

## Supplementary Material

### **Distribution, habitat use, and implications for the conservation of the globally threatened Azure-rumped Tanager *Tangara cabanisi* in Guatemala**

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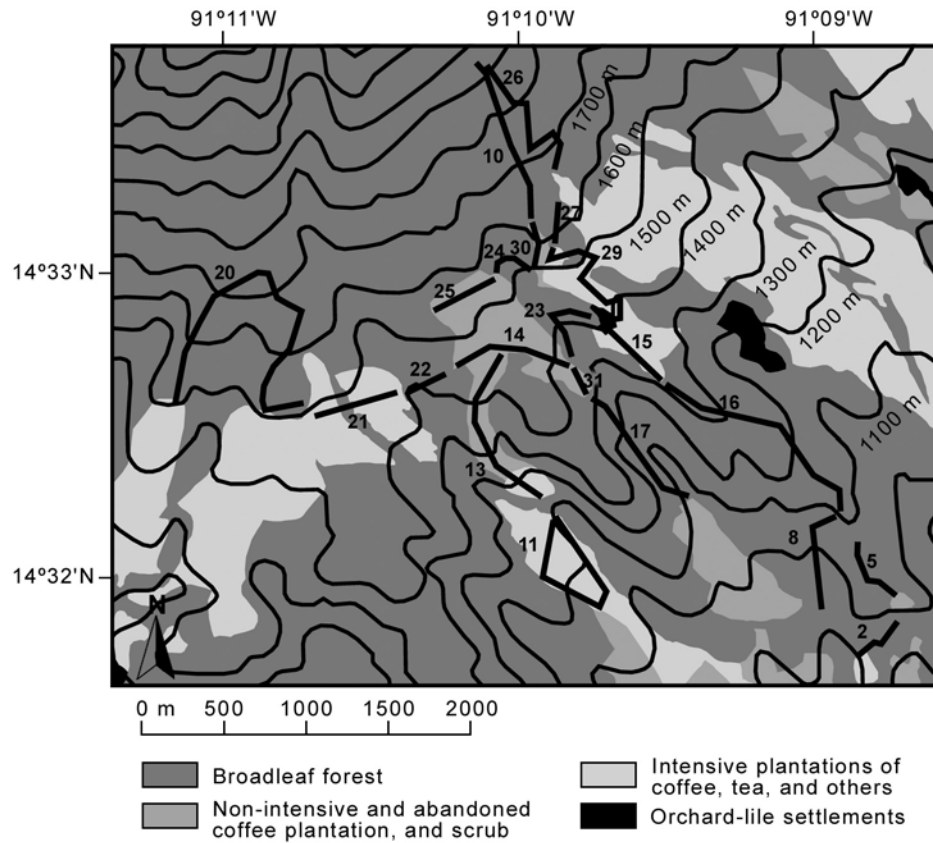


Figure S1. Land cover, contour lines, and location of transects (numbered lines) in the study area at Atitlán Volcano.

Table S1. Nomenclature of all plant names mentioned in the text and voucher specimens of species used as food or nesting substrate by Azure-rumped Tanager.

| Species                                                                       | Family          | Note*                                            |
|-------------------------------------------------------------------------------|-----------------|--------------------------------------------------|
| <i>Acrocarpus fraxinifolius</i> Wight & Arn.                                  | Fabaceae        |                                                  |
| <i>Beaucarnea recurvata</i> Lem.                                              | Agavaceae       |                                                  |
| <i>Camellia sinensis</i> (L.) Kuntze                                          | Theaceae        |                                                  |
| <i>Cecropia obtusifolia</i> Bertol.                                           | Cecropiaceae    | voucher: Eisermann, K., 36, AGUAT                |
| <i>Cestrum</i> sp.                                                            | Solanaceae      |                                                  |
| <i>Chomelia brachypoda</i> Donn. Sm.                                          | Rubiaceae       | food source (voucher: Eisermann, K., 34, AGUAT)  |
| <i>Eucalyptus</i> sp.                                                         | Myrtaceae       | voucher: Eisermann, K., 15, BIGU                 |
| <i>Ficus aurea</i> Nutt.                                                      | Moraceae        | food source, (voucher: Eisermann, K., 46, AGUAT) |
| <i>Ficus costaricana</i> (Liebm.) Miq.                                        | Moraceae        | food source (voucher Eisermann, K., 48, AGUAT)   |
| <i>Inga laurina</i> (Sw.) Willd.                                              | Mimosaceae      |                                                  |
| <i>Inga micheliana</i> Harms                                                  | Mimosaceae      | voucher: Eisermann, K., 44, AGUAT                |
| <i>Inga rodrigueziana</i> Pittier                                             | Mimosaceae      | voucher: Eisermann, K., 39, AGUAT                |
| <i>Inga spuria</i> Humb. & Bonpl. ex Willd.                                   | Mimosaceae      | voucher: Eisermann, K., 38, AGUAT                |
| <i>Meriana macrophylla</i> (Benth.) Triana                                    | Melastomataceae | voucher: Eisermann, K., 33, AGUAT                |
| <i>Miconia</i> sp.                                                            | Melastomataceae | food source (voucher: Eisermann, K., 32, AGUAT)  |
| <i>Perrottetia longistylis</i> Rose                                           | Celastraceae    | food source (voucher: Eisermann, K., 19, AGUAT)  |
| <i>Phoradendron heydeanum</i> Trel.                                           | Viscaceae       | food source (voucher: Eisermann, K., 17, BIGU)   |
| <i>Rhamnus discolor</i> (Donn. Sm.) Rose                                      | Rhamnaceae      | food source (voucher: Eisermann, K., 16, BIGU)   |
| <i>Trema micrantha</i> var. <i>strigillosa</i> (Lundell) Standl. & Steyererm. | Ulmaceae        | food source (voucher: Eisermann, K., 13, BIGU)   |

\*Voucher specimens deposited at: AGUAT (Herbarium of the Faculty of Agronomy of the San Carlos University, Guatemala City), BIGU (Herbarium of the School of Biology of San Carlos University, Guatemala City).

Table S2. Abundance of *Ficus aurea* trees along forest transects with a strip width of 120 m.

| Transect | Area (ha) | Number of <i>Ficus aurea</i> | Number of <i>Ficus aurea</i> /ha |
|----------|-----------|------------------------------|----------------------------------|
| 2        | 4.1       | 0                            | 0.00                             |
| 5        | 5.5       | 0                            | 0.00                             |
| 17       | 10.7      | 0                            | 0.00                             |
| 16       | 17.6      | 1                            | 0.06                             |
| 8        | 12.2      | 1                            | 0.08                             |
| 10       | 12.5      | 4                            | 0.32                             |
| 23       | 7.0       | 6                            | 0.86                             |
| 22       | 4.1       | 5                            | 1.22                             |
| 26       | 14.5      | 21                           | 1.45                             |
| 24       | 3.7       | 6                            | 1.64                             |
| 27       | 3.6       | 7                            | 1.95                             |
| 20       | 30.2      | 61                           | 2.02                             |

Table S3. Site of recent records (1976-2009) of Azure-rumped Tanager in Guatemala.

| Topographic unit                 | Site                                                                                 | Elevation (m) and Habitat                              | Note and Reference                                                                                                                                                                                                   |
|----------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tajumulco volcano                | El Porvenir (village), 14°58'N 91°55'W, dpto. San Marcos                             | 1,200 broadleaf forest and edge                        | seen several times in September 1999 (Valdez <i>et al.</i> 1999)                                                                                                                                                     |
| Sierra Madre south of San Marcos | San Rafael Pie de la Cuesta, reserva municipal, 14°56'N 91°52'W, dpto. San Marcos    | 1,800–1,900 broadleaf forest                           | 2 flocks of 3 birds each along a trail of 2 km length on 15 August 2009; at least 2 birds (including a young) on 27 October 2009 (K. Eisermann, photo, and C. Avendaño, pers. obs.)                                  |
| Sierra Madre south of San Marcos | Finca Dos Marias, 14°49'N 91°48'W, dpto. San Marcos                                  | 1,500–1,700 broadleaf forest                           | up to 25 birds per day in January 1997 and January 2002 (Cooper 2003)                                                                                                                                                |
| Lacandón volcano                 | Vista Alegre, Río Negro (village), 14°49' N 91°45'W, dpto. Quetzaltenango            | 1,500 forest edge                                      | 2 birds seen on 12 June 2005 (Tenez 2005)                                                                                                                                                                            |
| Chicabal volcano                 | Loma Linda (village), 14°44'N 91°38'W, dpto. Quetzaltenango                          | 1,280–1,420 broadleaf forest, shade coffee plantation  | at least 2 birds on 19 August 2009; at least 2 flocks of 3 and 6 birds (including juveniles) on 29 October 2009, and 2 flocks of 2 and 3 birds on 30 October 2009 (K. Eisermann, photo, and C. Avendaño, pers. obs.) |
| Santa María volcano              | Finca Montebello, 14°43'N 91°37'W, dpto. Quetzaltenango                              | 1,140 broadleaf forest                                 | at least 3 individuals recorded on 31 October 2009 (K. Eisermann and C. Avendaño, pers. obs.)                                                                                                                        |
| Santa María volcano              | Fincas El Faro y El Patzulín and surroundings, 14°43'N 91°34'W, dpto. Quetzaltenango | 1,280–1,500 broadleaf forest                           | sightings in 1976 and 1990 in El Patzulín, small flock in El Faro in 1987 (Vannini 1989, Heath and Long 1991, Collar <i>et al.</i> 1992)                                                                             |
| Santa María volcano              | Finca Los Pirineos, 14°41'N 91°33'W, dpto. Quetzaltenango                            | 1,100 secondary broadleaf forest and coffee plantation | nesting in May–June 2001 (J.Berry/eBird Guatemala*)                                                                                                                                                                  |
| Santo Tomás volcano              | Santa María de Jesús, 14°43'N 91°32'W, dpto.                                         | 1,600 humid broadleaf forest                           | common in February, June, July, October, and December 2000, and in March, May, June, July, August, and September 2001                                                                                                |

|                             |                                                                                                                               |                                                              |                                                                                                                                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | Quetzaltenango                                                                                                                |                                                              | Eisermann and Avendaño (2007), J. Berry/eBird Guatemala*)                                                                                                                                                                                                 |
| Santo Tomás volcano         | Las Nubes Reserve, 1,550 broadleaf forest edge and dpto. Suchitepéquez interior of forest fragment along stream               |                                                              | at least 4 birds on 16 August 2009 (K. Eisermann and C. Avendaño, pers. obs.)                                                                                                                                                                             |
| Atitlán volcano             | Los Andes Reserve, 1,200–1,700 14°33'N 91°11'W, humid broadleaf forest and edge dpto. Suchitepéquez                           |                                                              | first recorded in 2000 (Eisermann and Avendaño 2006), lowest record at 1,200 m (J. L. Yuxón, pers. comm.), during Christmas Bird Counts (GMAV* 2007–2009), frequent during current study incl. nesting record in 2008                                     |
| Atitlán volcano             | Los Tarrales Reserve (including El Vesubio Reserves and La Chusita Reserve), 14°33'N 91°10'W, dptos. Suchitepéquez and Sololá | 860–1,900 humid broadleaf forest and edge, coffee plantation | first recorded in 2004, frequently recorded each day in forest and edge between 1,400–1,800 m and coffee plantation at 1,400–1,600 m, yearly nesting records 2006–2009 (Eisermann and Avendaño 2007; Christmas Bird Count GMAV 2007–2009*; current study) |
| Atitlán volcano             | San Jerónimo Miramar Reserve, 14°34'N 91°10'W, dptos. Suchitepéquez and Sololá                                                | 1,300–1,800 humid broadleaf forest, coffee plantation        | recorded frequently each day in forest at 1,500–1,800 m, nesting recorded in 2008 (current study)                                                                                                                                                         |
| Atitlán volcano             | Santa Teresa Reserve, 14°N 34'N 91°08'W, dpto. Sololá                                                                         | 1,200 humid broadleaf forest                                 | flock of 8 birds seen on 16 December 2009 (Christmas Bird Count GMAV 2009*)                                                                                                                                                                               |
| Valley of Madre Vieja river | Pachuj Reserve, 14°37'N 91°07'W, dpto. Sololá                                                                                 | 1,300–1,450 broadleaf forest and edge                        | 1 bird recorded on 7 February 1999 (Eisermann and Avendaño 2006), 10 birds on 14 December 2008 (Christmas Bird Count GMAV 2008*)                                                                                                                          |
| Valley of Nicán river       | Unión Victoria, 14°34'N 91°03'W, dpto. Chimaltenango                                                                          | 1,260 broadleaf forest and edge                              | active nest in 2007 (D. Ruby, pers. comm.), 2 birds on 5 November 2009 (KE and CA, pers. obs.)                                                                                                                                                            |

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\*Data from Christmas Bird Counts at Atitlán Volcano (GMAV) online at <http://www.audubon.org/bird/cbc/hr/index.html>, data in eBird Guatemala online at <http://ebird.org/content/guatemala/>

Table S4. Legal protection within the potential area of distribution of Azure-rumped Tanager in Guatemala, according to recent information on Guatemala's protected areas (CONAP 2009).

| CONAP (2009)<br>Category                                  | Area (km <sup>2</sup> ) and % of<br>1,170 km <sup>2</sup> of the<br>potential area of<br>distribution | Area (km <sup>2</sup> ) of broadleaf<br>forest within the protected<br>areas and % of the total area<br>(250 km <sup>2</sup> ) of broadleaf<br>forest in the potential area<br>of distribution | IUCN (1994)<br>category of<br>protected area |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Parque Regional<br>Municipal (regional<br>park)           | 3.0 (0.3%)                                                                                            | 0.8 (0.3%)                                                                                                                                                                                     | V                                            |
| Area de Uso Múltiple<br>(multiple use area )              | 207.6 (17.7%)                                                                                         | 91.8 (36.7%)                                                                                                                                                                                   | VI                                           |
| Reserva Natural<br>Privada<br>(private protected<br>area) | 58.2 (5.0%)                                                                                           | 21.0 (8.4%)                                                                                                                                                                                    | —                                            |
| Zona de<br>Amortiguamiento<br>(buffer zone)               | 62.3 (5.3%)                                                                                           | 7.4 (3.0%)                                                                                                                                                                                     | —                                            |
| Zona de Veda<br>Definitiva<br>(no hunting zone)           | 39.4 (3.4%)                                                                                           | 16.8 (6.7%)                                                                                                                                                                                    | —                                            |
| TOTAL                                                     | 370.5 (31.7%)                                                                                         | 137.9 (55.2%)                                                                                                                                                                                  |                                              |