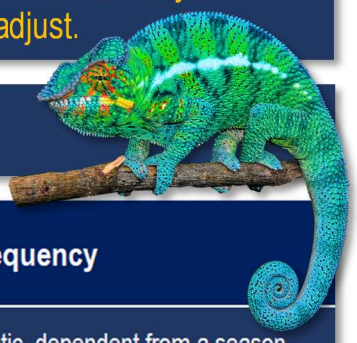
HYDRATION IN CHAMELEONS

GOLDEN RULE

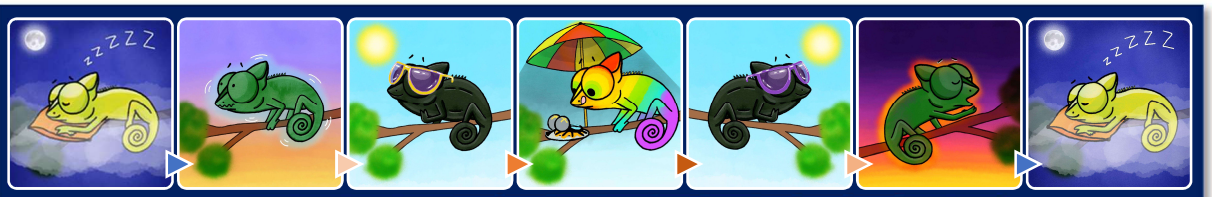
Assure the chameleon's permanent proper hydration, as close to nature as possible, never over-hydrate nor under- or de-hydrate; if in doubt, play safe; observe, measure and adjust.



WATER CYCLE IN THE WILD

State	Positioning	Permanent	Regular	Occasional	Frequency
Liquid water	Food (feeders)	✗	✓	✓	The food frequency is erratic, dependent from a season and time of the day.
	Rain	✗	✗	✓	Limited use being most frequent at night and because chameleons tend to hide from it; after the rain it might quickly evaporate.
	Dew	✗	✓	✓	Limited use due to quick evaporation in the morning.
	Stream, lake, waterfall	✓	✗	✓	Extremely rare, insignificant.
Fog types	Cloud	✗	✓	✓	A source of night hydration in high altitudes.
	Fog	✗	✓	✗	A regular source of hydration during the night at low temperatures at most chameleon locations.
	Mist	✗	✗	✓	Occasional occurrence only.
	Vapor	✗	✓	✓	Replacing fog in many regions.
Water vapor	Air humidity	✓	✗	✗	Fluctuates during the day, dependent from season.

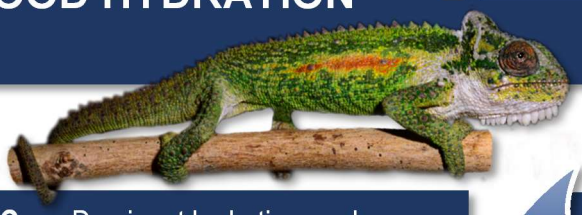
OCCURRENCE VARIOUS FORMS OF WATER DURING THE DAY



Forms of Water	Time (hours)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Liquid water	Food (feeders)									●		●		●		●		●		●					
	Rain			●	●			●						●		●					●	●			
	Dew	●	●	●	●	●	●	●														●	●	●	●
Fog types	Cloud, fog, mist, vapor	●	●	●	●	●	●	●														●	●	●	●
Water vapor	Air humidity (%)	100	100	100	100	100	100	94	85	62	50	45	40	35	30	30	30	40	50	60	70	77	85	90	95

MAGICAL FORMULA OF HYDRATION

GOOD HYDRATION * = WATER INTAKE – WATER LOSS / DANGER ELIMINATION**



WATER INTAKE

FOG DRINKING	Dominant hydration mode.
FOOD INTAKE	Feeders contain from 30% (roaches) to over 70% (caterpillars, lizards) of water.
DEW LICKING	Obscure hydration source - most dew evaporates in early morning hours at sunrise.
RAIN DRINKING	Optional, seasonal and unreliable hydration source.
WATERBODIES UTILIZATION	Obscure and rare hydration source.
METABOLIC GAIN	During Krebs' Citrate Cycle, water is a by - product - in insignificant volumes.

WATER LOSS

EXHALATION	Dominant water loss mechanism, reversely - proportional to air humidity.
DEFECATION	Insignificant.
URINATION	Insignificant.
EVAPORATION	None, the skin is almost waterproof.

DANGER ELIMINATION

CONTAMINATION, POISONING, OVERHEATING, DAMAGE, STRESS

Are either absent in the wild or subjects of natural protective mechanisms but need to be taken seriously and man-controlled in the captivity.

CAPTIVE MANAGEMENT

MAIN PRINCIPLE

1. Go for meaningful **fogging** first.
2. Then go for early morning and late afternoon **misting** while heat bulbs are off.
3. Then go for **dripper** or **rain** simulation.
4. If not enough, go for forceful **emergency hydration** methods.

THE OVERRULING PRINCIPLES

1. **Go naturalistic!**
2. **Go safe!**
3. **Observe, measure and adjust.**
4. **If enough, then enough.****

WATER INTAKE

FOG DRINKING	**FOGGER** only at night, only at temperatures below 20°C, intermittent or permanent in dependence from ventilation.
FOOD INTAKE	**FEED** with live, hydrated feeders; do not overhydrate with catterpillars.
DEW LICKING	**MISTER** (hand or automatic) in early morning and late afternoon while heat bulbs are off. *
RAIN DRINKING	**RAIN** simulation or dripper while heat bulbs are off. *
WATERBODIES UTILIZATION	Ignore.

WATER LOSS

EXHALATION	Keep the humidity in the night high (close to 100%) and at daytime low as per species requirements, never go higher than 70%. Beware, the combination of humid air and high-temperature kills due to respiratory infections.**
DEFECATION	Inspect for water content (should be dry).
URINATION	Inspect for water content (should be dry). Inspect the color (should be 15-50% orange, the rest white and hard).
EVAPORATION	Inspect the skin; any skin trauma, burn or lesion causes water loss.

DANGER ELIMINATION

CONTAMINATION	No bowls, waterfalls or fountains (germs).
POISONING	No fake objects (plastic plants, vines, bowls – microplastics, solvents, deterioration).
OVERHEATING	No overheating, no basking all day.
DAMAGE	No pressurized water in eyes (danger of corneal trauma, conjunctive or eye infection).
STRESS	No forceful hydration, no spraying on body.

* Beware of necessity of drainage system to catch and dispose the excessive water.

** Humidity control can be maintained through the combination of following devices and measures:

1. More or less frequent misting (hand operated or automated); beware misting must happen while the lights are off.
2. Live plants of dryer or more humid origin.
3. Moist substrate (sand, moss, bioactive).
4. Fogging operated through hygrostate; beware if operated at daytime and/or at temperature higher than 20°C, the fog must immediately evaporate and not stay, otherwise respiratory infections can happen.

*** All parameters should reflect climatic variations during the day and during seasons.

**** Species with all-year-round abundance of moisture can autoregulate (e.g. strict montane species). Species from regions with periods of abundance and long periods of lack or limited supply **CAN NOT AUTOREGULATE** and tend to overhydrate in case they are exposed to abundance (to create spares for the periods of lack).

EQUIPMENT

Fogger		**Device producing cold fog.**
Hand mister		**Hand operated device for producing mist.**
Automatic mister		**Automatic device for producing mist from high pressurized water.**
Dripper		**A water container with a small hole and/or a tube to allow drops of water to form and fall in a sequence.**
Rain simulation		**A device producing drops of water simulating rain.**
Hygroscope		**A device for measuring the air humidity.**
Hygrostate		**The device for maintaining the air humidity at set value or between set values.**
Drainage		**The measure assuring collection and disposition of excessive water.**