

Supplemental Materials

Supplemental Materials 1.

Descriptions of stages 26–43 of *Hemidactylus platyurus* embryonic development. Descriptions, terminology, and staging convention are based on those of other gekkonids (Griffing et al., 2019; Griffing et al., 2022) and *Zootoca vivipara* (Dufaure and Hubert, 1961). When incubated at 27°C, *H. platyurus* hatched approximately 51 days post-oviposition (dpo).

Stage 26: 25–27 somites are present. The otic capsule is visible and translucent. The optic cup is faintly visible with a large choroid fissure present. The endocardial tube is prominent. Pharyngeal arches I–II and pharyngeal cleft 1 are faintly visible. **Stage 27:** 30–32 somites are present. The mesencephalon (primordial optic tectum) and diencephalon are distinct from other cephalic features. The otic capsule is relatively larger. The optic cup and lens are circular with a distinct choroid fissure present. Pharyngeal arches I–III and pharyngeal clefts 1–2 are distinct. The endocardial tube is relatively larger and beating. The nephrogenous mesenchyme is visible. No limb buds are visible, but a forelimb condensation is faintly visible. **Stage 28:** 34 somites are present. The each cephalic region (metencephalon, mesencephalon, telencephalon, and diencephalon) has distinct boundaries and is relatively larger than the previous stage. Pharyngeal arches I–III and pharyngeal clefts 1–3 are distinct. Limb buds are still not visible, but a hindlimb condensation is faintly visible. **Stage 29:** 36 somites are present. The mesencephalon is bulging dorsally relative to other cephalic regions. The retinal pigmented epithelium (RPE) is faintly visible in the posterior of the eye. The nasal pits are present. Pharyngeal arch IV is barely visible. Both fore- and hindlimb buds are present, with the forelimb being larger. **Stage 30:** 42 somites are present. The eye is relatively more ovoid in shape with more dense pigment in the RPE. The choroid fissure is less visible. Torsion of the endocardial tube is underway. The viscera posterior to the endocardial tube is faintly visible. Both limbs exhibit a distinct apical ectodermal ridge (AER). The autopodium of the forelimb, but not the hindlimb, is distinct. The mesonephric liver is faintly visible. **Stage 31:** Somites are present along the full length of the tail. The optic tectum is bulging dorsally. Fusion of the anterior pharyngeal arches is apparent, with the maxillary arch spanning halfway along the ventral length of the cranium. Frontonasal prominences are distinct. The eye is larger relative to previous stages with more pigment in the RPE. The choroid fissure appears to be fused. The endolymphatic ducts are opaque. The heart now has distinct atrial and ventricular hemispheres. The developing liver and gallbladder are visible posterior to the heart. Genital tubercles are visible. The autopodium is distinct from the rest of the forelimb. **Stage 32:** The pharyngeal arches are fusing to the point of obscuring them. The maxillary and mandibular arches have grown anteriorly. The medial nasal processes (i.e. facial primordia) remain unfused. The eye exhibits dense pigment along the rim of the lens, suggesting iris development is underway. The liver larger relative to the previous stage. Both fore- and hindlimbs have paddle-shaped autopodia. The autopodia, zeugopodia, and stylopodia are distinct in all limbs. **Stage 33:** The optic tectum is noticeably paired. The regions of the brain adjacent to the optic tectum are relatively larger, giving the optic tectum a smaller, further posterior appearance — this developmental trend remains until the dorsal aspect of the cranial region is nearly flat. The eye

exhibits dense pigment in the RPE. The maxillary arch is adjacent to the fusing facial primordia and the mandibular arch is further anterior than previous. Each autopodium exhibits faint digital condensations. The body wall is more opaque than previous stages. **Stage 34:** The maxillary arch meets the fused facial primordia (i.e. snout) with the mandibular arch following closely posteriorly. The autopodia have grown in size and exhibit distinct digital condensations and adjacent webbing. Digital webbing recession has begun but the digit tips are not yet free. Genital swellings have grown in relative size and resemble hemipenes. **Stage 35:** The mandibular arch meets the facial primordia. Digital webbing recession continues and the distal tips of the digits are now free of webbing. The lateral gliding membrane (patagium) is faintly visible along the trunk. **Stage 36:** The craniofacial region is more elongate than the previous stage — this trend continues until stage 40. The forebrain is bulging at an equal height as the hindbrain. The nares are faintly visible as well as an external ear. The onset of toe pad development occurs in this stage. Digital webbing has completely recessed and the digits are mostly free (*H. platyrurus* retains more interdigital webbing than other members of the genus). **Stage 37:** Opaque white is visible at the distal tips of the digits, signaling the development of keratinized claws. The toe pad is distinct from the two most ungual phalanges. The external ear is distinctly visible. **Stage 38:** The regions of the brain are less bulbous than previous stages. The chromatophores of the iris are faintly visible and the eye remains overall very dark. The pupil is ovoid. Digits appear proportionally longer than the previous stage, the pad is noticeably wider than previous stages, and scissor ridges of the toe pads are visible by light microscopy. **Stage 39:** The chromatophores of the eye are distinctly visible now. Scales are now visible on the limbs, ventral portion of the tail, and the labial region. **Stage 40:** The iris occupies more of the eye than the previous shape, making an almond-shaped pupil. Scales are present all over the body and pigment is accumulating, particularly in the dorsum. The ventrum and brain regions are still largely translucent. **Stage 41:** The body wall largely opaque with the exception of the ventral surface of the trunk and ventral surface of the limbs, which remain faintly translucent. The brain region is fully obscured. The scales are fully developed all over the body. **Stage 42:** The body wall is fully opaque. Toe pad development is complete. Hemipenes remain everted. **Stage 43:** The scales are noticeably hydrophobic when the embryo is submerged in phosphate-buffered saline or water. The hemipenes are inverted. The embryo is ready to hatch.

Supplemental Materials 2.

Descriptions of stages 24–43 of *Hemidactylus imbricatus* embryonic development. Descriptions, terminology, and staging convention are based on those of other gekkonids (Griffing et al., 2019; Griffing et al., 2022) and *Zootoca vivipara* (Dufaure and Hubert, 1961). When incubated at 27°C, *H. imbricatus* hatched approximately 52 days post-oviposition (dpo).

Stage 24: 17 somites are present. The optic cup is horseshoe-shaped. The endocardial tube is present and somewhat curved. Pharyngeal arch I is faintly visible. **Stage 25:** 21–23 somites are present. The craniofacial region is more elongate than the previous stage. Pharyngeal arches I–II and pharyngeal cleft 1 are faintly visible. **Stage 26:** 25–27 somites are present. The mesencephalon (primordial optic tectum) is distinct from other cephalic regions. The otic capsule is visible and translucent. The optic cup is faintly visible with a large choroid fissure present. The endocardial tube is still prominent and more curved than previous stages. Pharyngeal arches I–II are present with pharyngeal arch III and pharyngeal cleft 1 are faintly visible. **Stage 27:** 31–32 somites are present. Both the mesencephalon and diencephalon are distinct from other cephalic features. The otic capsule is relatively larger. The optic cup and lens are circular with a distinct choroid fissure present. Pharyngeal arches I–III and pharyngeal clefts 1–2 are distinct. The endocardial tube is relatively larger and beating. The nasal pits are faintly visible. The nephrogenous mesenchyme is visible. No limb buds are visible, but a forelimb condensation is faintly visible. **Stage 28:** 33 somites are present. The each cephalic region (metencephalon, mesencephalon, telencephalon, and diencephalon) has distinct boundaries and is relatively larger than the previous stage, with the mesencephalon bulging dorsally. Pharyngeal arches I–III and pharyngeal clefts 1–3 are distinct. Limb buds are still not visible, but a hindlimb condensation is faintly visible. **Stage 29:** 35 somites are present. The retinal pigmented epithelium (RPE) is faintly visible in the posterior of the eye. Pharyngeal arch IV is barely visible. The otic capsule is larger relative to previous stages. The forelimb bud is faintly visible. **Stage 30:** 40 somites are present. The eye is relatively more ovoid in shape with dense pigment in the RPE. The choroid fissure is less visible and potentially fused. Torsion of the endocardial tube is underway. The viscera posterior to the endocardial tube is faintly visible. Both limb buds are visible and exhibit a distinct apical ectodermal ridge (AER). The mesonephric liver is faintly visible. **Stage 31:** Somites are present along the full length of the tail. The optic tectum is bulging dorsally. Fusion of the anterior pharyngeal arches is apparent, with the maxillary arch spanning more than halfway along the ventral length of the cranium. Fronto-nasal prominences are distinct. The eye is larger relative to previous stages with more pigment in the RPE. The choroid fissure appears to be fused. The endolymphatic ducts are opaque. The heart now has distinct atrial and ventricular hemispheres. The developing liver is visible posterior to the heart. Genital tubercles are visible. The autopodia are distinct from the rest of the fore- and hindlimb. **Stage 32:** The pharyngeal arches are fusing to the point of obscuring them. The maxillary and mandibular arches have grown anteriorly. The medial nasal processes (i.e. facial primordia) remain unfused. The eye exhibits dense pigment along the rim of the lens, suggesting iris development is underway. The liver larger relative to the previous stage and exhibits the developing gallbladder. Both fore- and hindlimbs have paddle-shaped autopodia. The autopodia, zeugopodia, and stylopodia are distinct in all limbs. **Stage 33:** The optic tectum is noticeably

paired. The regions of the brain adjacent to the optic tectum are relatively larger, giving the optic tectum a smaller, further posterior appearance — this developmental trend remains until the dorsal aspect of the cranial region is nearly flat. The eye exhibits dense pigment in the RPE. The maxillary arch is adjacent to or just meeting the fusing facial primordia and the mandibular arch is further anterior than previous. Each autopodium exhibits faint digital condensations. **Stage 34:** The mandibular arch is nearly adjacent to the facial primordia. The autopodia have grown in size and exhibit distinct digital condensations and adjacent webbing. Digital webbing recession has begun but the digit tips are not yet free. Genital swellings have grown in relative size and resemble hemipenes. The body wall is more opaque than previous stages. **Stage 35:** The mandibular arch meets the facial primordia. Digital webbing recession continues and the distal tips of the digits are now free of webbing. **Stage 36:** The craniofacial region is more elongate than the previous stage — this trend continues until stage 40. The forebrain is bulging at an equal height as the hindbrain. The nares are faintly visible as well as an external ear. The onset of toe pad development occurs in this stage. Digital webbing has completely recessed and the digits are free. **Stage 37:** The distal tips of the digits are pointed. The toe pad is distinct from the two most ungual phalanges. The external ear is distinctly visible. Small bumps are present on the dorsal surface of the tail signaling the onset of caudal scale development. **Stage 38:** The regions of the brain are less bulbous than previous stages. The pupil of the eye is ovoid. Ribs are visible through the body wall. Opaque white is visible at the distal tips of the digits, signaling the development of keratinized claws. Digits appear proportionally longer than the previous stage, the scissor ridges of the toe pads are visible by light microscopy as well as initial scales on the dorsal surface. **Stage 39:** Scales are now visible across the surface on the limbs, ventral portion of the tail, and the labial region. **Stage 40:** The chromatophores of the eye are distinctly visible now, framing an almond-shaped pupil. Scales are present all over the body and pigment is accumulating, particularly in the dorsum. The ventrum and brain regions are still largely translucent. **Stage 41:** The body wall largely pigmented and opaque with the exception of the ventral surface of the trunk and ventral surface of the limbs, which remain faintly translucent. The brain region is fully obscured. The scales are fully developed all over the body. Toe pad development is complete. **Stage 42:** The body wall is fully opaque. Hemipenes remain everted. **Stage 43:** The scales are noticeably hydrophobic when the embryo is submerged in phosphate-buffered saline or water. The hemipenes are inverted. The embryo is ready to hatch.

Supplemental Materials 3.

Raw adult and morphological data for *Hemidactylus* toe pads. Force measurement corresponds to a single forelimb on acrylic surface, mass and SVL (snout–vent length) correspond to the total mass and length of the individual, and area corresponds to ventral toe pad area of manual digit IV.

Species	Individual Identifier	Force (N)	Area (mm ²)	Mass (g)	SVL (mm)
<i>H. platyurus</i>	1	1.464	6.600	3.65	52.00
<i>H. platyurus</i>	2	0.652	6.540	3.59	54.24
<i>H. platyurus</i>	3	1.854	6.990	3.73	50.80
<i>H. turcicus</i>	1	0.530	3.698	3.74	48.95
<i>H. turcicus</i>	2	1.118	4.191	5.25	57.31
<i>H. turcicus</i>	3	0.050	2.663	3.00	47.74
<i>H. imbricatus</i>	1	0.000	2.808	3.50	49.38
<i>H. imbricatus</i>	2	0.072	2.51	3.18	42.80
<i>H. imbricatus</i>	3	0.113	2.437	2.90	42.26