1975, en calidad de ayudante de carpintería para trabajar en la construcción de los corrales de las iguanas; posteriormente fue asignado a otras actividades de mantenimiento y construcción de la infraestructura física de la institución. Con el transcurso del tiempo y por el místico esfuerzo y ganas de aprender, fue ganándose la consideración y respeto de sus compañeros de trabajo y jefes: actualmente ocupa el puesto de Jefe de Mantenimiento de la institución.

En la Estación aprendió el oficio de albañil, sus primeras experiencias en este campo fue "asentando bloques en la casa 'el castillo'" como él mismo manifiesta. Por iniciativa propia fue ganando experiencia en plomería y gasfitería. En buena medida depende de él que la Estación y el Parque dispongan de agua de manera permanente. Siempre está disponible fines de semana, días feriados, para resolver algún problema, reparar tuberías y mangueras, etc. Cuántas veces se ha visto a Alfonso salir de la vegetación densa, completamente mojado, al reparar alguna pieza.

"Me gustan las Islas y mi trabajo," manifiesta; "hubiese deseado acompañar a los científicos a las diferentes Islas y conocer más de cerca lo que hacen." De todas maneras, a través de la labor que ejecuta, él sabe que también ha aportado con su grano de arena a las diferentes actividades que la institución realiza.

Ha estado presente en épocas difíciles de duras pruebas, también ha participado de los momentos de éxito. En fin, en una u otra manera ha incrementado con su presencia la historia institucional. Siempre de buen humor y la mejor voluntad contribuye e influye considerablemente en el buen ambiente de trabajo, que rige en la Estación.

Don Alfonso también es chofer de la "Tortuga" que sirve para transporte del personal de la Estación. Fue condecorado y reconocido a principios de año, por haber cumplido 13 años de trabajo ininterrumpido en la institución. **Alfredo Carrasco, Estación Científica Charles Darwin, Isla Santa Cruz, Galápagos, Ecuador.**

INTRODUCED GECKOS IN PUERTO AYORA, SANTA CRUZ, WITH REMARKS ON OTHER AREAS

By: Marinus S. Hoogmoed

During the recent International Workshop on Herpetology in Galápagos (29 May-11 June 1988), several participants noted the presence of a large species of introduced gecko on buildings in Puerto Ayora, Isla Santa Cruz. All specimens seen were located on the walls of relatively large and new concrete or stone buildings. It seemed worthwhile to establish the identity and map the local distribution of this species, which certainly was not the endemic species, *Phyllodactylus galapagensis* Peters; according to J.W. Wright (pers. comm.), the large lizard was a recent introduction, first observed in 1979.

On the basis of information gathered in 1981 by former Station herpetologist, Robert Reynolds, when he first saw the species, the introduction probably occurred a few years earlier. According to the recollections of Tui De Roy and Gil De Roy, these geckos were seen at the Ninfa Bar as early as 1975. María Eulalia de Balfour was aware of this introduced gecko in a house behind the Catholic Church in Puerto Ayora in 1976.

Wright (1983a) identified the introduced large gecko in Puerto Ayora as *Phyllodactylus reissi*, but later he (Wright 1983b) changed his opinion and tentatively considered it *P. pumilis*, not giving the reasons for this change. However, studying specimens soon convinced me that they actually belong to *Phyllodactylus reissi* Peters rather than *P. pumilis* because of the lizard's size, the fact that the scales on the dorsal surface of the thighs and on the proximal one-fourth of the tail are homogeneous, and the fact that the scales in the supraocular region are the largest of the interorbital series. Additionally, when the distribution of both species on the mainland was taken into consideration, it appeared much more likely that *P. reissi* would be introduced accidentally from the mainland to Galápagos than *P. pumilis*, which is only known to occur in a rather small, and relatively inaccessible, area with no major shipping

ports. *P. reissi*, however, inhabits coastal Ecuador from Manabi (Manta) southward to northern Perú, where it even enters the upper Amazon Basin (Dixon and Huey 1970). It also occurs in Guayaquil, a major shipping port with traffic to Galápagos. Dixon and Huey (1970:54) considered this species "the most abundant scansorial gecko of northern Peru" and stated that their nocturnal activities are "essentially on vertical surfaces, i.e., trunks of trees, walls of buildings, boulders, cacti, and fence posts . . . ." Among the daytime retreats of this species they mentioned cracks in adobe walls and "beneath palm leaves, construction materials and fruit crates." Especially the last-mentioned daytime retreats could facilitate the transport of *P. reissi* from the mainland to the Galápagos Islands, when in close proximity to human settlements. The regular boat service from Guayaquil provides the Islands with numerous necessities like construction materials, vegetables, and other products.

Phyllodactylus reissi reaches a snout-vent length of 75 mm in males (mean 59.4 mm) and 73 mm in females (mean 57.5) (Dixon and Huey 1970). The largest specimen (male) from Puerto Ayora measured 75 mm. All specimens observed in Puerto Ayora were pale grayish, with indistinct, diffuse, darker spots that did not form distinct bands. The belly of most specimens was yellow or white with a yellow area. These two characters (size and color) are sufficient to distinguish *P. reissi* from the much smaller *P. galapagensis* (maximum snout-vent length 45 mm [Van Denburgh 1912; Lanza 1973]), which is distinctly patterned with bold, dark spots and bands on a brownish gray background (Wright 1984:26, lower lefthand picture). Upon closer examination, more differences between the two species become apparent: *P. reissi* has a distinct frontal depression; an oblique row of enlarged, projecting postanals; a midventral row of transversely enlarged subcaudals; truncate scansorial discs; and it lacks any pigment spots on the ventrals (which are white in preservative); *P. galapagensis* lacks the frontal depression, has no enlarged postanals and subcaudals, has rounded scansorial discs, and has a small black spot on each ventral (light brown in life [Van Denburgh 1912]).

During two surveys, parts of Puerto Ayora were checked for the presence of these large geckos. During the first survey on 31 May 1988 (2000-2130), the dock area around the Catholic Church and the Hotel Las Ninfas was intensively searched by J.W. Wright, L.A. Fitzgerald, and myself. A total of 28 specimens was captured and another 10 were seen but escaped. I did the second survey by myself on 9 June 1988 (2000-2100), and at that time saw a total of eight specimens on the walls of the hospital, the Hotel Las Palmeras, the Hotel Lobo del Mar, the Municipal building, the Sala de Uso Multiple, and opposite the INGALA building (see Fig. 1, triangles). During the two surveys and on some additional, casual evening observations, only four *P. galapagensis* were observed, all on the walls of buildings belonging to the Hotel Sol y Mar (Fig. 1, stars), where they seemed to occupy the same niche as *P. reissi* did in the more central part of Puerto Ayora. The only difference observed was that the buildings on which *P. reissi* occurred were in less rural areas than those on which *P. galapagensis* occurred (surrounded by open areas). Nowhere were the two species observed together. Though the data collected so far only can be considered anecdotical, they nevertheless seem to indicate the following:

1) *P. reissi* is well established in the central part of Puerto Ayora, being much more numerous in the dock area than elsewhere in town, where I only observed single individuals and no concentrations as on the Catholic Church and in the Hotel Las Ninfas. It appears that it has not spread beyond Puerto Ayora, though no search was made for this species outside the village.

2) In the human environment, *P. galapagensis* seems to occupy the same niche as *P. reissi*. In the natural environment, it lives among and under boulders, as I observed in 1981 in the CDRS.

3) The species do not occur together on the same buildings. This might mean they are mutually exclusive. Whether this exclusion is an active one, with *P. reissi* eating or harassing the much smaller *P. galapagensis*, or whether other factors are involved, is unknown.

4) The present distribution of both species in Puerto Ayora seems to suggest a spreading of *P. reissi* into the village, with the dock area as the center of dispersal. Whether it just occupied an empty niche in this artificial habitat, or whether it supplanted *P.*

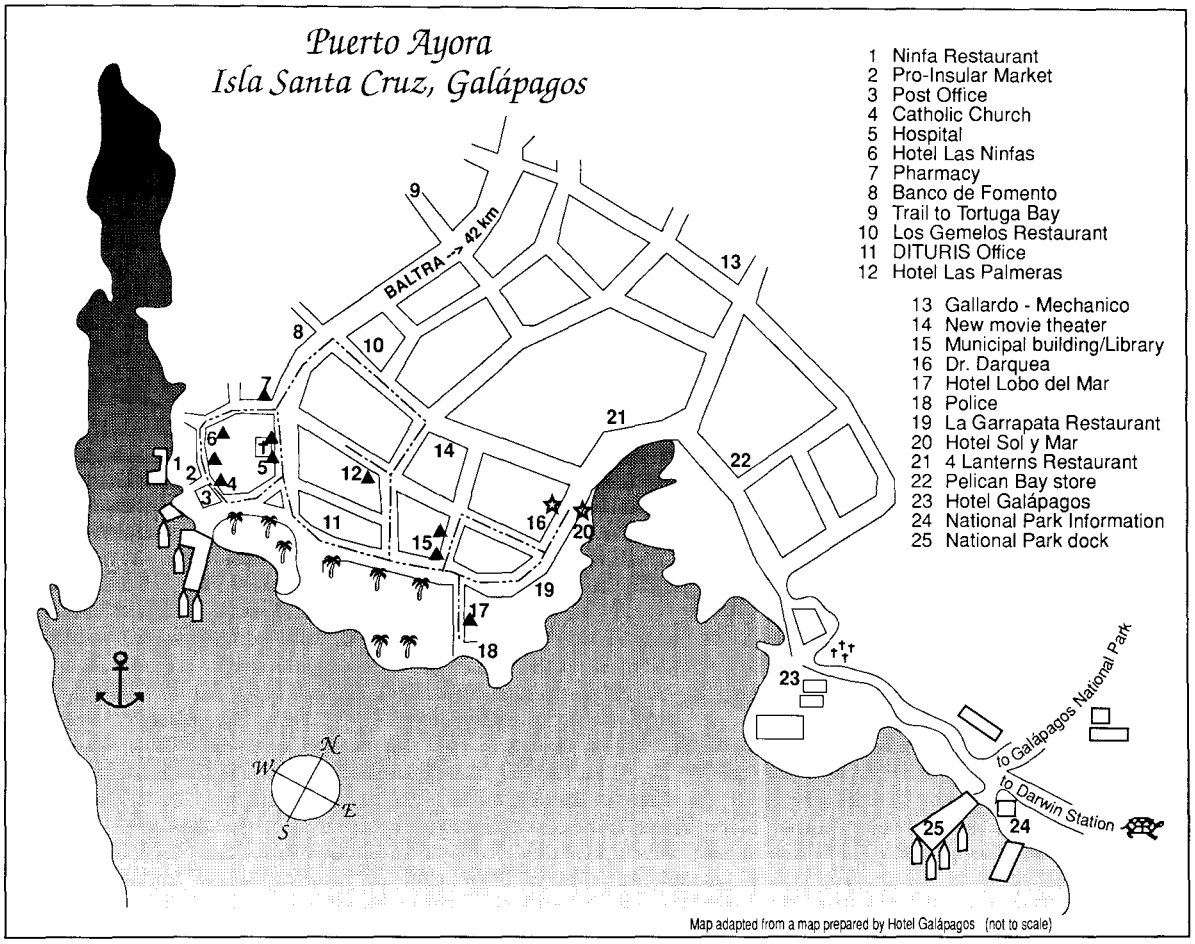

Figure 1. Map of central part of Puerto Ayora showing localities for *Phyllodactylus galapagensis* (stars) and *P. reissi* (triangles). The route of the two surveys is indicated with a broken line. Mapa de la zona central de Puerto Ayora enseñando localidades de *Phyllodactylus galapagensis* (asteriscos) and *P. reissi* (triángulos). La ruta investigada durante ambos censos está indicada por la linea rayada.

galapagensis, is not known.

5) The rate of dispersal from the point of introduction is not known, but by regular monitoring it could be established in the future.

The population of *P. reissi*, though largely in central Puerto Ayora, still might be controlled by a regular hunting and extermination program. Because no special skills are needed for this, and because logistics are not a problem, it should be possible to enlist the help of a variety of Park and Station personnel, visiting scientists, and students for "gecko-shoots," to eradicate this introduced species before it spreads into the natural environment, where it would really be impossible to control. The spread into the natural environment does not seem impossible, because its mainland habitats (Dixon and Huey 1970) are similar to habitats found in Galápagos. A regular program to monitor the population of P. *reissi* in Santa Cruz would be advisable in order to ascertain whether the "gecko-shoots" do have an effect. I estimate that the species could be removed from the presently inhabited area within 2 years' time. At the same time, care should be taken that no new introductions stem from ship cargo arriving to Santa Cruz and air cargo arriving on Baltra. Rigorous inspection of cargo by the Port Captain before it is brought ashore would be important to preventing future introductions.

According to Wright (1983a, 1983b) another species of gecko, *Lepidodactylus lugubris* (Duméril

and Bibron), also has been introduced to Puerto Ayora, although I did not observe it during my visit. This is a small gecko, comparable in size to *P. galapagensis*; the species is distributed from Ceylon eastward throughout the Pacific to New Zealand and to western Central (Panamá) and South America (Ecuador, Colombia). Undoubtedly this species is of Southeast Asian origin. Due to its close association with man and human transport, this species has achieved its present distribution. It probably reached Galápagos from the east via the Ecuadorian mainland, where it is well established. Periodic surveys of this species will be necessary to keep track of its spread. The third introduced species of gecko in Galápagos (only on San Cristóbal) is *Gonatodes caudiscutatus* (Günther). Originally it was described as *G. collaris* Garman and considered to be endemic to San Cristóbal. As such, it was reported again by Mertens (1963). Vanzolini (1965), however, showed the type specimen of *G. collaris* to be identical with *G. caudiscutatus* from western Ecuador. This opinion was supported by Rivero-Blanco (1979) and Wright (1983c). Apparently this species has been reported only from Wreck Bay (Puerto Baquerizo Moreno) and from El Progresso. Wright (1983c) assumed that it was introduced on San Cristóbal with agricultural products from the Guayaquil area. In contrast to the other two introduced geckos, *G. caudiscutatus* is an inhabitant of relatively wet areas, and in San Cristóbal it is found in the wet highlands and in artificially wet gardens in the coastal area. It is unknown whether this species is spreading or not. A regular monitoring program would be desirable.

Not all introductions involve long-distance movements. Wood (1939) reported the presence of *Phyllodactylus leei* Cope, a species supposedly endemic to San Cristóbal, in Puerto Villamil on Isabela. Lanza (1973) thought that it was accidentally introduced into Puerto Villamil from San Cristóbal by human traffic between Islands. Wright (1983a, 1983b) mentioned its introduction to Isabela, but was doubtful whether the species still existed on Isabela.

Clearly, mammals, birds, insects, and plants are not the only introduced organisms in Galápagos. Geckos are notorious migrants that can cover large distances as stowaways in human cargo, either as eggs, as juveniles, or as adults. Of the three species introduced from mainland Ecuador, the largest one, *P. reissi*, may pose the greatest threat to the smaller native species of *Phyllodactylus*. The effects of *L. lugubris* and *G. caudiscutatus* on the native geckos are not known but might be lessened because these species seem to prefer wetter habitats than *Phyllodactylus* from Galápagos. However, these are only speculations based on few observations, and careful research is needed in order to correctly estimate their impact (if any) on the native geckos and the ecosystem.

The fact that interisland transportation already seems to be responsible for the translocation of one endemic species of *Phyllodactylus* shows how careful one should be in transporting materials from one island to another. Possibly more interisland translocations have occurred but have gone unnoticed. One species (*P. galapagensis*) occurs on all the central Islands (Santa Cruz, Isabela, Fernandina, Santiago, Pinzón, Baltra, Daphne [Lanza 1973; Wright 1983a, 1983b]). Our present knowledge of this group does not enable us to distinguish between populations. Future research, especially in the field of genetics, might provide more data on recent movements of native species. For the time being, it seems advisable to start monitoring introduced gecko populations and, as soon as possible, to make decisions on whether their removal would be a high priority or not. My participation was made possible by a grant of the Van Tienhoven Foundation, Amsterdam, The Netherlands, and by the Tinker Foundation which sponsored the workshop in Galápagos.

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EFECTOS DEL INCENDIO DE 1985 EN LOS INVERTEBRADOS DE SIERRA NEGRA, ISLA ISABELA

Por: Sandra Abedrabbo

El incendio del sur de Isabela, ocurrido en marzo y abril de 1985, permitió evaluar su impacto en las comunidades de invertebrados y examinar los procesos de recolonización. En junio y noviembre del mismo año se hizo un chequeo preliminar de los invertebrados del área quemada y desde febrero de 1986 se empezó con muestreas sistemáticas en el sector de la pampa de Sierra Negra (1,100 m); puesto que fue una de las áreas más afectadas por el fuego, y homogénea en cuanto a vegetación y tipo de suelo.

Con el fuego los invertebrados soportaron una gran mortalidad, pero estos empezaron a recolonizar fácilmente el área quemada pocos meses después del incendio. Invertebrados pioneros como Orthoptera (grillos y saltamontes) y carnivoros oportunistas como Araneae (arañas) y Carabidae (escarabajos) fueron los que iniciaron el proceso. Posteriormente con la regeneración de la vegetación empezó la recuperación de los invertebrados herbívoros que dependen estrictamente de ella, como Homoptera (pulgones) y larvas de Lepidoptera (mariposas).

La recuperación de los invertebrados en el área quemada esta intimamente relacionada con la restitución de la capa orgánica del suelo y la vegetación. En refugios esta fauna no fue casi alterada y se consideran "Islas" que ayudan a reestablecer el equilibrio. La recuperación del área quemada de Sierra Negra ha sido bastante rápida, tanto en la recolonización de la vegetación como de los invertebrados. Se estima que en uno o dos años se puede tener una "estabilidad" de estas comunidades.

EFFECTS OF THE ISABELA FIRE OF 1985 ON THE INVERTEBRATES OF SIERRA NEGRA

The fire on southern Isabela in March and April of 1985 created the opportunity to study the impact of fire on the invertebrate community and the processes involved in recolonization. In June and November of 1985, a preliminary survey of the invertebrates in the burnt area was completed. Subsequently, in February 1986, systematic sampling was begun in the Sierra Negra pampa (1,100 m) because this was one of the areas most affected by the fire, and previously was one of the most homogeneous in terms of vegetation and soil characteristics.

The invertebrates suffered a high mortality as a result of the fire, but they readily began to recolonize the burnt area only a few months after the fire. Pioneer colonists such as orthopterans (crickets and grasshoppers), opportunistic carnivores such as