# Recommended Annual Breeding Schedule

Phrynosoma asio - Giant horned lizard

**Habitat basis**
Pacific-slope tropical dry forest and thorn scrub in southern Mexico and western Guatemala. Activity follows a long dry season and a warmer, humid rainy season rather than a true desert-only climate.

**Husbandry basis**
Published Los Angeles Zoo work maintained adults at about 28 C ambient, 70% RH and 30-37 C basking surfaces, with a cooler semi-active winter period. A long-term breeder reports 28-30 C days and basking up to 45 C.

**Legal status**
Phrynosoma spp. entered CITES Appendix II on 23 February 2023. P. asio is also listed as subject to special protection under Mexico's NOM-059. Keep provenance and movement records current.

| Month | Day ambient | Night | Basking surface | UVI | Photoperiod | Lamp hours | Day / night RH | Feeding | Seasonal management |
|---|---|---|---|---|---|---|---|---|---|
| **Jan** | 24 C | 18 C | 29 C | 1 | 8 h | 4 h | 40-50 / 45-55% | Very low | Semi-active brumation |
| **Feb** | 24 C | 18 C | 29 C | 1 | 8 h | 4 h | 40-50 / 45-55% | Very low | Semi-active brumation |
| **Mar** | 26 C | 18 C | 32 C | 2 | 10 h | 6 h | 45-55 / 50-60% | Low-moderate | Staged emergence |
| **Apr** | 28 C | 19 C | 35 C | 3 | 11 h | 8 h | 50-60 / 55-65% | High | Conditioning |
| **May** | 28 C | 20 C | 36-40 C | 3-4 | 12 h | 9 h | 60-70 / 65-75% | High | Rain onset / courtship |
| **Jun** | 29 C | 21 C | 37-42 C | 3-4 | 12 h | 10 h | 60-70 / 65-75% | High | Courtship / mating |
| **Jul** | 29 C | 22 C | 37-42 C | 3-4 | 12 h | 10 h | 65-75 / 70-80% | High | Mating / gravid females |
| **Aug** | 29 C | 22 C | 37-42 C | 3-4 | 12 h | 10 h | 65-75 / 70-80% | High | Egg laying |
| **Sep** | 28 C | 21 C | 36-40 C | 3 | 12 h | 9 h | 60-70 / 65-75% | High | Incubation / recovery |
| **Oct** | 27 C | 20 C | 34-38 C | 2-3 | 11 h | 8 h | 55-65 / 60-70% | Moderate | Late wet season |
| **Nov** | 26 C | 19 C | 32-35 C | 2 | 10 h | 6 h | 45-55 / 50-60% | Low | Dry-season taper |
| **Dec** | 24 C | 18 C | 29 C | 1 | 8 h | 4 h | 40-50 / 45-55% | Very low | Semi-active brumation |

Operating note: use the table as a facility starting point, not a set of single-point enclosure temperatures. Provide an immediate cooler retreat and deep substrate at every stage. Increase humidity through discrete spray or rain events while allowing exposed surfaces to dry.

Winter note: published zoo animals remained semi-active and used a reduced hotspot intermittently during a four-month brumation. Do not impose complete lamp-off cooling on this tropical species, and do not offer routine meals unless animals are active and basking.

# Practical Husbandry and Daily Management

A high-attention insectivore requiring deep substrate, careful hydration, measured heat and daily confirmation that each animal is feeding.

## Enclosure and substrate

Use **160 x 60 x 50 cm or larger for one adult**; increase the footprint substantially for a pair or established group. Provide 10-25 cm of an approximately 80% sand / 20% soil mix. The lower layer may remain lightly moist, but the surface must not stay waterlogged.

Create open basking sightlines with flat stones, sparse bunch grass, low brush, leaf litter and several shallow-burial areas. Secure all stones from the enclosure floor. Provide more than one equivalent heat, shelter and feeding position when animals share space.

## Heat, light and UVB

During full activity maintain warm air around **28-30 C**, a cooler retreat and a broad measured surface around **35-42 C**. A local surface approaching 45 C may be offered only with immediate escape routes. Avoid treating 45-50 C as an enclosure-wide target.

Target **UVI 3-4** at the principal active-season basking position, with complete shade and buried retreats. Measure UVI with a meter. In winter reduce duration and intensity gradually; retain a short daily hotspot around 29 C for intermittent use.

## Water and humidity

Keep a shallow stable water dish available. Spray the head and body lightly to stimulate drinking, especially after feeding, while preventing persistently wet substrate and contact sores. Increase rain events in May-October and reduce them gradually through the dry season.

## Diet and feeding

Offer a varied small-invertebrate diet. Termites, appropriately safe ants, small gut-loaded crickets and small roaches are useful; juvenile earwigs and other suitable soft-bodied prey may add variety. Published zoo animals accepted crickets as the staple when termites were seasonal.

During full activity offer small meals daily and, where practical, two feeding opportunities around peak activity. Remove uneaten ants. Do not assume every ant species is safe: some can sting excessively or release harmful defensive chemicals. Avoid hard-shelled larvae as routine staples.

Dust prey with plain calcium regularly and use a multivitamin at a conservative product-appropriate frequency. Record individual intake. Falling mass, repeated missed feeds or poor digestion requires prompt review and reptile-veterinary input.

## Social management and handling

Mixed-sex and bachelor groups have been maintained without observed aggression in a zoo colony, but compatibility is never guaranteed. Weigh every animal separately and separate for biting, food exclusion, suppressed basking, repeated hiding or declining condition.

Minimise restraint. Ocular-sinus blood squirting is a defensive response documented in this species; it indicates acute stress rather than a disease diagnosis. Check the eyes after an episode, reduce handling and seek veterinary advice for persistent irritation or injury.

## Daily keeper checks

| Check | Record |
|---|---|
| Activity | Basking, burial, emergence time and use of rain events |
| Feeding | Prey type and amount eaten by each individual |
| Condition | Mass trend, eyes, digits, skin, faeces and hydration |
| Equipment | Thermostats, surface temperatures, UVI and water change |

# Breeding, Incubation and Evidence Review

Confirmed captive data are available for this species and should replace generic horned-lizard assumptions.

## Courtship and oviposition

The species is oviparous. Wild breeding has been reported mainly in May-June, while published captive matings occurred in June-July. In the Los Angeles Zoo colony, a 20 July mating was followed by a 20-egg clutch on 18 August; the same female laid 19 eggs the following year.

The published gravid interval is about **30-60 days**. The reported mean clutch size is **16.9 +/- 4.9 eggs**. Provide at least 15-25 cm of diggable sand-soil with a warm, private nesting zone; females may excavate, lay about 7 cm deep, coat eggs with substrate and spend hours refilling and tamping the nest.

## Incubation

A proven starting method is fine vermiculite at approximately **2 parts vermiculite to 1 part water by mass**, with light condensation rather than saturated media. Monitor egg appearance and mass trend; correct dehydration gradually and avoid direct water on eggs.

At **26.5 C**, eggs hatched in about **100-112 days**. At **28 C**, hatching occurred in about **85-92 days**. The lower-temperature hatchlings were larger on average in one comparison. A failed early attempt at 31 C also used much drier substrate, so temperature and moisture effects cannot be separated.

## Neonates

| Area | Published starting point |
|---|---|
| Housing | Small groups in simple enclosures with moist paper towel, shallow water and a smooth basking stone |
| Basking | 30-37 C surface with UVB across the enclosure and shaded escape |
| Feeding | Very small prey two to four times daily; termites and pinhead crickets were most useful |
| Hydration | Light head misting after feeds; prevent oversaturation and contact sores |
| Hatching | Allow several days for emergence; do not pull hatchlings from eggs while yolk absorption is continuing |
| Monitoring | Confirm equal food access and record individual mass, digits, eyes, faeces and shedding |

## Source corrections applied

The original one-page file treated the CITES listing as unconfirmed, prescribed complete lamp-off dormancy, described ants as about 30% of the diet and stated that clutch and incubation data were unavailable. These points have been replaced with the adopted Appendix-II status and the species-specific Los Angeles Zoo husbandry and reproduction record.

## Key references


1. Recchio, I., Robertson-Billet, M., Rodriguez, C. & Haigwood, J. (2014). Captive husbandry and reproduction of Phrynosoma asio at the Los Angeles Zoo and Botanical Gardens. Herpetological Review 45(3):450-454.

2. Baur, B. (1979). Pflege und Zucht der Riesenkrötenechse, Phrynosoma asio. Salamandra 15:1-12.

3. Lara-Resendiz, R.A. et al. (2015). Selected body temperature of nine species of Mexican horned lizards (Phrynosoma). Revista Mexicana de Biodiversidad 86:275-278.

4. CITES CoP19 Proposal 18 and Notification 2023/005: inclusion of Phrynosoma spp. in Appendix II, effective 23 February 2023.

5. NOM-059-SEMARNAT-2010: Phrynosoma asio listed as subject to special protection (Pr).


**Important: This is a practical evidence-informed protocol, not a controlled experimental standard. Change seasonal parameters gradually, measure surface heat and UVI directly, monitor every animal's mass and intake, and revise the schedule from your own verified breeding and health records.**

# UVI beneath the optional T5 tube

Phrynosoma asio

## Your measuring point

Measure UVI at normal back height directly beneath the brightest accessible part of the optional T5 strip. Place the strip toward the middle/back with free access to and away from it; preserve a gradient into fully covered refuges near UVI 0. These numbers describe the exposure area, not the whole enclosure or a daily average.

## Measure and adjust

**1. Use a UV Index meter.** A Solarmeter 6.5/6.5R or equivalent UVI meter is suitable. Broadband UVB readings in microwatts/cm2 cannot be substituted for UVI.

**2. Measure the installed arrangement.** Warm the tube for about 30 minutes. Keep the reflector, guards and mesh in their normal positions. With the animal elsewhere, hold the sensor at its normal back height, aimed toward the tube.

**3. Adjust the fixture.** Begin near the lower part of a newly selected working range and adjust gradually. Respect the lamp manufacturer's minimum distance. Recheck after each change and check every higher accessible branch, rock or platform.

**4. Keep a full gradient.** Provide usable exposure across the animal's body, lower-UVI areas and fully covered refuges near UVI 0. For daytime baskers, overlap the UV area with visible light and appropriate basking warmth while retaining cooler shade.

**5. Record and recheck.** Log UVI, measuring point, tube-to-back distance, tube age and lamp-on time. Recheck through the year and after changes to the tube, reflector, mesh or furnishings. Exposure duration and behaviour also determine dose.

A T5 range is a working exposure target, not a whole-cage setting, measured wild monthly average, guaranteed optimum or proven safety ceiling. The animal must be able to enter and leave freely.

## Monthly target at normal back height

| Month | UVI under T5 when on |
|---|---|
| January | 1 |
| February | 1 |
| March | 2 |
| April | 3 |
| May | 3-4 |
| June | 3-4 |
| July | 3-4 |
| August | 3-4 |
| September | 3 |
| October | 2-3 |
| November | 2 |
| December | 1 |

**Retain numbers; clarify measurement**
The retained range remains a provisional captive working target. No new species-specific result was found that clearly requires a numerical change. Retaining it is not certification of an experimentally established optimum.

**Evidence level:** Provisional retention. The seasonal schedule is a captive operating plan; it is not measured wild monthly UV. Off means the existing planned UVB-off/rest phase is preserved. Any staged Off/1 entry still means gradual reintroduction.

**UV references:** Baines et al. (2016), UV-Tool; Muryn, Baines and Dishman (2026), Reptile Lighting Guide V10. Full rationale and monthly comparison: UVI_Audit_Report.html.