

# INSECTA MUNDI

A Journal of World Insect Systematics

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0635

A checkered history: distribution of *Pyrgus* Hübner species  
in The Bahamas, including the first Caribbean records of  
*Pyrgus albescens* Plötz (Lepidoptera: Hesperiiidae)

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Date of issue: June 29, 2018

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Insecta Mundi 0635: 1–9

ZooBank Registered: urn:lsid:zoobank.org:pub:A8FADF AE-5BA0-4F73-B599-AA01C0C1EACD

**Published in 2018 by**

Center for Systematic Entomology, Inc.

P.O. Box 141874

Gainesville, FL 32614-1874 USA

<http://centerforsystematicentomology.org/>

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A checkered history: distribution of *Pyrgus* Hübner species in The Bahamas, including the first Caribbean records of *Pyrgus albescens* Plötz (Lepidoptera: Hesperidae)

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**Abstract.** Despite being generally distributed and common on Cuba, Hispaniola, and in south Florida, species of *Pyrgus* Hübner (Lepidoptera: Hesperidae), commonly known as checkered skippers, are very poorly known from The Bahamas. Previous records indicated the presence only of *Pyrgus oileus* (Linnaeus, 1767), just from Great Inagua Island, although its status on that island remains unclear. Herein we document *P. oileus* for the first time from Grand Bahama Island, suggesting an independent dispersal of this species to the northern Bahamas from south Florida. Furthermore, we document *Pyrgus albescens* Plötz, 1884 from Grand Bahama and Abaco islands, representing the first Caribbean records for this rapidly dispersing species. We suggest that both *P. oileus* and *P. albescens* arrived on Grand Bahama sometime between 2010 and 2014, most likely from south Florida, and that *P. albescens* has subsequently dispersed to Abaco. Careful study of *Pyrgus* species in The Bahamas is needed to document future colonization events.

**Key words.** Abaco, Grand Bahama, biogeography, butterfly, dispersal, skipper.

## Introduction

The history of the genus *Pyrgus* Hübner, [1819], commonly known as checkered skippers, is truly checkered in The Bahamas. To date, only *Pyrgus oileus* has been reported from the Commonwealth, and only from a single island, Great Inagua (Clench and Bjorndal 1980). Even on Great Inagua, *P. oileus* may not be a permanent resident, as discussed by Clench and Bjorndal (1980), Simon and Miller (1986) and Smith et al. (1994; but see below). The apparent absence of *P. oileus* in The Bahamas (other than on Great Inagua) is puzzling, considering its abundance and relatively ubiquitous distribution in disturbed habitats on the nearby Greater Antilles of Cuba (e.g., Alayo and Hernández 1987; Núñez and Barro 2012) and Hispaniola (e.g., Schwartz 1989), as well as in southern Florida (Smith et al. 1994) and many of the Florida Keys, including Key West (Minno and Emmel 1993).

Ongoing faunal surveys of The Bahamas led by JYM have included recent expeditions to 13 major islands between 2010–2016 (see Materials and Methods), yet these surveys failed to record *Pyrgus oileus*. Therefore, it was a surprise when checkered skippers were encountered on Grand Bahama in October, 2014; specimens were collected at multiple sites across the island on 25–27 October. Close examination

of these specimens revealed the presence of *P. albescens* among samples of *P. oileus* from the island—a species that had previously not been recorded from The Bahamas or anywhere in the Caribbean. Our subsequent survey of Lepidoptera on North Abaco in 2016 also revealed the presence of *P. albescens*, suggesting that it is an established, breeding resident in the northern Bahamas, not merely a stray, and that it may be actively dispersing within The Bahamas.

*Pyrgus albescens* is an enigmatic butterfly with a confusing taxonomic history (see Mielke 2005 for complete synonymy). For the past century there has been copious debate over the taxonomic status of *P. albescens*, beginning with Skinner's (1906b) treatment of *P. albescens* (as *P. occidentalis* Skinner, 1906—now considered a synonym of *P. albescens*) as a subspecies-level taxon, just seven months after he (1906a) treated it as a full species. Many authors have since considered *P. albescens* to be a subspecies or form of *P. communis* (Grote, 1872) and its synonym (e.g., Barnes and Lindsey 1921; Lindsey et al. 1931; McDunnough 1938; Evans 1953; dos Passos 1964), while others have treated *P. albescens* as a species-level taxon (e.g., Klots 1951). Tilden (1965) studied the relationship between *P. communis* and *P. albescens*, and concluded that there was “no taxonomic category that expresses their relationship precisely.” Subsequently, Miller and Brown (1981) treated *P. albescens* as a full species, and Austin (1986) concluded that *P. albescens* and *P. communis* are “probably no more than allopatric subspecies.” More recent investigations into the taxonomic status of the two entities have still not reached a consensus. While a recent molecular study failed to separate *P. communis* and *P. albescens* (Fordyce et al. 2008), most contemporary authors have followed Burns (2000) in treating *P. albescens* and *P. communis* as separate, though very closely related, species-level taxa (e.g., Austin and Warren 2001; Calhoun 2002; Pelham 2008). Under this paradigm, adults of *P. albescens* and *P. communis* cannot be separated by wing pattern and females of the two species cannot be separated at all, other than through association with males (but see Austin and Warren 2001). Males of the two taxa can be separated upon genitalic examination by differences in the shape of their valvae (Burns 2000).

Regardless of its checkered taxonomic history, and lingering uncertainty over its taxonomic status, *P. albescens* appears to have dramatically expanded its distribution in North America in the past half century. As first noted by Burns (2000) and detailed by Calhoun (2002), *P. albescens* has rapidly expanded its range eastward across the Gulf Coast region of the southern United States to Georgia, and apparently colonized the entire state of Florida within a period of about thirty years. Since 2002, *P. albescens* has continued to expand its range northward along the Atlantic Coast of the eastern United States, through South Carolina and North Carolina (LeGrand 2018), and by 2010 it had reached as far north as Virginia (Lepidoptera collections of the McGuire Center for Lepidoptera and Biodiversity (MGCL), ex H. Pavulaan). Perhaps even more remarkable than the speed of this colonization event is that *P. albescens* appears to have completely displaced *P. communis* in Florida in the process (Calhoun 2002). However, questions remain about the identity of checkered skippers (other than *P. oileus*) in south Florida, since recent photographic and observational records have not been associated with examination of male valvae, which is required for a definitive identification (Burns 2000). Yet, since *P. communis* has not been confirmed from southern Florida in over seventy years, and it has not been confirmed from anywhere in Florida in the past two decades—all males identified through genitalic examination since 1998 have been *P. albescens* (Calhoun 2002)—it is now generally assumed that the contemporary population in southern Florida is composed only of *P. albescens*.

The appearance of *P. albescens* on Grand Bahama in 2014 suggests a recent colonization from southern Florida, and begs the question of how far into the Caribbean this skipper will eventually spread. In an effort to clarify the status of *P. albescens* in south Florida and The Bahamas, as well as further define the range of *P. oileus* in the Commonwealth, we herein report details from our field and museum investigations.

## Materials and Methods

Faunal surveys of The Bahamas between 2010 and 2016 included the following islands (from northwest to southeast): Grand Bahama, Abaco, North Andros, South Andros, New Providence, Eleuthera, Cat, Exuma, San Salvador, Long, Crooked, Mayaguana, and Inagua (Fig. 9). Multiple visits were made to five islands from 2010 to 2016 (Abaco, North Andros, San Salvador, Cat, and Crooked) and 11 islands (Grand

Bahama, Abaco, South Andros, New Providence, Eleuthera, Cat, Exuma, Long, Crooked, Mayaguana, and Inagua) were sampled in 2014 after a season of substantial rainfall throughout the region. In 2014, islands were sampled for up to five days each, with a different locality surveyed for moths each night and several locations surveyed from morning to early afternoon for butterflies. While our objective was comprehensive sampling of moths, butterfly collecting was more focused on a representative sample and groups less easily identified in the field such as HesperIIDae. Recent fieldwork, including collections of *Pyrgus*, was conducted on Grand Bahama 24-28 October 2014 and on North Abaco 29 October to 2 November 2014 and 31 May to 8 June 2016.

We reviewed the historical literature dealing with butterflies in The Bahamas for additional information on checkered skippers; other than the sources cited above, we failed to find any new literature records. We simultaneously searched the Lepidoptera collections of the McGuire Center for Lepidoptera and Biodiversity (MGCL), Florida Museum of Natural History, University of Florida (Gainesville, Florida, USA), for pre-2014 *Pyrgus* specimens from The Bahamas, and found nine specimens of *P. oileus* from Great Inagua from 2007 (see below). Finally, we consulted various online databases (iNaturalist; Lotts and Naberhaus 2018; Warren et al. 2018) and social media platforms (Twitter, Instagram, Flickr) for records of checkered skippers from the Commonwealth; these efforts revealed a record of *P. oileus* from Grand Bahama from 2013 (see below).

Genitalia of male *Pyrgus* were examined, using an Olympus SZH10 stereomicroscope, by carefully removing the scales from the distal end of the abdomen using a fine paintbrush. Once the external scales were removed, valvae were readily examined and compared. Pinned adults were photographed with a Canon 70D and 100 mm IS macro lens and MT-24EX Macro Twin Lite Flash (Canon U.S.A., Inc., Melville, NY). Two to four images were taken for each specimen and stacked with Zerene Stacker, version 1.04 using the DMap algorithm and assembled on the plate with Adobe Photoshop CS5.1. Localities were plotted on an ArcGIS World base map and adapted with Adobe Photoshop CS5.1.

## Results

### Specimens Examined—*Pyrgus oileus*

BAHAMAS: **Grand Bahama Island**: vic. Barbary Beach, 26.558526°, -78.536983°, 26 Oct 2014, J.Y. Miller, M. Simon, R. Rozycki, D. Matthews, MGCL Acc. No. 2014-31 (1 M, MGCL 243428, 1 F, MGCL 243789); same data except 27 Oct 2014 (1 F, MGCL 244926); 2.5 mi. E of Barbary Beach, 26.567960°, -78.503534°, 27 Oct 2014, M. Simon & R. Rozycki, MGCL Acc. No. 2014-31 (1 M, MGCL 244928); Freeport, equestrian trail off E Sunrise Hwy., 26.516051°, -78.676736°, 25 Oct 2014 M. Simon & R. Rozycki, MGCL Acc. No. 2014-31 (1 M, MGCL 243701); **Great Inagua**: Matthew Town, 7–12 Dec 2007, D. Knowles, MGCL Acc. No. 2011-1 (6 F, MGCL 247509–247514); Salt Pond Hill, 10 Nov 2007, D. Knowles, MGCL Acc. No. 2011-1 (1 M, MGCL 247515); Man of War Bay nr. Calf Pond, 20°56', -73°40', 9–12 Jun 2007 L.D. & J.Y. Miller, M.J. Simon, MGCL Acc. No. 2007-9 (1 M, MGCL 231308, 1 F, MGCL 231309).

### Specimens Examined—*Pyrgus albescens*

BAHAMAS: **North Abaco**: 1.8 mi. SE of Cooperstown, 26.850533°, -77.486085°, 6 Jun 2016, J. Miller, M. Simon, G. Goss, D. Matthews, MGCL Acc. No. 2016-9 (3 F, MGCL 247037, 247045, 247046); same data except 7 Jun 2016 (2 M, MGCL 247058, 247454); **Grand Bahama Island**: Freeport, area SE of Britannia Blvd. & Sunset Hwy., 26.513233°, -78.679429°, 25 Oct 2014, J.Y. Miller & D. Matthews, MGCL Acc. No. 2014-31 (1 F, MGCL 243480).

We observed many differences in wing pattern between *Pyrgus oileus* (Fig. 1–4) and *P. albescens* (Fig. 5–8) from The Bahamas, which have been summarized by other authors from North America (e.g., MacNeill 1975). In nature, checkered skippers generally land with their wings held open, exposing the dorsal wing pattern; ventral surfaces are rarely exposed during daily activity, although adults perch with their wings tightly closed during the night and periods of poor weather, exposing the more

cryptically colored ventral wing pattern. Thus, most observations of checkered skippers will be of the upperside only. We have found that the most convenient dorsal wing character to separate the species is the presence (in *P. oileus*, Fig. 1,3) or absence (in *P. albescens*, as well as in *P. communis*) of the small white spot at the distal end of the forewing discal cell (Fig. 3 arrow). While the size of this spot on *P. oileus* is variable, and a trace of the spot is very rarely discernable on unusual specimens of *P. albescens* or *P. communis*, this is generally a very reliable feature to separate the two taxa. If only the ventral surface of a checkered skipper in The Bahamas is observed, the presence (in *P. oileus*) of a dark streak along the ventral hindwing costa (absent in *P. albescens*), at about mid-wing (Fig. 4 arrow), will separate the two species. This same feature also separates *P. oileus* from the very closely related *P. orcus* (Stoll, 1780) (which lacks this dark macule), a taxon distributed further east in the Caribbean and in Central and South America (Evans 1953, Austin and Warren 2001).

Valvae of *P. oileus* from The Bahamas ( $n = 1$  from Great Inagua, 3 from Grand Bahama) were similar to those from south Florida ( $n = 3$ ), Cuba ( $n = 3$ ) and Hispaniola ( $n = 3$ ). Valvae of both male *P. albescens* specimens from North Abaco were examined; these likewise exhibited no differences compared to recently collected male *P. albescens* from north Florida ( $n = 1$  from Bay County, 1 from Clay County, 4 from Marion County).

## Discussion

The paucity of records for *Pyrgus* species from The Bahamas may or may not reflect their actual or current distributions in the Commonwealth. As noted by Smith et al. (1994) for *P. oileus*, “this skipper is sometimes so abundant as to be regarded a nuisance, discouraging collectors from obtaining adequate series.” Calhoun (2002) also commented on the “general apathy exhibited by lepidopterists toward anything resembling the ‘common’ *P. communis*.” Given that checkered skippers are frequently disregarded by lepidopterists in the field, it is possible that they are partly or largely underreported in The Bahamas, and could occupy broader distributions in the Commonwealth than currently known. However, skipper butterflies were thoroughly collected during past Lepidoptera surveys on various islands, including Andros (Clench 1977), San Salvador (Elliott et al. 1980), Crooked, Acklins, Mayaguana (Miller et al. 1992), Cat (Miller and Simon 1998), and New Providence (Cock 1998), and our most recent faunal surveys on various Bahamian islands have also focused collection efforts on skippers (e.g., Miller et al. 2015; Steinhauser et al. 2017). We therefore doubt that negligence during field surveys can entirely account for the lack of checkered skipper records from most islands.

As noted above, the status of *Pyrgus oileus* on Great Inagua Island remains uncertain. Clench and Bjorndal (1980) reported finding it in yards and vacant lots in Matthew Town in 1973, but could not relocate it in the same localities in 1977. Subsequent surveys for Lepidoptera during 1984 and 1985 on Great Inagua failed to detect the species (Simon and Miller 1986). However, specimens were collected in 2007 at Salt Pond Hill, Matthew Town, and Man of War Bay (MGCL collection), suggesting that if the species had disappeared from the island earlier, it had since recolonized. We have no information on the current (post-2007) status of *P. oileus* on Great Inagua, and note that it was not collected during 2014 sampling by M. Simon and G. Goss.

It is unknown exactly when or how *Pyrgus oileus* and *P. albescens* reached the northern Bahamas, but our results indicate that both species were established on Grand Bahama by late 2014. Neither species was encountered during a photographic survey the butterfly fauna of the island on June 16–22, 2010 (Cook 2018). The earliest record of *P. oileus* from Grand Bahama that we are aware of is a photograph of a male from Bevans Town, 8 January 2013, by Flickr users “Kristof and Yulia.” Given the recent colonization history of *P. albescens* in Florida (Calhoun 2002), where it has aggressively replaced *P. communis*, as well as the relative proximity of Grand Bahama and Abaco to southern Florida, it would not be surprising if *P. albescens* (at least) has arrived in The Bahamas recently, through its own dispersal abilities. *Pyrgus oileus* is also known to be highly vagile, with a fluctuating distributional limit “that expands substantially in favorable years” (Burns and Kendall 1969). Thus, there is no reason to believe that *P. oileus* could not have reached Grand Bahama through its own dispersal abilities as well. This said, human-enabled dispersal to The Bahamas cannot be ruled out for either species of checkered skipper.

If our current records for *Pyrgus* in The Bahamas accurately reflect distributions of the species in

the Commonwealth, and assuming their arrival happened via natural colonization events, the current occurrence of checkered skippers in the Commonwealth suggests two independent dispersal routes. The proximity of Great Inagua Island (Fig. 9) to the Greater Antilles of Cuba and Hispaniola, where *P. oileus* is widespread and common (see introduction), strongly suggests dispersal of *P. oileus* from one or both of these islands. *Pyrgus oileus* appears to have secondarily dispersed into the northern Bahamas, onto Grand Bahama, perhaps at about the same time that *P. albescens* did (possibly between 2010–2013) from southern Florida. The appearance of *P. albescens* on North Abaco in 2016 suggests it may have dispersed there from Grand Bahama.

*Pyrgus oileus* and *P. albescens* are both denizens of highly disturbed habitats, as noted by various authors (e.g., Calhoun 2002). Specimens of *P. albescens* from North Abaco were collected along a mowed roadside easement bordering the primary paved road, which was recently platted for development, and included sporadic plantings of ornamental croton. The easement was bordered by a *Casuarina* L.-dominated shoreline on the northeast side, with mixed coppice, *Casuarina*, palms and other ornamental plantings on the southwest. The specimen of *P. albescens* from Grand Bahama was likewise collected in a disturbed roadside habitat, adjacent to a defunct outdoor go-cart and roller skating rink at the edge of a relict tract of native pinelands (*Pinus caribaea* Morelet). One male of *P. oileus* was collected on Grand Bahama on the same day, along a horse trail within 500 meters of the aforementioned locality, while other *P. oileus* specimens were collected in a roadside habitat bordering the *Casuarina*-dominated shoreline with dense stands of *Lantana* L. and other shrubs. We would not be surprised if subsequent observers find *P. oileus* and *P. albescens* flying in exact sympatry in The Bahamas, since they commonly occur in exact sympatry and synchrony in Florida (Calhoun 2002; pers. obs. 2006–2017).

Larval foodplants for checkered skippers in The Bahamas have not been recorded as yet. In Florida, *P. oileus* and *P. albescens* appear to largely use the same foodplants, mainly *Sida rhombifolia* L. and *S. acuta* Burm.f. (Calhoun 2002; Minno et al. 2005), although a wide range of probable malvaceous foodplants are suspected (Minno and Minno 1999; Minno et al. 2005). Nine species of *Sida* L. and 18 other genera of Malvaceae (including Sterculiaceae) are known to occur in the Commonwealth, with *Sida acuta*, *S. spinosa* L., *S. urens* L. and *S. veronicifolia* Lam. specifically recorded for Abaco and Grand Bahama (Correll and Correll 1982). We noted the presence of a *Waltheria* L. species (Malvaceae), either *W. indica* L. or *W. bahamensis* Britt., at two *Pyrgus* sites on Grand Bahama near Freeport, and *Melochia* L. (Malvaceae) in the vicinity of Barbary Beach. While *Sida* is a likely foodplant in The Bahamas, multiple genera of Malvaceae may be used.

The invasion of *Pyrgus albescens* into The Bahamas represents the first record of the species from the Commonwealth, as well as the first report of this species from anywhere in the Caribbean. We urge visiting lepidopterists, as well as interested residents, to pay special attention to checkered skippers throughout The Bahamas. Focused efforts should be made to locate *P. oileus* on Abaco, as well as on New Providence and Eleuthera. Likewise, *P. albescens* should specifically be sought on New Providence and Eleuthera, which appear to be likely destinations of further dispersal if this species continues to spread in the northern Bahamas. Recent hurricane activity from 2015 to 2017 may have also aided or otherwise affected dispersal of these species. Indeed, it is time to put aside any feelings one may have about the irrelevance of checkered skippers, and closely monitor their presence and abundance throughout the Commonwealth of The Bahamas.

## Acknowledgments

We thank Philip S. Weech, Director, and Stacy Lubin-Gray, of the Bahamas Environment, Science and Technology (BEST) Commission for permission to conduct scientific research in the Bahamas. We also thank Mr. Simeon Pinder, Director of Agriculture, and Luceta Hanna for their invaluable assistance in providing export permits for the specimens collected during our Lepidoptera surveys. 2014 fieldwork in the Bahamas was funded by National Geographic Committee for Research and Exploration grant number 9439-14 (JYM, PI). Special thanks to Mark Simon, Gary Goss, and Rick Rozycki for their collecting efforts and logistic support as part of the Miller Bahamas field team. We also thank K. M. Daly for assistance searching for online *Pyrgus* records and discussions, Harry Pavulaan for donating *Pyrgus*

specimens from Virginia, Rick Rozycki and Denis Knowles for donating *Pyrgus* specimens from Great Inagua, and Marc Minno for information on *Pyrgus* in south Florida. Finally, we thank John Calhoun and John Shuey for thoughtful reviews that improved this manuscript.

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Received April 12, 2018; accepted May 17, 2018.

Review editor Andrei Sourakov.



**Figures 1–8.** *Pyrgus* adults from The Bahamas. 1) *P. oileus* male, dorsal view, Grand Bahama Island, MGCL 244928. 2) Same specimen, ventral. 3) *P. oileus* female, dorsal, Grand Bahama Island, MGCL 244926, arrow indicates diagnostic white spot at the distal end of the forewing discal cell. 4) Same specimen, ventral, arrow indicates diagnostic dark streak along ventral hindwing costa. 5) *P. albescens* male, dorsal, North Abaco, MGCL 247454. 6) Same specimen, ventral. 7) *P. albescens* female, dorsal, North Abaco, MGCL 247046. 8) Same specimen, ventral; See material examined for full label data.

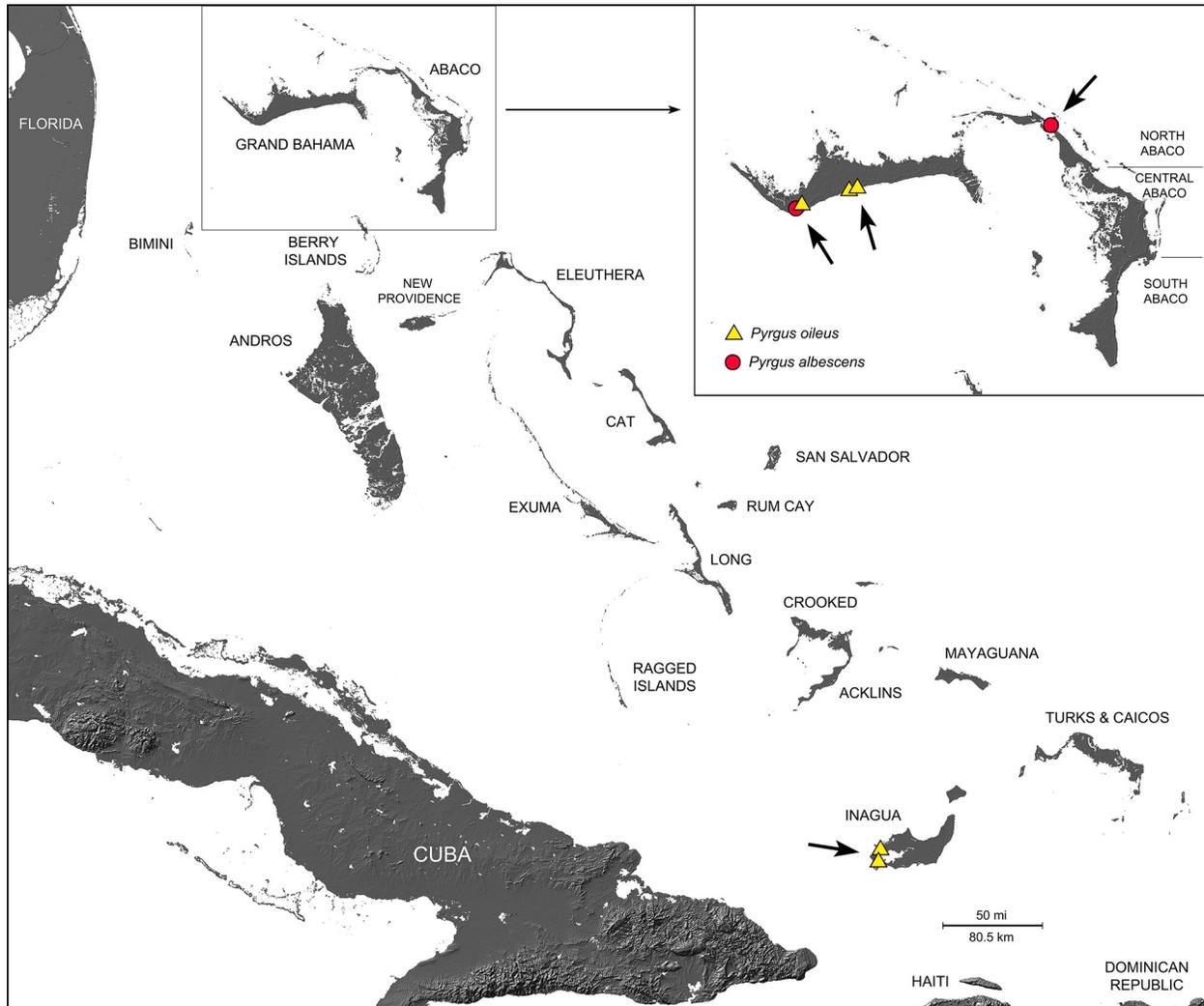


Figure 9. Map of The Bahamas/Lucayan Archipelago including distribution of *Pyrgus oileus* and *P. albescens*.

