set of standards that are set by the Sustainable Agriculture Network (SAN). The RA is the secretariat for the SAN. Banana is just one of over 40 crops that the RA use in their certification scheme. RA has certified over 1600 banana farms, resulting in an area of 109,000 ha under certification (RA, 2015). Certification by SAN is based on 10 principles: social and environmental management system; ecosystem conservation; wildlife protection; water conservation; fair treatment and good working conditions for workers; occupational health and safety; community relations; integrated crop management; soil management and conservation; and integrated waste management SAN (2005, 2010). While fieldwork was conducted during 2007, ongoing follow up visits, informal interviews and observations of practices on banana farms confirm that management of banana production remains unchanged. Furthermore, while RA standards are undergone modifications during this time, they have not been to the extent that they have modified management practices in the areas in which this research is concerned SAN (2005, 2010).

While Chiquita began strongly marketing the RA certification seal in Europe in 2005, as an alternative 'green' label that promised reduced environmental impact on the farms receiving its certification (Corporate Social Responsibility, 2005), there is a lack of research to support these claims. In order to convince skeptical consumers and critics, and as a result of their own strong belief that their practices really do make a difference, Chiquita agreed to allow access to their farms for independent research to be conducted that would compare the ecological state of their own farms with those of uncertified competitors. The research presented here is, in part, the result of this open access to Chiquita farms for field work, and aims to fill the void of information regarding the ecological impact of various banana management systems. We test the hypothesis that management practices resulting in RA certification lead to reduced environmental impact on and around these farms compared to non-RA certified farms.

2. Methods

In order to measure the impact of production practices on the local ecology, we measured insect diversity and abundance and bird diversity; we complemented this data with a habitat characterization of each sampling site. Arthropods were chosen as the measure of environmental quality for this study because they comprise 90% of the organismal variability of all species; they dominate the structure of ecosystems (Pimentel et al., 1992); and they perform crucial functions to stabilize ecosystems (Wilson, 1987), all of which makes them a good measure for both biodiversity evaluation (Duelli et al., 1999) and ecosystem resilience. Greater ecosystem resilience is in the economic interest of banana producers, because it means that the production system has a greater capacity to respond to extreme events like flooding, drought, and waves of high pest pressure or the introduction of new pests, and enables the system to return to a state of equilibrium.

Surface-dwelling arthropods are often used in biodiversity inventories in agricultural areas because many species are polyphagous predators, they are easily collected in pitfall traps, and catches in pitfall traps provide a large enough number of species to allow for the application of statistical methods (Duelli et al., 1999). In addition to the sampling of surface-dwelling arthropods, sampling Heteroptera and some suborders within the Hymenoptera group (via the use of yellow bowl traps) can be a good indicator of biodiversity (Duelli et al., 1999). Thus, sampling with the use of both pitfall traps and yellow bowl traps can enable the evaluation of environmental quality of a site, with a view towards sustainable management practices within the banana production system.

Insect sampling was thus conducted using these two different methods for trapping insects. Yellow bowl traps and pitfall traps were set out at each sampling site. Sites sampled at the banana farms were placed along a transect running from the forest to the edge, to 30 m in, to the center of the farm. (See Fig. 1.) On some small farms ($n = 2$), the site that was 30 m in also constituted the center of the farm. On other farms there was no adjacent forest ($n = 7$). The specific site for each sampling point was decided in advance after consulting a map of the farm and surrounding land uses. In cases where there was not forest adjacent to the farm, the edge site was placed adjacent to rivers ($n = 3$) or open pasture ($n = 4$).