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Data Article

Summary data of home proximity to the nearest greenhouse (floricultural) crops and areas of greenhouse crops around various distances from homes in agricultural settings in Ecuador

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ABSTRACT

This article presents data of 623 children (1156 observations) between 4 and 17 years of age living in floricultural communities of Ecuador from 3 examination periods (2008, Apr 2016, and Jul–Oct 2016) as part of the study of Secondary Exposure to Pesticides among Children and Adolescents (ES-PINA). We present geospatial data of residential distance to the nearest greenhouse crop and areas within various buffer sizes around homes of participants which is data used in the original research article: Suarez-Lopez JR, et al. “Residential proximity to greenhouse crops and pesticide exposure (via acetylcholinesterase activity) assessed from childhood through adolescence”. These geospatial variables are related but different constructs of the potential for off-target drift of pesticides from crops onto homes nearby (via acetylcholinesterase activity) Understanding the associations between these distance and crop area variables is important as a growing number of investigations are using these constructs of off-target pesticide drift to characterize their associations with both exposure biomarkers and outcome mea-

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E-mail address: jrsuarez@health.ucsd.edu (J.R. Suárez-López).<https://doi.org/10.1016/j.dib.2020.105980>2352-3409/© 2020 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license. (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

tures. Geographic positioning of greenhouses and homes were obtained using GPS receivers and satellite imagery. Distances between homes and the nearest greenhouse edge, and areas of greenhouse crops within various buffer zones (0–150 m, 151–300 m, 310–500 m, 501–750 m, and 751–1000 m) around homes were calculated using Geographic Information System software.

Beyond the dataset, we present demographic and anthropometric characteristics, and indicators of pesticide exposure of participants across categories of areas of greenhouse crops around homes for buffer sizes of 0–150 m around homes. We also present the distribution of areas of flower crops within various buffer zone sizes around children's homes and the correlation coefficients between household proximity to the nearest treated greenhouse crops and areas of flower crops within various buffer zones within 1000 m of homes.

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Specifications table

Subject	<i>Public Health</i>
Specific subject area	<i>Environmental Health</i>
Type of data	<i>Data and tables</i>
How data were acquired	Data obtained from the cohort of Secondary Exposures to Pesticides Among Children and Adolescents (Exposición Secundaria a Plaguicidas en Niños y Adolescentes [Spanish], ESPINA study)
Data format	<i>Raw data: Excel file</i> <i>Summary of data: Tables</i>
Parameters for data collection	Sample consists of 1156 observations of 623 children and adolescents who lived in Ecuadorian floricultural communities from 3 examination periods (2008, Apr-2016 and Jul-Oct 2016).
Description of data collection	Home interviews were conducted with parents and other adults living with children at time of data collection. Children were examined for their height, weight, and blood hemoglobin concentration. Geospatial information of children's homes and areas of flower crops around homes were acquired using GPS receivers and satellite imagery.
Data source location	Location of participants: Pedro Moncayo County, Pichincha, Ecuador <i>Institution: University of California San Diego, La Jolla, CA, USA; Fundación Cimas del Ecuador, Quito, Pichincha, Ecuador.</i>
Data accessibility	Data is in the article
Related research article	Suárez-López, J.R., Nazeeh, N., Kayser, G., Suarez-Torres, J., Checkoway, H., López-Paredes, D., Jacobs, D.R., Cruz, F. de la, Residential proximity to greenhouse crops and pesticide exposure (via acetylcholinesterase activity) assessed from childhood through adolescence. <i>Environ. Res.</i> 2020 109728. https://doi.org/10.1016/j.envres.2020.109728 .

Value of the data

- This article provides data and describes the relationship between 2 geospatial indicators of off-target pesticide drift from crops to homes in agricultural areas: home proximity to the nearest greenhouse crop and areas of crops within various buffer sizes around homes (from 150 m to 1000 m).
- These data are of value as there is an increase in the use of these geospatial constructs of off-target pesticide drift in relation to health outcomes and other exposure constructs.

- These data are a resource to investigators interested in evaluating and understanding the relationship between these two important geospatial indicators of pesticide exposure of residents in agricultural communities.
- This data article gives deeper insight to our published research article about the association between home proximity to treated flower crops and pesticide exposure.

1. Data description

We present data of two geospatial indicators of pesticide drift from greenhouse crops (primarily floricultural) to nearby homes collected during 3 examinations (2008, April 2016 and July–October 2016) of participants of the study of Secondary Exposures to Pesticides Among Children and Adolescents (ESPINA): A) home proximity to the nearest treated crop, and B) areas of flower crops near homes (buffers ranging from 150 m to 1000 m). Summary data is presented in 3 tables. [Table 1](#) provides information about participants' characteristics (mean and standard

Table 1

Characteristics of participants across categories of greenhouse crop areas within 150 m of homes ($n = 623$, $n_{\text{observations}} = 1156$).

Range, m ² N _{observations}	0 m ²	Tertiles* of areas of greenhouse crops within 150 m from homes			
	0	3 to 1,495	1,549 to 5,543	5,920 to 31,906	P-trend
Age, years					
2008 ^a	6.6 (1.6)	6.5 (1.8)	6.3 (1.6)	7.6 (1.4)	0.60
Apr 2016 ^b	14.2 (1.9)	14.4 (1.8)	13.8 (1.6)	14.5 (1.9)	0.96
Jul-Oct 2016 ^c	14.5 (1.7)	14.7 (1.6)	14.1 (1.8)	14.1 (2.0)	0.09
Gender, male %					
2008 ^a	51	50	50	55	0.81
Apr 2016 ^b	50	52	56	45	0.95
Jul-Oct 2016 ^c	51	52	42	39	0.08
Parental education, years					
2008 ^a	7.7 (3.8)	6.5 (3.2)	8.0 (3.7)	5.1 (1.9)	0.04
Apr 2016 ^b	8.1 (3.6)	8.9 (3.6)	7.6 (3.5)	8.3 (3.5)	0.69
Jul-Oct 2016 ^c	8.1 (3.5)	8.3 (3.6)	8.5 (3.4)	7.6 (3.0)	0.93
Lived withflower worker:%					
2008 ^a	48	34	75	82	0.22
Apr 2016 ^b	48	48	44	40	0.35
Jul-Oct 2016 ^c	51	50	45	44	0.23
Examination date**					
2008 ^a	85 (11.4)	86.3 (8.5)	86.4 (7.2)	80.8 (7.0)	0.93
	−12.3 (5.4)	−14.0 (5.1)	−13.9 (4.3)	−9.6 (5.8)	0.40
Jul-Oct 2016 ^c	102.9 (19.0)	101.8 (18.9)	99.3 (14.4)	106.2 (20.8)	0.95
Height-for-age Z-score, SD					
2008 ^a	−1.22 (0.97)	−1.50 (0.98)	−1.06 (1.22)	−1.52 (0.78)	0.41
Apr 2016 ^b	−1.64 (0.91)	−1.28 (1.09)	−1.52 (1.01)	−1.60 (0.98)	0.28
Jul-Oct 2016 ^c	−1.53 (0.93)	−1.33 (0.91)	−1.38 (0.96)	−1.46 (0.93)	0.16
Hemoglobin, g/dL					
2008 ^a	12.6 (1.2)	12.6 (1.0)	13.1 (1.7)	12.1 (0.8)	0.99
Apr 2016 ^b	13.0 (1.4)	13.1 (1.2)	13.1 (1.3)	13.2 (1.1)	0.45
Jul-Oct 2016 ^c	13.0 (1.2)	13.1 (1.4)	13.0 (0.9)	12.6 (0.9)	0.19
Residential proximity to the nearest greenhouse crop, m					
2008 ^a	530 (333)	90 (49)	87 (28)	41 (22)	<0.01
Apr 2016 ^b	712 (663)	119 (17)	72 (31)	51 (28)	<0.01
Jul-Oct 2016 ^c	812 (883)	117 (23)	71 (34)	44.5 (28)	<0.01

Values shown are percent or mean (SD).

* Tertile cut-offs based on the pooled values for all exam periods.

** Days after the Mother's Day flower harvest (end of a peak pesticide spray period).

^a Summer examination in 2008 $N = 311$.

^b April examination in 2016 $N = 319$.

^c July–October examination in 2016 $N = 529$.

Table 2

Distributions of areas of flower crops within buffers of various sizes around homes between 2008 and 2016. Includes only participants with non-zero area values.

Buffer size around homes	N _{total}	N _{>0 m²}	Percentile cut-offs (for values >0 m ²)				
			10 th	25 th	50 th	75 th	90 th
2008							
0–150 m	310	61	257	492	989	3064	12,159
151–300 m	310	129	492	1,180	3,617	10,620	26,513
301–500 m	310	182	592	2,112	7,041	22,392	54,678
501–750 m	310	238	989	2,810	17,359	55,306	145,002
750–1000 m	310	247	1,126	7,407	40,328	131,804	211,374
2016 April							
0–150 m	330	106	645	1,495	3,604	9,915	17,250
151–300 m	330	163	1,658	2,654	8,160	42,492	73,834
301–500 m	330	191	2,401	7,845	18,815	91,223	190,586
501–750 m	330	260	2,610	12,449	34,084	112,030	323,258
750–1000 m	330	281	5,257	10,923	55,059	235,937	537,262
2016 Jul-Oct							
0–150 m	535	181	545	1,247	3,102	8,746	16,924
151–300 m	535	263	1,382	2,685	7,125	24,831	70,337
301–500 m	535	322	2,401	9,344	19,606	65,152	166,658
501–750 m	535	411	2,610	11,972	34,512	116,915	322,019
750–1000 m	535	441	6,487	11,687	52,116	234,703	531,757

deviation, percent, and *p*-value for trend) across tertiles of areas of greenhouse crops within 0–150 m from homes. This tables provides further characteristics to supplement our recently published article [9] associated with the present data report. Table 2 presents the distributions of areas of flower crops within buffers of various sizes around homes, among participants with non-zero area values. Table 3 provides the correlation coefficients between residential proximity to the nearest greenhouse crops and areas of flower crops within various buffer sizes around homes within 1000 m of homes.

We also include a data file (Excel) pooling observations for all participants across the 3 time periods (long-format) that includes information of residential distance to the nearest flower crop, and areas of greenhouse crops within the following distances from participants' homes: 0–150 m, 151–300 m, 301–500 m, 501–750 m, 751–1000 m and examination period.

2. Experimental design, materials and methods

ESPINA is a prospective cohort analysis of children living in agricultural communities of Pedro Moncayo County, Pichincha, Ecuador. This cohort was initiated in 2008 to examine effects of pesticide exposure on child development. Ecuador has a large floricultural industry that is mainly located in Pedro Moncayo County. This substantial flower production involves the use of a wide range of pesticides including insecticides and herbicides [1–4]. Flower production in Pedro Moncayo County is mostly done inside greenhouses with windows that allow air to circulate.

A total of 313 children aged 4–9 years living in the floricultural communities of Pedro Moncayo County, Pichincha province, Ecuador were examined in Jul–Aug 2008. In 2016, a total of 554 participants aged 12–17 years were examined, including 316 new volunteers. In April 2016, we examined 331 participants and in July–October 2016 we examined 535 participants; 311 participants were examined in both April and July–October exams in 2016. The present analyses include 311 participants examined in 2008, 319 participants examined in April 2016 and 529 participants examined in July–October 2016 who had all covariates of interest

In 2008, most participants in the ESPINA study were identified through the Survey of Access and Demand of Health Services in Pedro Moncayo County in 2004. This survey was

Table 3

Pearson correlation coefficients between log-transformed residential proximity to the nearest greenhouse crops and log-transformed areas of flower crops within various buffer sizes around homes.

		Residential distance to the nearest crop*	Greenhouse crop areas within various distances from homes*										
			0–150 m	151–300 m	301–500 m	501–750 m	751–1000 m	0–300 m	0–500 m	0–750 m	0–1000 m		
Residential distance to the nearest crop, m		1.00											
Greenhouse crop areas within various distances from homes*	150 m	–0.80	1.00										
	151–300 m	–0.77	0.69	1.00									
	301–500 m	–0.65	0.46	0.72	1.00								
	501–750 m	–0.57	0.37	0.51	0.64	1.00							
	751–1000 m	–0.51	0.28	0.43	0.55	0.73	1.00						
	0–300 m	–0.80	0.73	0.99	0.72	0.51	0.42	1.00					
	0–500 m	–0.77	0.57	0.81	0.95	0.64	0.56	0.81	1.00				
	0–750 m	–0.69	0.43	0.61	0.74	0.93	0.73	0.61	0.77	1.00			
0–1000 m	–0.64	0.37	0.52	0.64	0.83	0.89	0.52	0.67	0.88	1.00			

All correlations had p-values <0.001.

* Log-transformed variables.

established by Fundación Cimas del Ecuador in collaboration with the communities of Pedro Moncayo County and is a representative sample of the population. The remaining children were invited to participate through community leaders and governing councils, and by word-of-mouth. The ESPINA study aimed to present a balanced distribution of children who have lived with a flower plantation worker and those who did not living with any agricultural workers. Children included met the following criteria: A) lived with a flower plantation worker for at least one year, or B) never lived with an agricultural worker, never inhabited a house where agricultural pesticides were stored and never have had previous contact with pesticides.

As in 2008, new participants in 2016 were selected and invited to participate using the System of Local and Community Information (SILC) developed by Fundación Cimas del Ecuador, which includes information of the 2016 Pedro Moncayo County Community Survey (formerly the Survey of Access and Demand of Health Services in Pedro Moncayo County). Additional details about data collection and participant recruitment strategies have been published previously [5,6].

2.1. Data collection

In the 2008 and 2016 examinations, parents and other adult residents were interviewed at their homes to obtain socioeconomic information, demographic characteristics of household members and prevalence of pesticide use information at the household level. In summer 2008, we examined children in 7 schools of Pedro Moncayo County to ensure a quiet and friendly environment for children. In 2016, children were examined twice: the first examination was conducted in April and the second examination was between July and October. Similarly, children were examined in their schools during the summer (July–August) closure or during weekends thereafter.

Examiners were unaware of participants' pesticide exposure status. Children's weight was measured using a digital scale (Tanita model 0108MC; Tanita Corporation of America, Arlington Heights, IL, USA) and standing height was measured by stadiometer to the nearest 1 mm following recommended procedures [7]. Children's height-for-age z-scores were calculated using the World Health Organization (WHO) normative sample [8].

Hemoglobin concentration was measured using the EQM Test-mate ChE Cholinesterase Test System 400 from a single finger stick sample (EQM AChE Erythrocyte Cholinesterase Assay Kit 470) Kit 470 (EQM, Cincinnati, OH, USA) in all the examination periods.

Geographic coordinates of children's homes were collected in 2004, 2006, 2010 and 2016 as part of the SILC using portable global positioning systems. Flower plantation edges (areal polygons) were created by satellite imagery from 2006 to 2016. Distance between children's homes to the nearest flower plantation perimeter were calculated using ArcGIS (ESRI, Redlands, CA, USA). We also calculated the areas of flower plantations within the following distances from participants' homes: 0–150 m, 151–300 m, 301–500 m, 501–750 m, 751–1000 m using ArcGIS.

2.2. Statistical analysis

Children's characteristics were calculated using mean for normally distributed variables and percent for categorical variables (Table 1). P-value for trend was calculated using linear regression to test significant differences in participants' characteristics by categories of areas of greenhouse crops within 150 m from homes, using a log-transformed area variable. We also calculated the following percentile values for areas of crops within various buffer sizes across all 3 examinations: 10th, 25th, 50th, 75th, 90th (Table 2) and Pearson correlation coefficients between residential proximity to the nearest greenhouse crops and areas of flower crops within various buffer sizes around homes (Table 3).

Ethics statement

The ESPINA study was approved by the Institutional Review Boards of the University of Minnesota, The University of California San Diego, Universidad San Francisco de Quito and the Ministry of Public Health of Ecuador and is endorsed by the Local Governments of Pedro Moncayo County. Informed consent, parental authorization of child participation and assent of child participants older than 7 years of age were obtained.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.dib.2020.105980](https://doi.org/10.1016/j.dib.2020.105980).

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