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| **Process Stages** | **Check** | **Data Elements** | **Tier 1. Examples of Element Applications in Biodiversity Collection Management & Utilization** |
| I. Pre-acquisition & associated sample date | □ | Type of institution | Research infrastructures, museum on loan biospecimens, new acquisitions |
| □ | Selection criteria (sample) | Museum type specimens, culture collection reference strains, indicator organisms |
| □ | Selection criteria (quality) | Biological Resource Centre (BRC) quality criteria (authenticity, purity, stability) |
| □ | Collection modality | Dead, living, replicable, totipotent, dictates biospecimen or bioresource usability |
| □ | Collection category | Museum herbarium, spirit, molecular, type, reference, voucher specimen; active / base genebank, working / master |
| □ | Provenance | Biodiversity access and benefit sharing |
| □ | Time scale | Geological timescales for climate change research; long-term conservation at cryogenic temperatures *ad infinitum* |
| □ | Taxonomy | Species verification, new species identification |
| □ | Biological donor | Population genetics, taxonomic research, metagenomics |
| □ | Anatomical site | Tissues used for storage and extraction; explants used to initiate cultures |
| □ | Vital state | Post mortem evidence for wildlife forensics, viability of living collections |
| □ | Physiological & developmental state | Viable culture initiation |
| □ | Gender | Species identification, genetic resources conservation, assisted breeding |
| □ | Life cycle & reproductive state | Genebanks, assisted breeding, species re-introductions, wildlife management |
| □ | Health & nutritional status | Endangered, at risk species management, exploitation of cultures for natural products biotechnology |
| □ | Toxicological status | Xenobiotic, radiation, environmental impact studies, poisons |
| □ | Axenicity | Purity critical for molecular genetics, omics research; non-axenicity for parasitology, symbioses, assemblages, eDNA |
| □ | Disease and pathology status | Epidemiological studies, safe transfer of biospecimens and bioresources |
| II. Acquisition, stabilization & transport | □ | Collection & sample container | Stabilization of all types of biospecimen, sample, eDNA, biological/genetic resource, organism; especially when biodiversity is sampled and dispatched from remote, extreme or difficult locations (e.g. polar regions, conflict zones) and when cold chain and the chain of custody, security, monitoring and logistics are compromised by lack of infrastructure |
| □ | Time |
| □ | Stabilization |
| □ | Shipping parameters – stage 1 |
| □ | Interim storage |
| □ | Shipping parameters – stage 2 |
| □ | Short-term storage |
| III.Preservation, fixation & storage | □ | Preparation | Prevention of deterioration, particularly fragile, labile biospecimens (e.g. Lepidoptera, molluscs, insects) before preservation |
| □ | Chemical fixation | Preservation of the original state e.g. herbarium samples, tissues, horn, feathers, organisms in spirit collections, eDNA |
| □ | Preservation by desiccation & drying |
| □ | Flash / snap freezing |
| □ | Preservation at low temperatures |
| □ | Long-term storage | Stabilization of permanent museum collections under environmentally controlled conditions |
| □ | Freeze/thaw parameters / cycles | Sample quality impacts on thermo-labile biospecimens; repeated sub-sampling from the same specimen |
| IV. *In vitro* culture | □ | Culture | Multiple steps involved in the successful initiation and serial sub-culture of viable cells, tissues, organs, organisms *in vitro* |
| □ | *In vitro* conservation | Conservation of active and base collections in culture collections, genebanks, BRCs |
| V. Conservation storage & recovery | □ | Cryopreservation | Conservation of viable cells, tissues, organs, organisms in cryobanks *ad infinitum* |
| □ | Rewarming & recovery | Recovering fit-for-purpose viable, functional, totipotent cells, tissues, organs, organisms after cryostorage |
| VI. Dispatch transport & cold chain security | □ | Shipping temperature & conditions | Cold chain, chain of custody, security, monitoring, logistics for shipping viable biological/genetic resources, organisms |
| VII. Quality assurance & quality control measures | □ | Quality management | All types of biospecimen, sample, biological/genetic resource especially for endangered and at risk species |