Companion Guide to Welfare Indicators in Anurans

Introduction

Anurans exhibit subtle behavioural and physiological changes in response to noxious stimuli, environmental stress, or disease. Early detection through these indicators can prevent escalation. Explanations include potential causes, with references for further reading. Always correlate observations with environmental factors and seek veterinary advice for diagnosis.

Indicators

Altered Feeding

Description: Altered ingestion of food through the mouth, assisted by forelimbs and potentially involving forward body tilting. This includes reduced appetite, incomplete meals, or absence of normal feeding behaviour. **Explanation and Causes:** Normal feeding may cease until a noxious stimulus resolves. In anurans, this can result from stress, infection, or environmental toxins, leading to energy conservation for recovery. (Adapted from Sneddon, 2003; Días et al., 2022.) **Detection Tips:** Observe during feeding times; note uneaten prey or lethargy around food.

Anomalous Behaviour

Description: Any behaviour atypical for the species, such as unusual interactions with the environment or body parts. **Explanation and Causes:** Post-noxious stimulus changes may include rubbing affected areas, supporting on limbs abnormally, or rocking. These are detectable signs of discomfort or pain in amphibians. (Sneddon, 2009.) **Detection Tips:** Compare with known species norms; look for repetitive or novel actions.

Altered Locomotion

Description: Modified movement from one location to another, via water or land, horizontally or vertically, using hindlimbs, forelimbs, or both. This includes reduced speed, frequency, or coordination. **Explanation and Causes:** Locomotion decreases to allocate energy for healing and avoid further injury or pain. Observed in response to stressors in aquatic and terrestrial species. (Ashley et al., 2009; Días et al., 2022.) **Detection Tips:** Monitor swimming or hopping patterns; note hesitancy or avoidance of movement.

Oedema

Description: Presence of swelling, quantifiable as a percentage of body oedema. Often subcutaneous and peripheral. **Explanation and Causes:** Environmental stressors like ultraviolet radiation or toxins can induce developmental deformities and oedema. Infections may cause limb deformities and peripheral swelling. Anurans possess nociceptors in skin layers, making oedema painful. (Blaustein et al., 2003; Khalifa et al., 2020; Fox and Whitear, 1978.) **Detection Tips:** Inspect limbs and body for puffiness; use gentle palpation if safe.

Altered Movements

Description: Changes in body part movements (limbs, head, etc.) without overall displacement, either increased or decreased. **Explanation and Causes:** Anurans minimise movement to conserve energy and reduce predation risk from visibility. Reductions divert resources to recovery and pain avoidance. (Ryan, 1988; Ashley et al., 2009.) **Detection Tips:** Observe resting postures; note fidgeting or unusual stillness.

Retained Moult

Description: Evidence of incomplete skin shedding, where the anuran cannot fully remove old skin. **Explanation and Causes:** Shedding normally involves limb movements and ingestion of skin. Causes include endocrine disorders, systemic illnesses, or environmental issues, akin to dysecdysis in related taxa. (Días et al., 2022; Ascaso, 2001.) **Detection Tips:** Look for ragged or adherent skin fragments, especially on extremities.

Altered Respiration

Description: Breathing movements that are slow or accelerated beyond the species' normal range. **Explanation and Causes:** Respiration occurs via skin and lungs in terrestrial forms, or requires surfacing in aquatics. Abnormal rates indicate response to painful or stressful stimuli. (Días et al., 2022; Sneddon, 2009.) **Detection Tips:** Count gill or buccal movements per minute; compare with baselines.

Additional Guidance

- **Baseline Establishment:** Record normal ranges for your colony upon acquisition.
- **Integration with Protocol:** Use during step 3 of inspections.
- **Limitations:** These indicators are suggestive; not diagnostic. Combine with lab tests if needed.
- **References:** Consult cited sources for in-depth study.

This guide should be used alongside the protocol and spreadsheet for comprehensive monitoring.