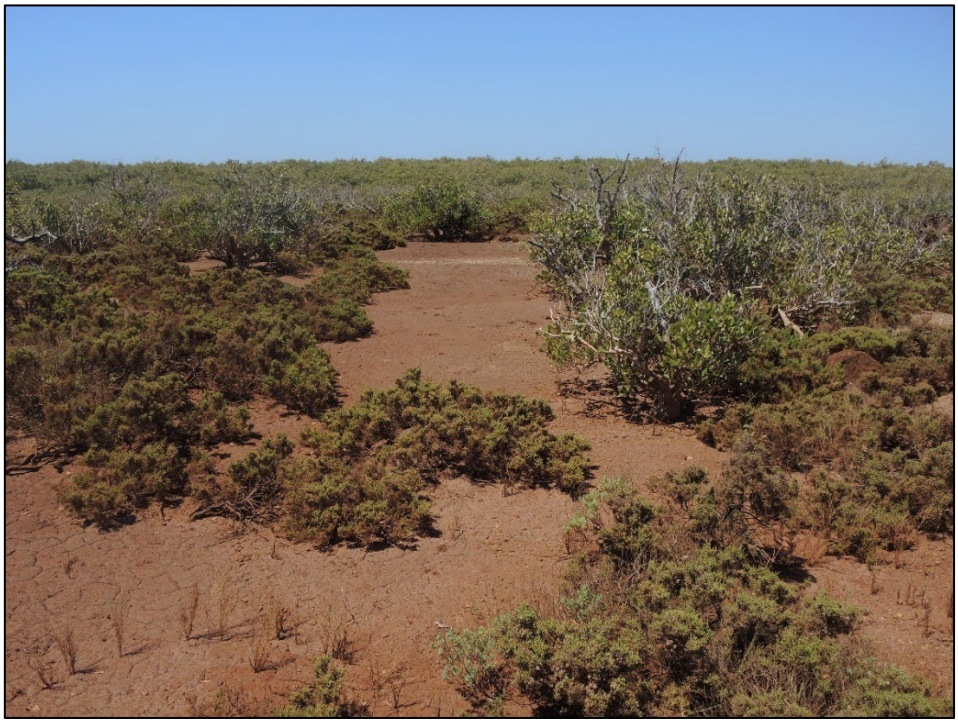
Eramurra Solar Salt Project: *Tecticornia* resolution study

9 May 2024



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Executive summary

Target enrichment using bait capture for Next-Generation DNA sequencing is a recent molecular method that has been demonstrated to be an effective tool for distinguishing between different plant species. A key benefit to this method is being able to sequence both fresh field vouchers along with older herbarium specimens, allowing researchers to leverage valuable historical collections to serve as comparable material. This approach is grounded in the principles of reproducibility and reliability and has potential for future automation of plant identifications.

This study illustrates that bait capture using customised baits ('Salibaits') developed for the subfamily Salicornioideae is an effective method for discriminating between different species and subspecies of *Tecticornia*. A total of four species of *Tecticornia* were recorded from the Eramurra Solar Salt Project (ESSP) site during this study, namely *T.* sp. nov. 'large ovate seed', *T. halocnemoides* subsp. *tenuis*, *T. halocnemoides* subsp. *longispicata*, and *T. pterygoserma* subsp. *denticulata*. This is consistent with previous surveys, as these species were recorded as being present on the ESSP site during vegetation surveys undertaken in 2020, along with *T. auriculata*, *T. pruinosa*, *T. indica* subsp. *bidens* and *T. indica* subsp. *leiostachya*. A single collection of *T. pergranulata* subsp. *elongata* was also collected near Point Sampson in December 2023 during this study.

The taxon represented by Clade 1 in the molecular analysis was confirmed to be a potentially new, undescribed species, currently informally tagged as *T.* sp. nov. 'large ovate seed'. This taxon is part of an aggregate informally recognised at the Western Australian Herbarium, which has been postulated to include several potentially new taxa. Other representatives included in this study that were also tagged as *T.* sp. nov. 'large ovate seed' variously placed in Clades 3, 4, 5, and 8 (labelled as 'large seed'); however, it is evident that these taxa are distinct from the Clade 1 taxon. From the December 2023 survey undertaken during this study, it is evident that the Clade 1 taxon is common across the ESSP site and at several localities to the north and south of the proposed footprint. A further 69 specimens at the Western Australian Herbarium included in the analyses, collected from 1964 – 2020 across populations distributed along the west coast from Carnarvon to Derby, also represent the Clade 1 taxon present on the ESSP site. Therefore, Clade 1 *T.* sp. nov. 'large ovate seed' has a relatively widespread distribution and does not appear to be under conservation threat. It is recommended that this taxon be phrase-named and included on the Western Australian Plant Census (as displayed on Florabase) as *Tecticornia* sp. Pilbara Coast, to distinguish it from other specimens currently included in the 'large ovate seed' aggregate.

Accessions of the subspecies *Tecticornia pterygosperma* subsp. *denticulata* did show some genetic divergence but further research is required to confirm if there are corresponding morphological differences, indicating this variant may warrant taxonomic recognition. A single collection from the ESSP (LH068) is genetically similar to samples collected northwards at Point Sampson (LH103 and LH101) as well as from Babbage Island near Carnarvon (PERTH 09382186). So, if this entity was eventually recognised as a distinct taxon, it appears to be relatively widespread and therefore would not represent a narrow range endemic species nor likely to be of conservation concern. All other species of *Tecticornia* that were identified during this study and previous vegetation surveys of the ESSP site are widespread and do not represent any species of conservation concern.

Future work will focus on undertaking further DNA sequencing and morphological analyses to accurately resolve the taxonomy of the genus *Tecticornia* and name potentially new taxa. This step is essential for future automisation of identifications, as the resolution of all species including currently 'unknown' taxa is necessary for reliable determinations going forward, whether it is based on bait capture sequencing or morphology (e.g. automated AI-based identifications of scanned specimens).

Background

The genus *Tecticornia*, commonly known as samphires, belongs to the subfamily Salicornioideae in the goosefoot family Chenopodiaceae. Currently, there are around 60 species and subspecies of *Tecticornia* formally recognised, most of which are endemic to Australia. Samphires are halophytic (meaning 'salt-loving'), as they require salt to thrive and grow. In fact, they represent some of the most salt-tolerant land plants known, with some species documented as surviving in salinities ranging from 1500–2000 mM NaCl (compared to seawater, which is approximately 500 mM NaCl) (English 2004).

Samphires are a keystone group, as they form the dominant vegetation in saline habitats along coastlines and around inland salt lakes across the Australian continent. Inland species must tolerate long periods of drought, interrupted by seasonal rainfall events that cause intermittent and extreme fluctuations in salinity. Some species can even endure long periods of waterlogging following significant cyclonic rainfall events. For example, *Tecticornia pergranulata* can survive up to 10 months completely submerged (English 2004; Pedersen *et al*. 2006; Rich *et al*. 2008). In contrast, coastal species are exposed to regular, cyclical fluctuations associated with tidal inundation. Research has shown there are significant physiological and ecological differences among samphires in their ability to tolerate salinity and waterlogging (Colmer *et al*. 2009; English 2004; Short & Colmer 1999), which can result in localised sorting of species into patterns of zonation from the lake floor to outer fringing vegetation (Figure 1). Samphires growing on tidal floodways and mangal flats may also experience more frequent inundation and anaerobic soil conditions (Figure 2) compared to plants growing higher in the landscape in more freely drained soil. Consequently, some species of *Tecticornia* maybe highly sensitive to changes in hydrology through disturbance (e.g. construction of infrastructure), which may impact salinity and waterlogging regimes due to the pooling of water in some areas or less inundation in others.

Figure 1. Zonation of *Tecticornia* across Fortescue Marsh in the Pilbara. *Tecticornia medusa* is significantly more tolerant of waterlogging and is confined to the wettest area near the central floodway, while *T. auriculata* (blueish green shrubs) are present in the less frequently flooded zone, while taxa within the *T. halocnemoides* complex (yellow-green shrubs) are confined to the outer fringes of the samphire vegetation. Image by: S. Dillon.

Figure 2. Low, sprawling *Tecticornia* shrubs growing between mangrove trees in frequently flooded tidal mud flats near Port Hedland. Photograph by: K.A. Shepherd.

Identification of samphires

While samphires are easily recognised as a single vegetation type at the landscape level, ironically individual plants are extremely difficult to identify to species. This is due to their reduced morphology as they do not have true leaves (only succulent, bead-like stems), the flowers are tiny, and non-descriptive, and the seeds are very small (usually less than 1.5 mm long) (Figure 3). A detailed study of samphire seeds using Electron Microscopy (Shepherd *et al.* 2005), determined that the shape, colour, and ornamentation of seeds are useful diagnostic characters and, in some cases, also the only reliable character for species identification, particularly among closely related taxa (species or subspecies). However, as samphire seeds are so small, these fine details are not as readily observed with the naked eye. Unfortunately, seed is also held only on some species with 'soft-fruits' for a period of weeks or months post-flowering before fruits fall, rendering them sterile and essentially unidentifiable for most of the year.

Samphires pose further taxonomic challenges due to the presence of unresolved species complexes with morphological intergrades, and potential hybrids among sympatric (co-occurring) species (Wilson 1980). Polyploids (taxa with multiple sets of chromosomes) have also been documented within some species of the genus and even among species in the same population (Shepherd & Yan 2003). In two remarkable occurrences seed collected from a single mother plant, when germinated, recorded different chromosome numbers; a phenomenon not documented elsewhere in the literature. It is unclear what impacts these variations in chromosome numbers show on the morphology of species. For example, are plants with higher chromosomes numbers larger in size or exhibit variation in seed size and colour, as observed in other plants. Samphires also exhibit considerable phenotypic variation when growing under different microenvironments and seasonal conditions. This further complicates determining which morphological characters are reliable for identifying species.

Figure 3. *Tecticornia auriculata* near Port Hedland, Western Australia. A – habit, a tall, blueish-green shrub; B – branches with succulent, bead-like articles (instead of true leaves); C – inflorescences showing small anthers (each tiny anther is exserted from a single flower, which are hidden behind rings of succulent bracts). Voucher: *K.A. Shepherd* KS 1356. Images by: K.A. Shepherd.

As samphires are difficult to identify and do not produce conspicuous flowers or fruits, many taxa are often overlooked in the field and consequently are underrepresented in vegetation surveys. Inexperienced collectors may not recognise different species or even identify when plants are flowering, or more importantly, are in fruit. Therefore, sterile specimens are often collected without fruits and mature seeds, hindering or in some cases completely preventing, accurate identification. Knowledge of species is very poor in general, even among experienced field botanists. For example, an assessment of the field identifications of 416 specimens (across 35 accessions) of *Tecticornia* submitted in 2022 by environmental consultants to the Western Australian Herbarium to be formally identified by samphire specialist Dr Kelly Shepherd, only 9 specimens (2.16%) had been identified correctly to species by the consultants, with a further 7 specimens (1.68%) identified to the correct species but the incorrect subspecies. Further, 64 specimens (15.38%) were found to be sterile and therefore could not be formally identified at all (this increased to a total of 21% of *Tecticornia* specimens identified in 2023), while 32 specimens (7.69%) did not match any known species or even phrase-named species, so represented potentially new but unrecognised taxa.

Pilbara samphires

Within the Pilbara bioregion of Western Australia there are 18 species and subspecies of *Tecticornia* and an additional three phrase-named taxa, which represent potentially new species that have not yet been formally named and described (Table 1). Three of the 18 represent priority species of conservation concern, as they are only known from a limited number of populations; however, these in addition to *T. verrucosa* and *T.* sp. Yoothapina Station (A.A. Mitchell 883), only occur in inland regions of the Pilbara and are not found along the coast in the Roebourne IBRA subregion.

Table 1. Species of *Tecticornia* recorded the Pilbara bioregion (represented by specimens lodged at the Western Australian Herbarium), and their conservation status. Species in grey occur inland and are not found along the coast in the Roebourne IBRA subregion. Data from FloraBase https://florabase.dbca.wa.gov.au/).

Taxon name	**Conservation status**
Tecticornia auriculata (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson	
Tecticornia disarticulata (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson	
Tecticornia doliiformis (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson	
Tecticornia globulifera K.A.Sheph.	Priority 1
Tecticornia halocnemoides (Nees) K.A.Sheph. & Paul G.Wilson	
Tecticornia halocnemoides subsp. *longispicata* (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson	
Tecticornia halocnemoides subsp. *tenuis* (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson	
Tecticornia indica subsp. *bidens* (Nees) K.A.Sheph. & Paul G.Wilson	
Tecticornia indica (Willd.) K.A.Sheph. & Paul G.Wilson subsp. *indica*	
Tecticornia indica subsp. *julacea* (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson	
Tecticornia indica subsp. *leiostachya* (Benth.) K.A.Sheph. & Paul G.Wilson	
Tecticornia medusa K.A.Sheph. & S.J.van Leeuwen	Priority 3
Tecticornia pergranulata subsp. *elongata* (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson	
Tecticornia pergranulata (J.M.Black) K.A.Sheph. & Paul G.Wilson subsp. *pergranulata*	
Tecticornia pruinosa (Paulsen) K.A.Sheph. & Paul G.Wilson	
Tecticornia pterygosperma (J.M.Black) K.A.Sheph. & Paul G.Wilson	
Tecticornia pterygosperma subsp. *denticulata* (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson	
Tecticornia verrucosa Paul G.Wilson	
Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	Priority 1
Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	
Tecticornia sp. Yoothapina Station (A.A. Mitchell 883)	

Seven known taxa, including two subspecies of *Tecticornia halocnemoides* (subsp. *longispicata* and subsp. *tenuis*) were identified from previous vegetation surveys undertaken in 2020 on the Leichhardt Eramurra Solar Salt Project (ESSP) site by Phoenix Environmental Sciences (Table 2). Many of these species are widespread across the landscape and are not considered to be species of conservation concern. A total of 15 collections were also made of specimens that were identified as *Tecticornia halocnemoides* 'ovate seed aggregate'. This is an informal tag name that has been used for numerous potentially unrecognised taxa (i.e. not a single taxon) currently documented as belonging to the *Tecticornia halocnemoides* complex (see discussion below).

A further eight sterile specimens were also found across the site in varying frequency (Figure 4; Table 3). As these specimens did not contain any fruits or seeds, they could not be identified. It is uncertain if they represent sterile specimens of known species (e.g. species included in Table 2), or one or more potentially new, undescribed species.

Table 2. Species of *Tecticornia* documented as being present on the Leichhardt Eramurra Solar Salt Project site during vegetation surveys conducted in 2020.

Tecticornia auriculata
Tecticornia halocnemoides subsp. *longispicata*
Tecticornia halocnemoides subsp. *tenuis*
Tecticornia indica subsp. *bidens*
Tecticornia indica subsp. *leiostachya*
Tecticornia pruinosa
Tecticornia pterygosperma subsp. *denticulata*
Tecticornia halocnemoides 'ovate seed aggregate' (15 samples)

Table 3. Sterile *Tecticornia* documented as being present on the Leichhardt Eramurra Solar Salt Project (ESSP) site during vegetation surveys conducted in 2020 (See Figure 4).

Taxon	**Leichhardt site number(s)**
Tecticornia sp. sterile 1	ET004-01; ET004-02; ET004-03;
Tecticornia sp. sterile 2	ET004-01
Tecticornia sp. sterile 3	ET008-4; ET008-02
Tecticornia sp. sterile 4	ET011-04; ET011-06
Tecticornia sp. sterile 5	ET011-04; ES001
Tecticornia sp. sterile 6	E052-A
Tecticornia sp. sterile 7	ES013R
Tecticornia sp. sterile 8	ES013R

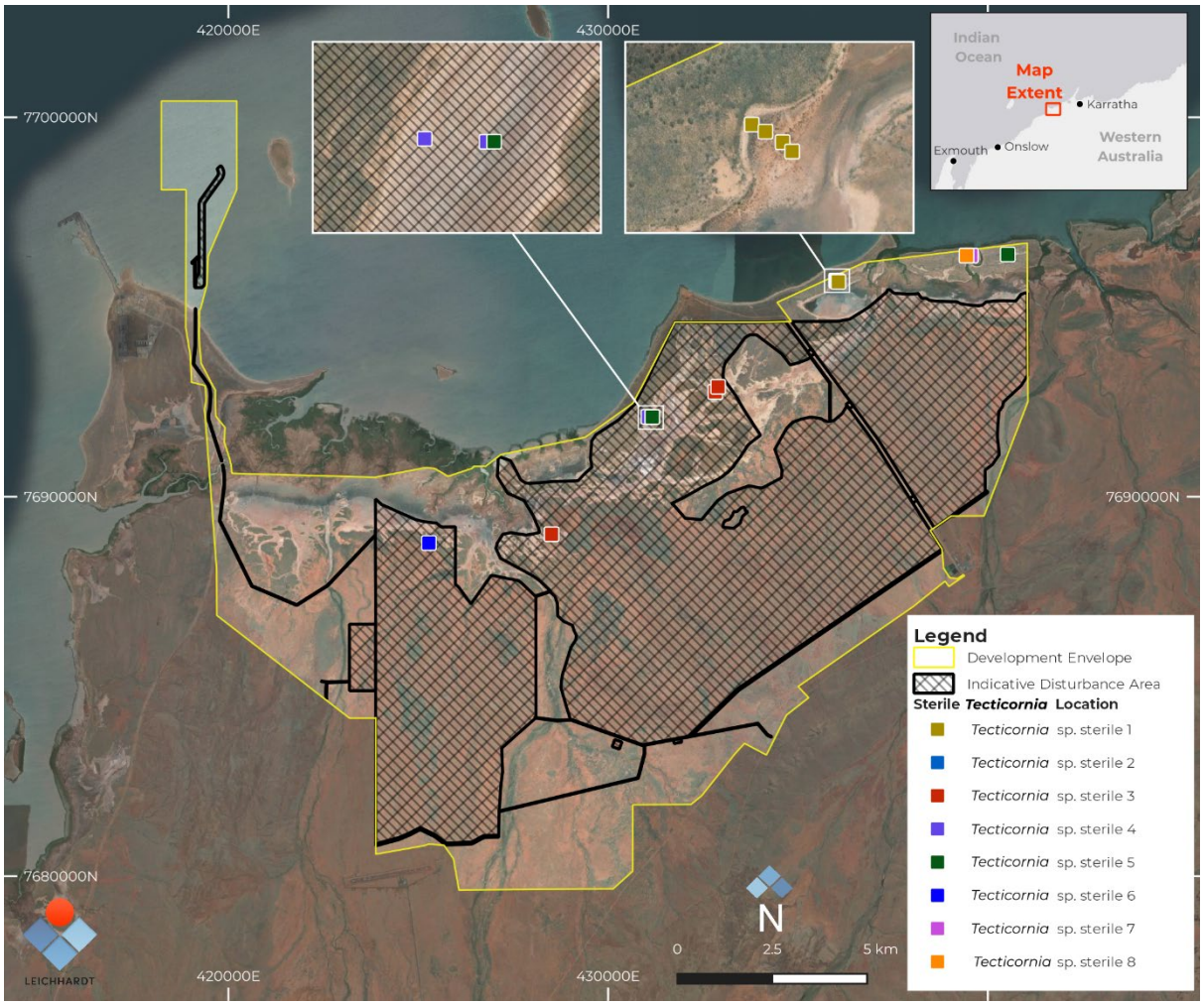

Figure 4. Distribution of sterile specimens of *Tecticornia* collected across the Leichhardt Eramurra Solar Salt Project (ESSP) site during vegetation surveys in 2020.

Tecticornia halocnemoides species complex

Tecticornia halocnemoides is one of the most widespread species in the genus (Figure 5) with five subspecies currently recognised. This species represents one of the most taxonomically intractable groups in an already challenging genus, as the subspecies all have very small vegetative articles that are only a few millimetres long and tiny seeds usually less than 1.1 mm long.

As with many species in the genus, seeds represent one of the most important diagnostic features of the *T. halocnemoides* complex. Differences in the size, colour, and overall shape of the seeds as well as the position and type of ornamentation on the seed surface are important (Figure 6). More than 40 years ago Paul Wilson (1980) noted that there was also considerable variation remaining within *T. halocnemoides*, suggesting that further discrete new taxa should be distinguished. He stated that the feature "least responsive to environmental conditions, and therefore most suited for the use in discriminating taxa is the seed; within the subspecies of *halocnemoides* can be recognised several seed variants but it has not proved possible to clearly correlate (in a manner which can be described) these variants with other morphological characters." While some specimens lodged in state herbaria have been identified to a subspecies, many are currently lodged under the name *T. halocnemoides sensu*

lato (*s.l.*) (i.e. 'in the broad sense') potentially representing innumerable variants (represented in grey in Figure 4). Some potentially new taxa previously included under *T. halocnemoides* have also been phrase named and are now included on the Western Australian Census as displayed on FloraBase (Western Australian Herbarium 1998–) such *T.* sp. Chinocup (K.A. Shepherd KS 1191), *T.* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552); *T.* sp. Lake Wallambin (K.A. Shepherd KS 1157) and *T.* sp. Lake Way (P. Armstrong 05/961). Further preliminary sorting of *T. halocnemoides s.l.* at the Western Australian Herbarium resulted in specimens being temporarily placed into large, informal aggregates, which each in turn may contain several potentially new species (e.g. 'large ovate seed aggregate', 'tuberculate seed aggregate' and 'round seed aggregate'). Since these aggregates are simply meant to serve as a broad framework for future taxonomic work, they are not formerly recognised on the WA Census (Western Australian Herbarium 1998–). Due to a lack of adequate specimens, time, and field resources, the taxonomic status of many of these taxa remains unresolved. Moreover, as stated by Paul Wilson (1980), a significant challenge remains in identifying other morphological features that may be useful in formally describing new species as distinct (beside the seed alone).

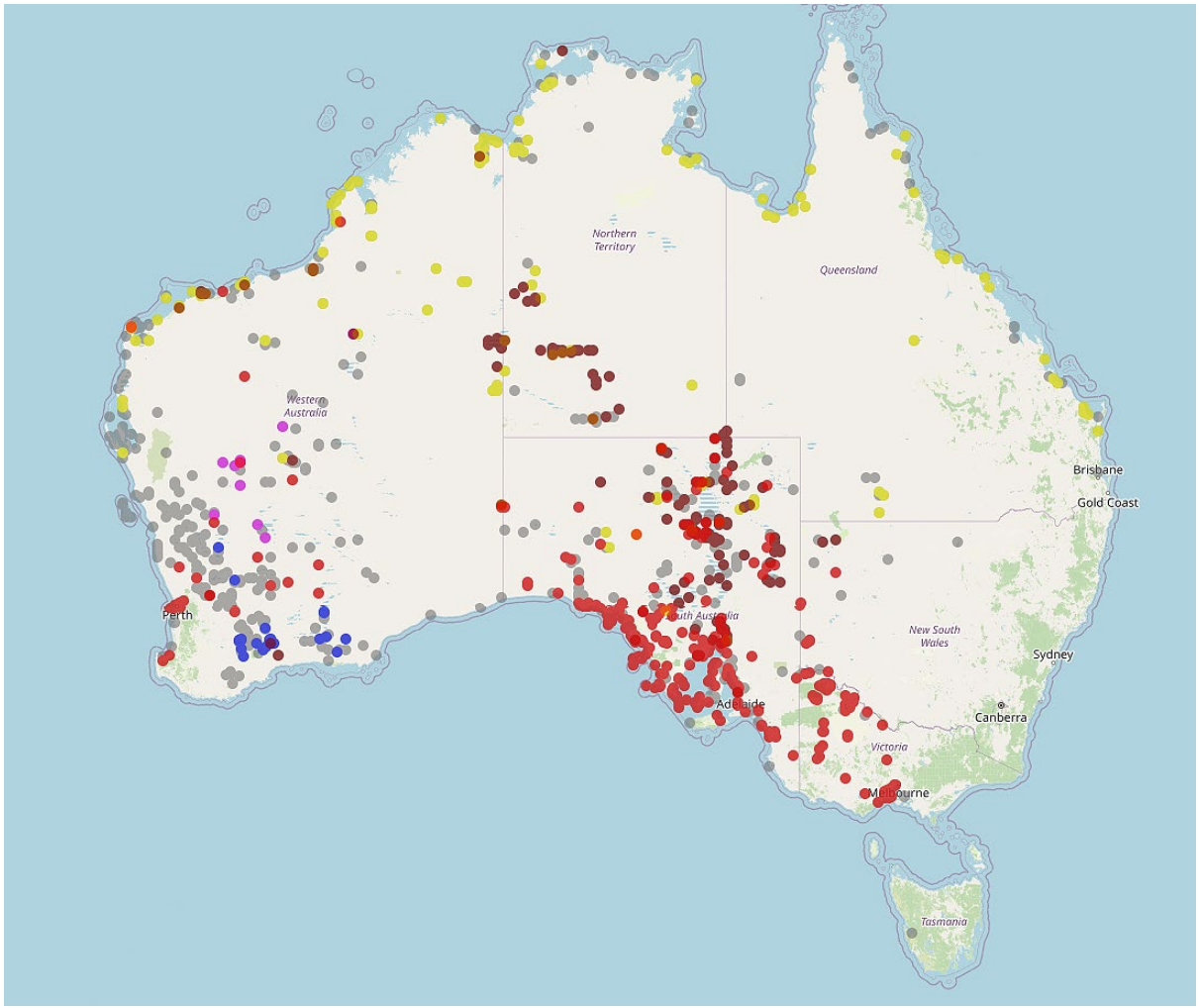

Figure 5. Distribution of *Tecticornia halocnemoides* voucher specimens held in Australian herbaria. *T. halocnemoides* subsp. *catenulata* (●); *T. halocnemoides* subsp. *caudata* (●); *T. halocnemoides* subsp. *halocnemoides* (●); *T. halocnemoides* subsp. *longispicata* (●); *T. halocnemoides* subsp. *tenuis* (●); *T. halocnemoides* unsorted (●). Data: Australasian Virtual Herbarium (AVH) https://avh.chah.org.au/.

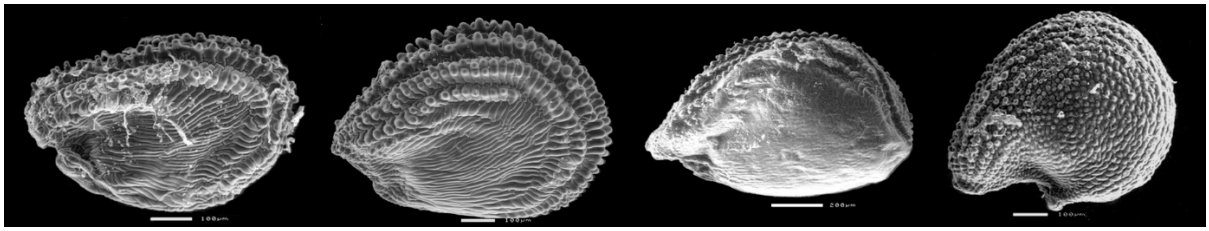

Figure 6. Environmental Scanning Electron Microscopy (ESEM) micrographs of *Tecticornia halocnemoides* seeds. From left to right: *T. halocnemoides* subsp. *catenulata*, *T. halocnemoides* subsp. *caudata*, *T. halocnemoides* subsp. *longispicata*, and *T. halocnemoides* subsp. *tenuis*. White scale bars = 100 µm, except B = 200 µm. Vouchers: *P.G. Wilson 8585*, *P.G. Wilson 8273*, *S. Jacobs 3653*, K.*A. Shepherd, M. Waycott & A. Calladine KS 791*. Images by: K.A. Shepherd.

Innovations in molecular DNA sequencing in recent years are providing hope for clarifying relationships within *Tecticornia* and the *T. halocnemoides* complex. Early sanger sequencing methods that focused on comparing short, non-coding regions of nuclear DNA (e.g. ITS and ETS – internal and external transcribed spacer regions), proved largely unsuccessful in clarifying species-level relationships due to a lack of genetic variation detected (Shepherd *et al.* 2004; Dakin 2021). However, the recent development of target bait capture methods, along with a concomitant increase in computing power that can handle exponentially increasing data sets, is showing promising results across many plant groups.

Analysis of genetic data is often depicted in form of a phylogenetic tree – a graphical representation that shows the evolutionary relationships among a group of organisms. In these trees, the closer individual organisms are placed together on adjacent branches, the more genetically similar they are and therefore the closer they are related to each other. Preliminary phylogenetic analyses of *Tecticornia* sequence data from a Genomics for Australian Plants (GAP) project (https://www.genomicsforaustralianplants.com/tecticornia-salicornia/) using Angiosperm353 and custom target capture baits ('SaliBaits'), has resulted in some surprising findings. For example, we would expect that all the subspecies of *Tecticornia halocnemoides* would be very closely related and cluster together along adjacent branches on a phylogenetic tree. However, it is now apparent from the GAP preliminary data, that some subspecies of *Tecticornia halocnemoides* are more closely related to other species than they are to each other (Figure 7). For example, *T. halocnemoides* subsp. *longispicata* and *T. halocnemoides* subsp. *catenulata*, are more genetically similar to the inland Pilbara species *T. medusa* and *T. globulifera* respectively (Figure 8), than they are to each other or other subspecies of *T. halocnemoides*. These data suggest that each of the subspecies of *T. halocnemoides* may need to be recognised as distinct species. It is also clear from the phylogenetic data that various samples of the 'unsorted' informal aggregates of *T. halocnemoides* included in this study are also genetically distinct and may warrant taxonomic recognition. In practice, this means we may be dealing with several thus far unknown taxa that may represent unique biological entities that play an integral biological role in these unique saline ecosystems.

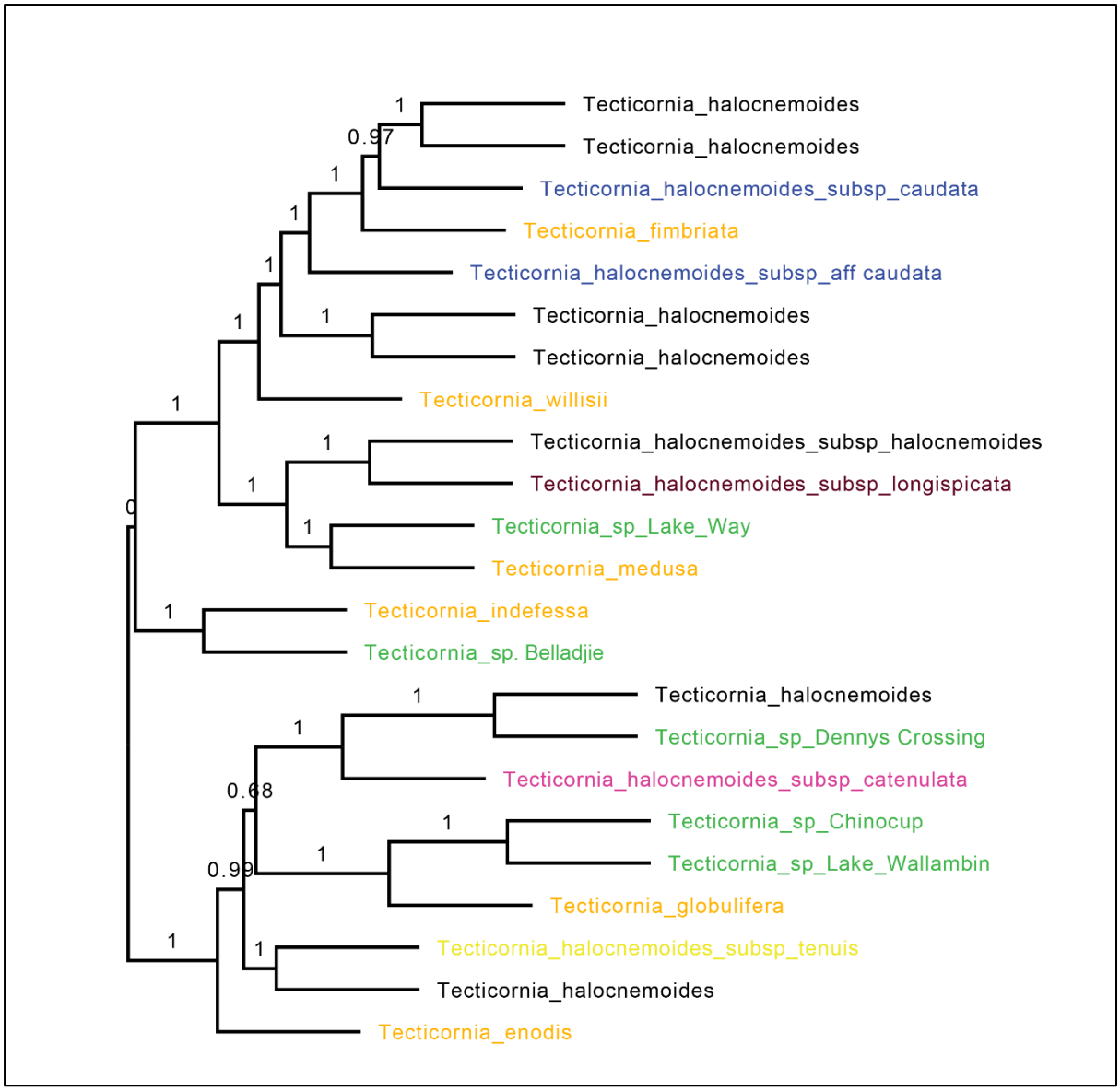

Figure 7. A phylogenetic tree from preliminary 'SaliBaits' target capture molecular data, showing unsorted *Tecticornia halocnemoides* scattered across the clade, as well as subspecies of *halocnemoides* (colours correspond to those in Figure 5) being more closely related to other known species (orange names) or phrase-named taxa on the WA Census as displayed on FloraBase (green names), than they are to each other (with a high statistical support i.e. close to 1.00).

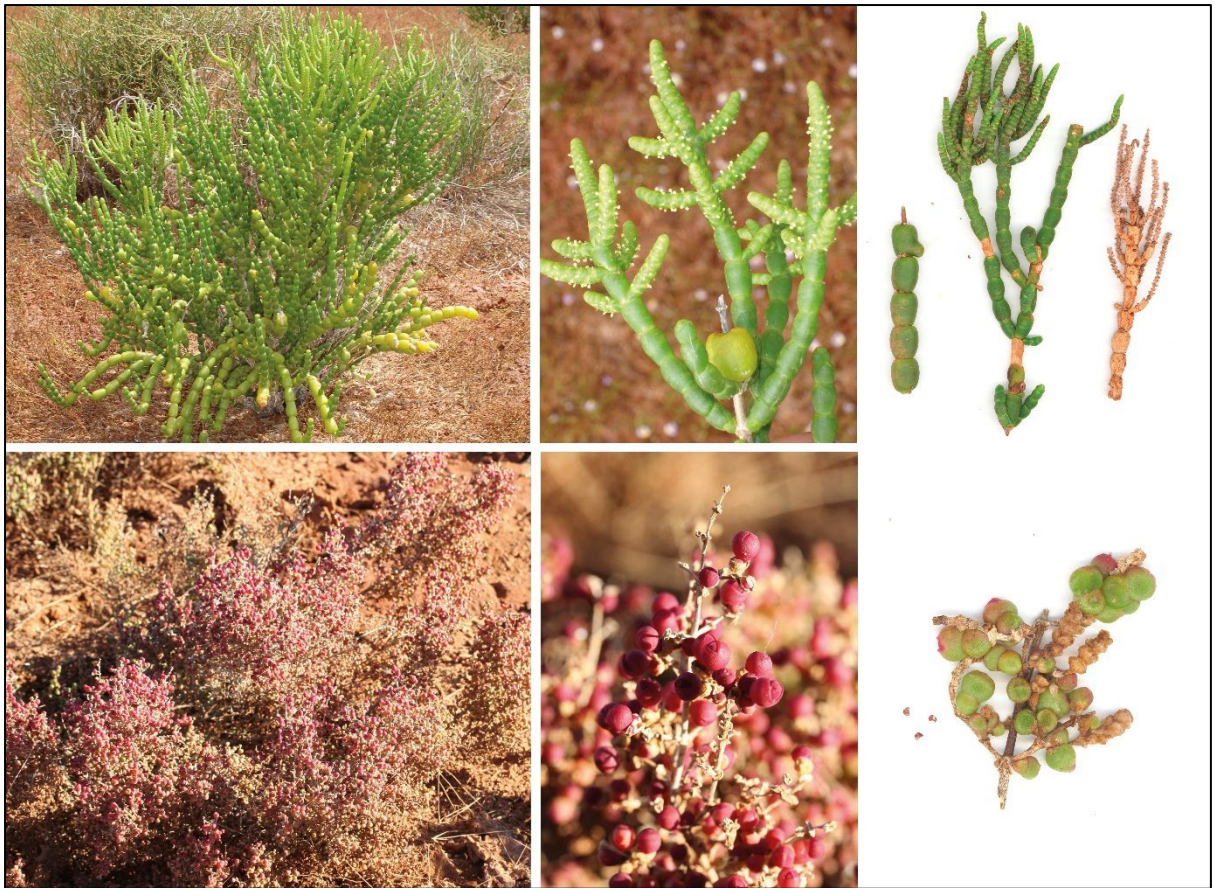

Figure 8. Current subspecies of *Tecticornia halocnemoides* appear to be more closely related to other Pilbara species such as *T. medusa* (top) or *T. globulifera* (bottom), than they are to each other.

Aims

An accurate assessment of the true biodiversity of these important and habitat-specific halophytic plants, which occur in areas vulnerable to threats from increased development activity and climate change (through changes in sea levels and hydrological regimes), is essential for sustainable development. Due to challenges in accurately identifying species of *Tecticornia*, there is limited capacity for land managers or regulators to determine if any potentially new taxa may be impacted by natural or anthropogenic threats. It is important therefore, that we clarify the status of any potentially undescribed taxa, so their conservation status can be accurately assessed.

It is evident from early survey work, that undescribed taxa in the *Tecticornia halocnemoides* 'large ovate seed aggregate' were present across the ESSP project area. However, it is unclear if these samples represent more than one taxonomic entity. Moreover, it is unclear how widely distributed these taxa may be or if any represent distinct, narrow range endemics that are only present on the ESSP site.

To answer these questions, this study focused on undertaking targeted *Tecticornia* field work on and around the ESSP site (Figure 7) to collect specimens similar to *T. halocnemoides*, and then undertake target enrichment genomic sequencing and subsequent phylogenetic analyses, to confirm which specimens collected within the ESSP site are genetically unique or genetically similar to specimens collected from the Port Hedland area (K.A. Shepherd 2009 collections) or currently lodged at the Western Australian Herbarium. This allows assessments to be made about the uniqueness of any

potentially new, undescribed taxa and if they represent entities that may be of conservation concern due to their restricted occurrence.

This study was undertaken to confirm if:

a) known *Tecticornia* species are present and restricted to the ESSP site only;
b) known *Tecticornia* species are present on both the ESSP site and elsewhere;
c) potentially new, undescribed *Tecticornia* taxa are present and restricted to the ESSP site only;
d) potentially new, undescribed *Tecticornia* taxa are present on both the ESSP site and elsewhere.

Methods & Results

Field sampling

Sampling of *Tecticornia* diversity was undertaken within the Eramurra Solar Salt Project (ESSP) area and to the north (Nickol Bay/Clearverville and Cossack/Point Sampson) and south (Onslow and Cape Preston) of the project site.

Field work was undertaken between the 4–7 December 2023, focusing on collecting specimens from the *Tecticornia halocnemoides* complex for DNA target enrichment sequencing (Appendix 1). A total of 80 plants (LH 001–LH080) were sampled across the ESSP site (Figure 9, purple points; Figure 10 showing details). Some of these areas correspond to sites where sterile material was previously collected in 2020 (Figure 4). The remaining samples (LH 081–LH160) were collected south and north of the ESSP site along the Pilbara coast (Figure 9, orange points).

Photographs were taken of each plant showing the overall habit (form) and close images of the branches and inflorescences were collated into a plate for comparison (Appendices 2–7).

Specimens collected in the Port Hedland area in 2009 by K.A. Shepherd (Figure 11) have also been assessed. Field photographs of habit including close images of inflorescences and fruits have been collated together for comparison along with detailed photomacroscope images of seeds, where available, as some samples had immature seed or where sterile (Appendices 2, 3 and 5).

Currently the Western Australian Herbarium holds more than 550 specimens identified as belonging to the *Tecticornia halocnemoides* complex. These specimens were screened and a subset of 77 samples were selected for DNA sequencing, representing the morphological variation across the complex in Western Australia (Figure 12). These specimens will serve as a comparison for the ESSP samples.

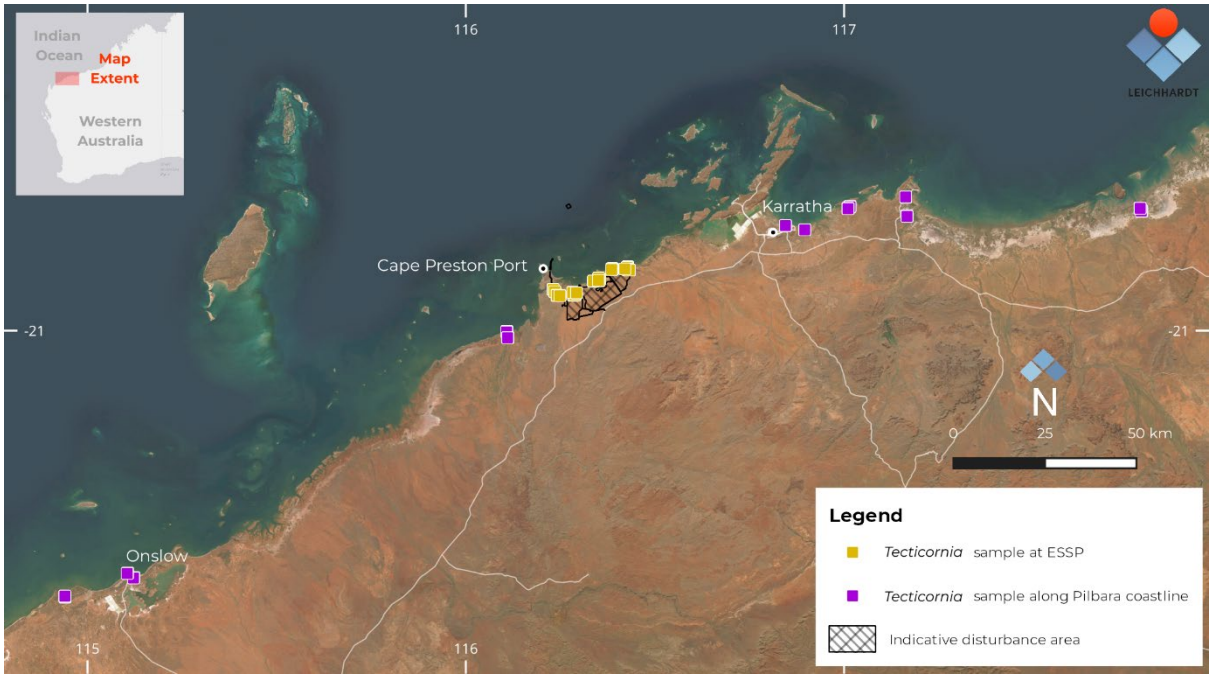

Figure 9. Distribution of *Tecticornia* samples from the *T. halocnemoides* complex sampled in December 2023 for target enrichment sequencing from the Leichhardt Eramurra Solar Salt Project (ESSP) site (samples LH 001–LH080 ■) and along the Pilbara coastline (samples LH 081–LH160 ■). See Appendix 1 for voucher data.

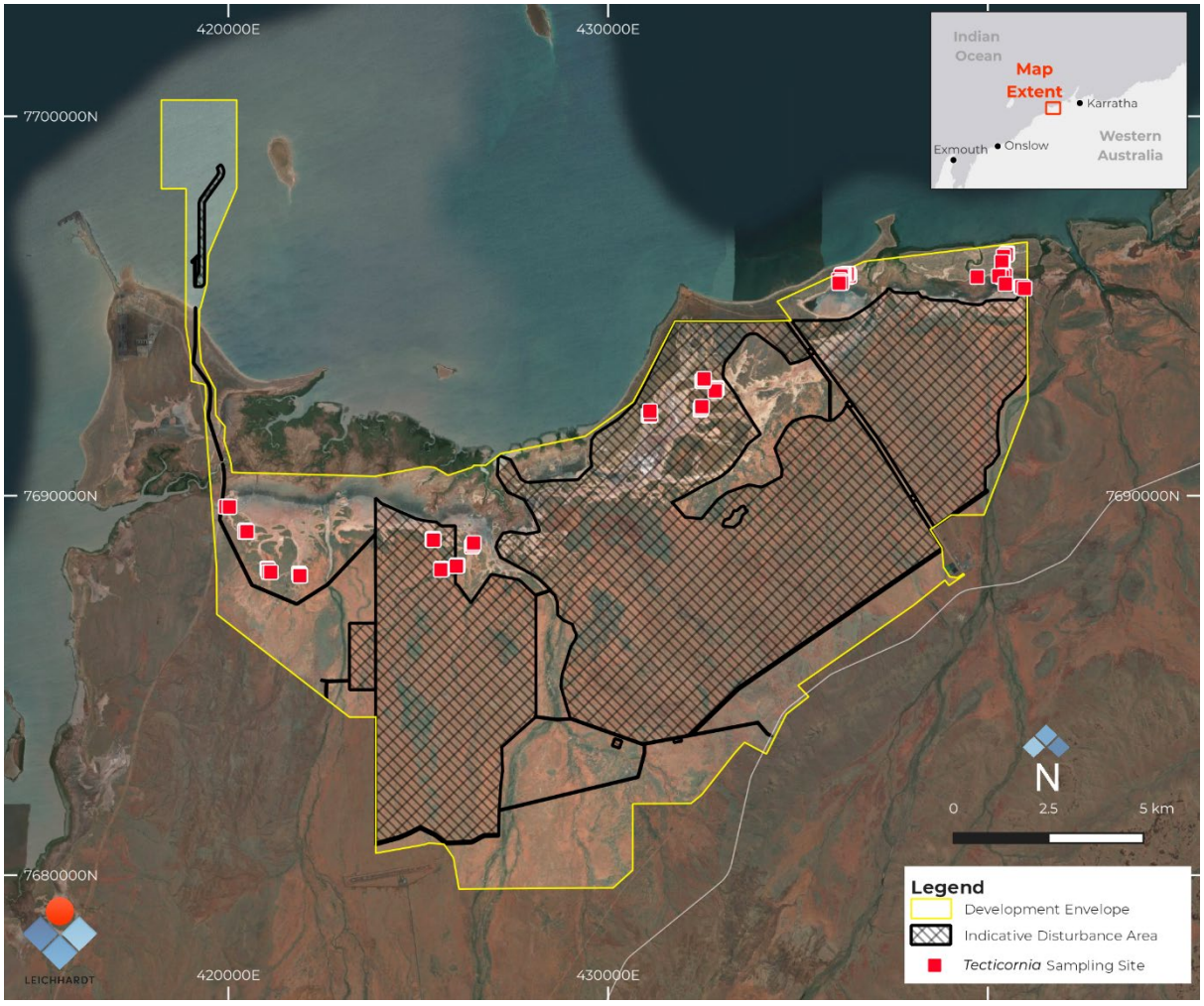

Figure 10. Distribution of the December 23 *Tecticornia* sampling sites across the Leichhardt ESSP area (samples LH 001–LH080 ■). See Appendix 1 for voucher data.

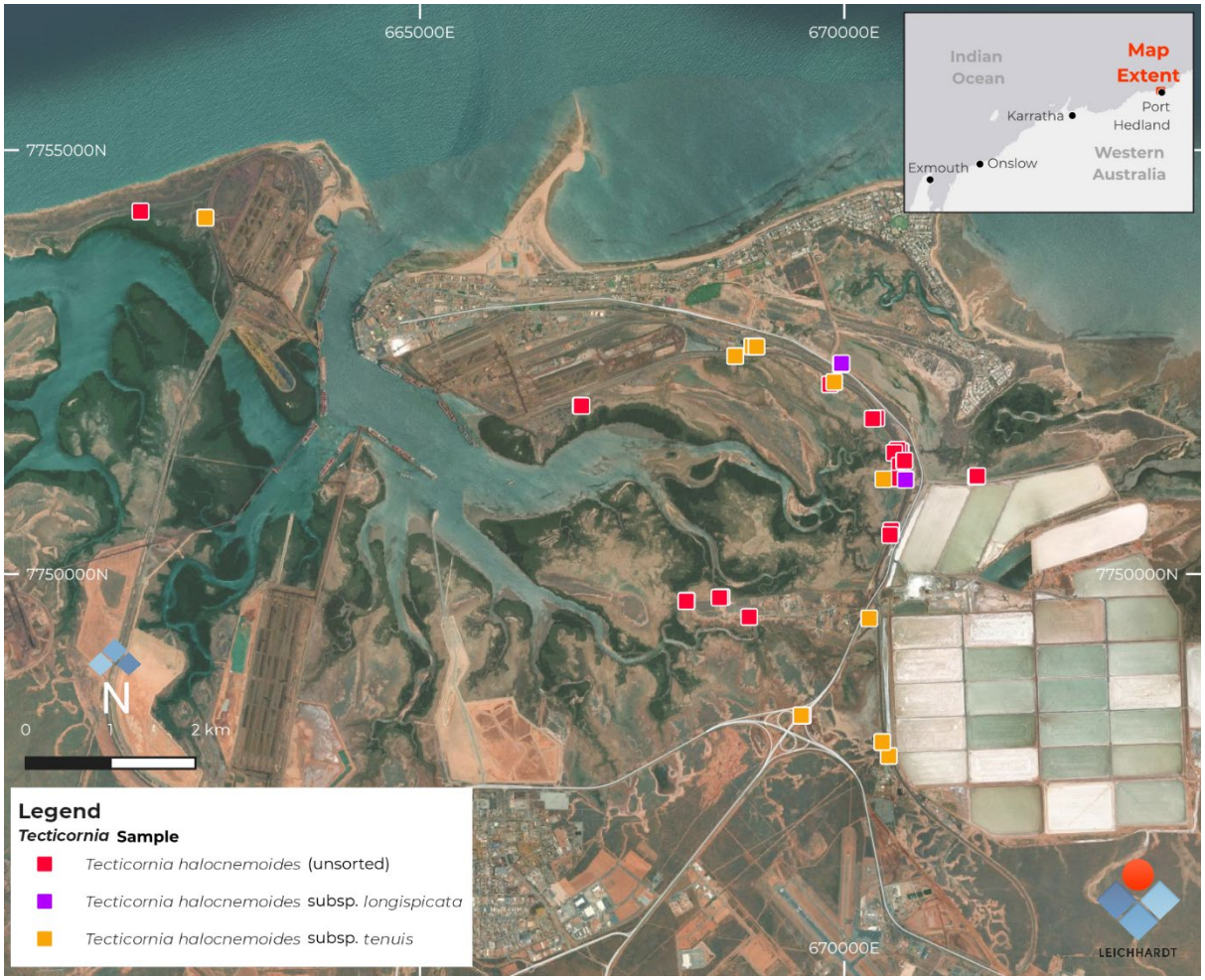

Figure 11. Distribution of *Tecticornia* collections made in 2009 by Kelly A. Shepherd around the Port Hedland area that were sampled for sequencing. *T. halocnemoides* unsorted (■), *T. halocnemoides* subsp. *longispicata* (■); *T. halocnemoides* subsp. *tenuis* (■). See Appendix 1 for voucher data.

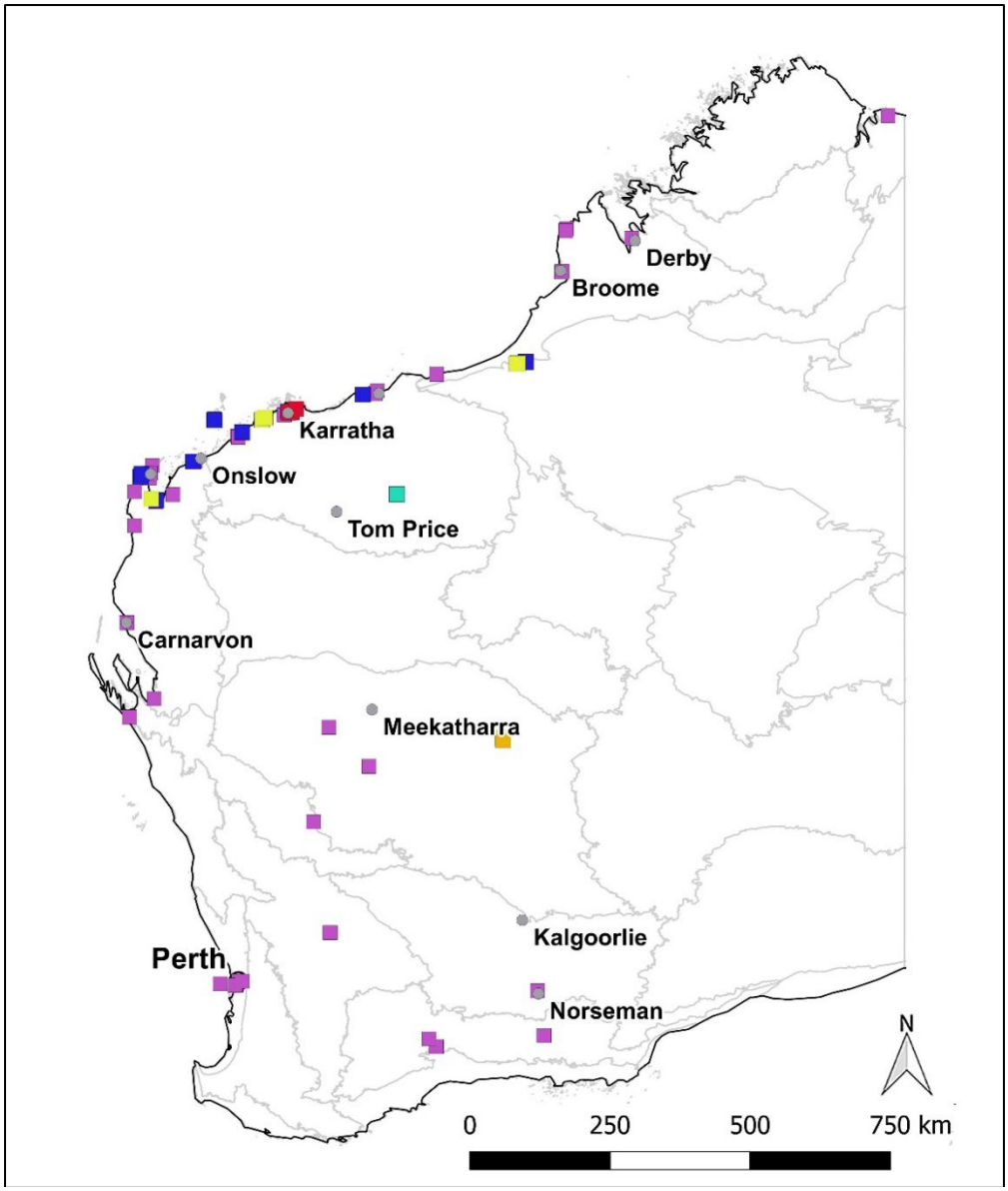

Figure 12. Distribution of *Tecticornia* specimens sampled for sequencing currently lodged at the Western Australian Herbarium (PERTH). *Tecticornia halocnemoides* complex (unsorted) (■); *T. halocnemoides* subsp. *longispicata* (■); *T. halocnemoides* subsp. *tenuis* (■); *T.* 'large ovate seed' (■); *T.* 'round seed' (■); *T.* 'tuberculate seed' (■). See Appendix 1 for voucher data.

DNA sequencing

This project aimed to undertake targeted bait capture sequencing using custom baits ('SaliBaits') recently designed by Prof Dr Gudrun Kadereit's group at the Ludwig Maximilian University of Munich, Germany. These baits were designed specifically to discriminate between species within the Salicornioideae subfamily and preliminary analyses indicate they are useful in delimiting closely related species of *Tecticornia*. A MyBaits custom SaliBaits set (Cat. No. 300416.v5-ARB) was ordered from Arbor Biosciences in Michigan, USA and sent to the Australian Genome Research Facility (AGRF) in Melbourne in preparation for sequencing.

A destructive sampling agreement with the Western Australian Herbarium (PERTH) was approved in January 2024. Tissue samples from the field collections were prepared at the Herbarium following the

recommended AGRF protocols. Samples of dried leaf material from each specimen was carefully weighed (totally no more than 20–30 mg) and placed in labelled round-bottom Eppendorf tubes.

Table 4. Summary of *Tecticornia* specimens sampled for target bait capture sequencing at the Australian Genome Research Facility (AGRF). Voucher information in Appendix 1.

Total samples	**Sample source**
160	2023 field work across the ESSP site and along the Pilbara coast
51	K.A. Shepherd unmounted 2009 collections from around the Port Hedland area
77	Vouchers from the Western Australian Herbarium

Sample tissue was sent to the Australian Genome Research Facility (AGRF) https://www.agrf.org.au/ in Adelaide for DNA extraction. Dried plant tissue from each sample was ground using a TissueLyser II (Qiagen) with tungsten carbide beads for simultaneous sample disruption and homogenisation according to the manufacturer's instructions. Genomic DNA was extracted using the DNeasy® Plant mini kit (Qiagen) on a QIAcube Connect (Qiagen) according to the manufacturer's instructions. DNA quantity and quality were assessed using 1% E-Gel with Sybr Safe dye (Thermo Fisher) and concentrations were assessed using the Quantifluor dsDNA assay (Promega).

The samples were then forwarded to the AGRF lab in Melbourne for DNA quality control (QC) assessment (see results below) prior to library prep and sequencing. DNA samples were enzymatically fragmented as part of the NEBNext Ultra II FS library preparation workflow. Libraries were prepared using the NEBNext Ultra II FS Library Prep Kit (New England Biolabs, Ipswich, MA, USA) according to the manufacturer's instructions with inserts of approximately 350 base pairs (bp). Pooled libraries (16 samples/reaction) were enriched using the MyBaits custom SaliBaits with V5 chemistry and 62°C hybridisation according to the manufacturer's instructions. Sequencing was performed on a NovaSeq 6000 (Illumina Inc., San Diego, USA) using v1.5 chemistry and 150bp paired-end reads.

A total of 281 (of 288) samples passed the QC in terms of DNA concentration. DNA concentration ranged from 183.02 ng/ul (*T. halocnemoides* LH160) to 7.83 ng/ul (*T. halocnemoides* subsp. *longispicata* KS 1365), which also included all of the ESSP samples (Prefix 'LH'). However, seven of the 288 samples failed the DNA concentration test (Table 1), as these samples had a DNA concentration that was less than 7 ng/ul.

Perhaps more concerning is that only 31 samples out of the total 288 screened, passed AGRF QC. Of these, 29 of the 160 Eramurra SSP samples (Prefix 'LH') passed this test, while a further 130 LH samples appeared to have degraded DNA ('DEG' in AGRF data below). A single LH specimen (*T. halocnemoides s.l.* LH007), despite returning a DNA concentration of 69.36 ng/ul, appeared to have no visible DNA ('Not Visible' in Table 5 and 'NV' in AGRF data below). It is somewhat surprising that all of the LH ESSP samples did not pass the QC, as vouchers were collected in December 2023 and tissue samples were harvested from specimens within a matter of days and placed in silica gel to facilitate rapid drying of plant tissue. As *Tecticornia* tissue is so succulent the samples may have taken longer to dry than other plant tissue and thus has shown some level of DNA degradation.

Of the Herbarium samples included, a further 57 also showed a higher degree of DNA degradation. This is not unexpected, as many of the samples are old with some collected 55 years ago. In anticipation of potential issues, multiple accessions of different taxa were included in this study to account for any redundancies. Moreover, it is known that the AGRF QC is highly sensitive and previous experience through the phylogenomic projects within Genomics for Australian Plants (https://www.genomicsforaustralianplants.com/phylogenomics/) has shown that many projects essentially fail this part of the QC screening. In other projects, including earlier work on *Tecticornia*

(https://www.genomicsforaustralianplants.com/tecticornia-salicornia/), sequencing went ahead and by in large reasonable results were returned and were successfully analysed. So, while it is expected that samples which failed both DNA concentration and quality check may not generate enough reliable genomic data, we believed that sufficient DNA concentration was detected across the majority of samples. Thus, approval was given to proceed with the sequencing.

Table 5. Samples that failed the AGRF DNA quantity or quality QC and the year of sample collection.

Taxon	**Collection number or WA Herbarium barcode**	**Year**	**DNA concentration ng/ul**	**DNA Quantity**	**DNA Quality**
Tecticornia halocnemoides s.l.	LH007	2023	69.36	PASS	NV
Tecticornia halocnemoides s.l.	KS 1364	2009	6.20	FAIL	NV
Tecticornia halocnemoides s.l.	KS 1369	2009	21.22	PASS	NV
Tecticornia halocnemoides s.l.	KS 1373	2009	15.62	PASS	NV
Tecticornia halocnemoides s.l.	KS 1340	2009	23.84	PASS	NV
Tecticornia halocnemoides s.l.	KS 1341	2009	5.62	FAIL	NV
Tecticornia halocnemoides s.l.	KS 1344	2009	18.39	PASS	NV
Tecticornia halocnemoides s.l.	KS 1346	2009	9.75	PASS	NV
Tecticornia halocnemoides s.l.	KS 1362	2009	12.16	PASS	NV
Tecticornia halocnemoides s.l.	KS 1353	2009	9.88	PASS	NV
Tecticornia halocnemoides s.l.	KS 1335	2009	8.02	PASS	NV
Tecticornia halocnemoides s.l.	KS 1333	2009	6.25	FAIL	NV
Tecticornia halocnemoides s.l.	KS 1332	2009	17.39	PASS	NV
Tecticornia halocnemoides s.l.	KS 1329	2009	14.09	PASS	NV
Tecticornia halocnemoides s.l.	KS 1330	2009	19.40	PASS	NV
Tecticornia halocnemoides s.l.	KS 1328	2009	27.16	PASS	NV
Tecticornia halocnemoides subsp. *longispicata*	KS 1365	2009	7.83	PASS	NV
Tecticornia halocnemoides subsp. *tenuis*	KS 1355	2009	20.72	PASS	NV
Tecticornia halocnemoides subsp. *longispicata*	KS 1343	2009	15.56	PASS	NV
Tecticornia halocnemoides subsp. *tenuis*	PERTH 02481189	1977	11.38	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 07478224	1982	10.87	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 06208916	1964	13.40	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 08026122	1999	13.31	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 02479818	1986	11.96	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 02479907	1965	12.16	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 02669641	1975	10.02	PASS	NV
Tecticornia halocnemoides subsp. *longispicata*	PERTH 02480743	1981	9.06	PASS	NV
Tecticornia halocnemoides subsp. *longispicata*	PERTH 02479184	1978	7.84	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 07624646	1999	20.69	PASS	NV
Tecticornia halocnemoides subsp. *caudata*	PERTH 02478919	1970	9.28	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 02478331	1969	5.40	FAIL	NV
Tecticornia halocnemoides subsp. *catenulata*	PERTH 02478501	1969	10.94	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 02480271	1969	4.40	FAIL	NV
Tecticornia halocnemoides s.l.	PERTH 02479761	1965	8.40	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 02479753	1972	12.37	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 02478684	1970	9.61	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 09031448	1989	20.72	PASS	NV
Tecticornia halocnemoides subsp. *tenuis*	PERTH 09127674	2017	20.18	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 09031499	1989	5.92	FAIL	NV
Tecticornia halocnemoides subsp. *tenuis*	PERTH 07542283	2007	24.67	PASS	NV
Tecticornia halocnemoides subsp. *tenuis*	PERTH 02480115	1970	11.35	PASS	NV

Taxon	Collection number or WA Herbarium barcode	Year	DNA concentration ng/ul	DNA Quantity	DNA Quality
Tecticornia halocnemoides subsp. *tenuis*	PERTH 04754085	1996	16.29	PASS	NV
Tecticornia halocnemoides subsp. *tenuis*	PERTH 09241159	2009	13.67	PASS	NV
Tecticornia 'tuberculate seed aggregate'	PERTH 09134506	2014	15.66	PASS	NV
Tecticornia 'tuberculate seed aggregate'	PERTH 09134565	2014	11.36	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02481006	1975	9.37	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02479745	1972	14.11	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02479265	1987	8.07	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02481340	1975	14.58	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02481022	1980	13.40	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02480263	1969	14.09	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02481359	1975	16.13	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 04974492	1995	18.44	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02480158	1977	10.08	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02479729	1970	6.08	FAIL	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02479419	1969	15.54	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02478579	1978	11.13	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02479176	1978	11.99	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 08955247	2010	12.97	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02479877	1976	14.35	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02481391	1981	15.71	PASS	NV
Tecticornia halocnemoides s.l.	PERTH 02481464	1981	14.69	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02478544	1981	14.54	PASS	NV
Tecticornia 'large ovate seed aggregate'	PERTH 02481456	1981	9.99	PASS	NV

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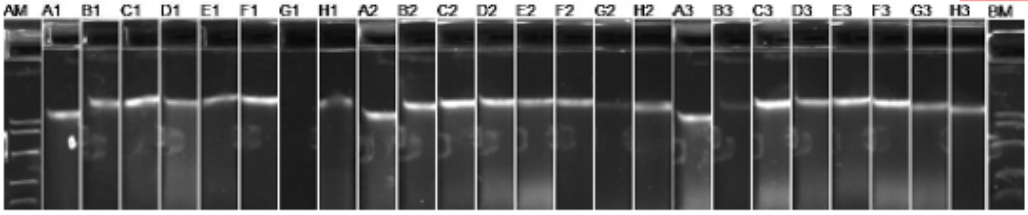
DNA QC Report

Client Name	Kelly Shepherd
CAGRF #	CAGRF23120103
Lab ID	15758
Date	
DNA Conc. (ng/µL)	7.7
Ladder	E-Gel High Range Ladder

SAMPLE FAIL LEGEND

Degradation	DEG
RNA Contamination	RNA
Protein Contamination	PRO
Other Contamination	CON
Not Visible	NV



Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
AM	E-Gel High Range Ladder						
A1	1	T_halocnemoides_LH001	53.75		PASS	PASS	PASS
B1	2	T_halocnemoides_LH002	51.39		PASS	PASS	PASS
C1	3	T_halocnemoides_LH003	69.55		PASS	DEG	FAIL
D1	4	T_halocnemoides_LH004	85.47		PASS	DEG	FAIL
E1	5	T_halocnemoides_LH005	51.71		PASS	PASS	PASS
F1	6	T_halocnemoides_LH006	56.50		PASS	PASS	PASS
G1	7	T_halocnemoides_LH007	69.36		PASS	NV	FAIL
H1	8	T_halocnemoides_LH008	69.01		PASS	PASS	PASS
A2	9	T_halocnemoides_LH009	62.82		PASS	DEG	FAIL
B2	10	T_halocnemoides_LH010	69.00		PASS	DEG	FAIL
C2	11	T_halocnemoides_LH011	79.01		PASS	DEG	FAIL
D2	12	T_halocnemoides_LH012	77.96		PASS	DEG	FAIL
E2	13	T_halocnemoides_LH013	74.54		PASS	DEG	FAIL
F2	14	T_halocnemoides_LH014	56.69		PASS	PASS	PASS
G2	15	T_halocnemoides_LH015	38.95		PASS	PASS	PASS
H2	16	T_halocnemoides_LH016	82.06		PASS	PASS	PASS
A3	17	T_halocnemoides_LH017	74.34		PASS	DEG	FAIL
B3	18	T_halocnemoides_LH018	27.30		PASS	PASS	PASS
C3	19	T_halocnemoides_LH019	99.64		PASS	DEG	FAIL
D3	20	T_halocnemoides_LH020	62.33		PASS	DEG	FAIL
E3	21	T_halocnemoides_LH021	67.15		PASS	DEG	FAIL
F3	22	T_halocnemoides_LH022	90.03		PASS	DEG	FAIL
G3	23	T_halocnemoides_LH023	61.49		PASS	DEG	FAIL
H3	24	T_halocnemoides_LH024	70.68		PASS	PASS	PASS
BM	E-Gel High Range Ladder						

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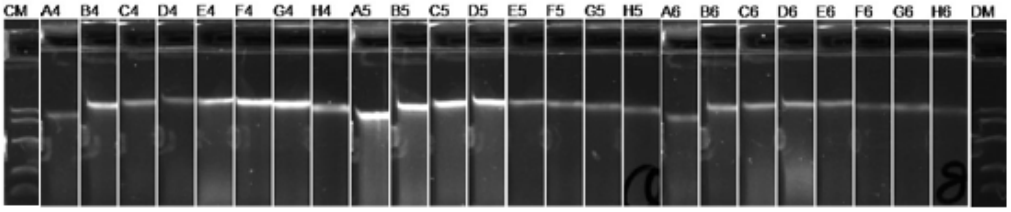

Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
CM	E-Gel High Range Ladder						
A4	25	T_halocnemoides_LH025	40.61		PASS	PASS	PASS
B4	26	T_halocnemoides_LH026	67.81		PASS	PASS	PASS
C4	27	T_halocnemoides_LH027	53.96		PASS	PASS	PASS
D4	28	T_halocnemoides_LH028	36.70		PASS	PASS	PASS
E4	29	T_halocnemoides_LH029	83.26		PASS	DEG	FAIL
F4	30	T_halocnemoides_LH030	94.23		PASS	PASS	PASS
G4	31	T_halocnemoides_LH031	97.05		PASS	PASS	PASS
H4	32	T_halocnemoides_LH032	83.72		PASS	PASS	PASS
A5	33	T_halocnemoides_LH033	119.29		PASS	DEG	FAIL
B5	34	T_halocnemoides_LH034	109.47		PASS	DEG	FAIL
C5	35	T_halocnemoides_LH035	111.13		PASS	DEG	FAIL
D5	36	T_halocnemoides_LH036	99.37		PASS	DEG	FAIL
E5	37	T_halocnemoides_LH037	62.06		PASS	PASS	PASS
F5	38	T_halocnemoides_LH038	54.53		PASS	PASS	PASS
G5	39	T_halocnemoides_LH039	57.77		PASS	PASS	PASS
H5	40	T_halocnemoides_LH040	62.36		PASS	PASS	PASS
A6	41	T_halocnemoides_LH041	48.62		PASS	DEG	FAIL
B6	42	T_halocnemoides_LH042	57.53		PASS	DEG	FAIL
C6	43	T_halocnemoides_LH043	52.62		PASS	DEG	FAIL
D6	44	T_halocnemoides_LH044	58.15		PASS	DEG	FAIL
E6	45	T_halocnemoides_LH045	55.50		PASS	PASS	PASS
F6	46	T_halocnemoides_LH046	44.57		PASS	PASS	PASS
G6	47	T_halocnemoides_LH047	38.23		PASS	PASS	PASS
H6	48	T_halocnemoides_LH048	35.49		PASS	PASS	PASS
DM	E-Gel High Range Ladder						

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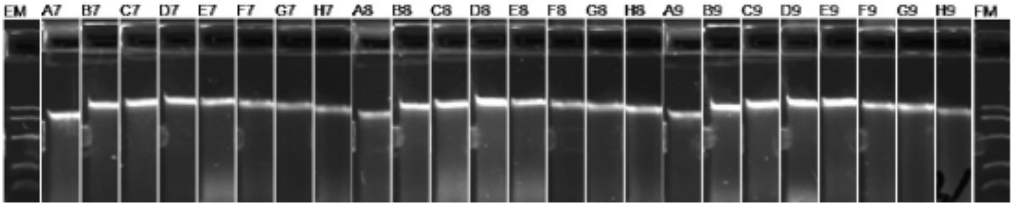

Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
EM	E-Gel High Range Ladder						
A7	49	T_halocnemoides_LH049	73.74		PASS	DEG	FAIL
B7	50	T_halocnemoides_LH050	72.70		PASS	DEG	FAIL
C7	51	T_halocnemoides_LH051	72.77		PASS	DEG	FAIL
D7	52	T_halocnemoides_LH052	68.90		PASS	DEG	FAIL
E7	53	T_halocnemoides_LH053	81.35		PASS	DEG	FAIL
F7	54	T_halocnemoides_LH054	69.44		PASS	PASS	PASS
G7	55	T_halocnemoides_LH055	70.33		PASS	PASS	PASS
H7	56	T_halocnemoides_LH056	72.32		PASS	DEG	FAIL
A8	57	T_halocnemoides_LH057	61.83		PASS	DEG	FAIL
B8	58	T_halocnemoides_LH058	91.07		PASS	DEG	FAIL
C8	59	T_halocnemoides_LH059	103.39		PASS	DEG	FAIL
D8	60	T_halocnemoides_LH060	123.68		PASS	DEG	FAIL
E8	61	T_halocnemoides_LH061	98.03		PASS	DEG	FAIL
F8	62	T_halocnemoides_LH062	67.65		PASS	DEG	FAIL
G8	63	T_halocnemoides_LH063	105.45		PASS	DEG	FAIL
H8	64	T_halocnemoides_LH064	113.33		PASS	DEG	FAIL
A9	65	T_halocnemoides_LH065	58.89		PASS	DEG	FAIL
B9	66	T_halocnemoides_LH066	108.29		PASS	DEG	FAIL
C9	67	T_halocnemoides_LH067	92.39		PASS	DEG	FAIL
D9	68	T_halocnemoides_LH068	106.96		PASS	DEG	FAIL
E9	69	T_halocnemoides_LH069	102.60		PASS	DEG	FAIL
F9	70	T_halocnemoides_LH070	94.79		PASS	DEG	FAIL
G9	71	T_halocnemoides_LH071	96.94		PASS	DEG	FAIL
H9	72	T_halocnemoides_LH072	85.56		PASS	PASS	PASS
FM	E-Gel High Range Ladder						

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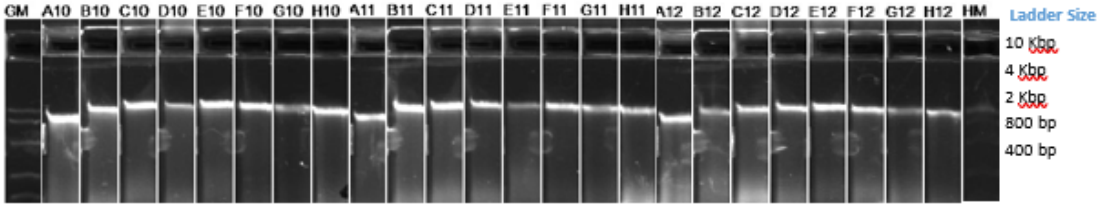

Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
GM	E-Gel High Range Ladder						
A10	73	T_halocnemoides_LH073	126.53		PASS	DEG	FAIL
B10	74	T_halocnemoides_LH074	128.42		PASS	DEG	FAIL
C10	75	T_halocnemoides_LH075	105.37		PASS	DEG	FAIL
D10	76	T_halocnemoides_LH076	90.16		PASS	DEG	FAIL
E10	77	T_halocnemoides_LH077	117.40		PASS	DEG	FAIL
F10	78	T_halocnemoides_LH078	82.70		PASS	DEG	FAIL
G10	79	T_halocnemoides_LH079	67.77		PASS	PASS	PASS
H10	80	T_halocnemoides_LH080	144.31		PASS	DEG	FAIL
A11	81	T_halocnemoides_LH081	81.09		PASS	DEG	FAIL
B11	82	T_halocnemoides_LH082	142.60		PASS	DEG	FAIL
C11	83	T_halocnemoides_LH083	115.57		PASS	DEG	FAIL
D11	84	T_halocnemoides_LH084	76.92		PASS	DEG	FAIL
E11	85	T_halocnemoides_LH085	75.57		PASS	DEG	FAIL
F11	86	T_halocnemoides_LH086	85.23		PASS	DEG	FAIL
G11	87	T_halocnemoides_LH087	94.23		PASS	DEG	FAIL
H11	88	T_halocnemoides_LH088	155.50		PASS	DEG	FAIL
A12	89	T_halocnemoides_LH089	119.79		PASS	DEG	FAIL
B12	90	T_halocnemoides_LH090	93.16		PASS	DEG	FAIL
C12	91	T_halocnemoides_LH091	106.35		PASS	DEG	FAIL
D12	92	T_halocnemoides_LH092	89.97		PASS	DEG	FAIL
E12	93	T_halocnemoides_LH093	78.98		PASS	DEG	FAIL
F12	94	T_halocnemoides_LH094	93.51		PASS	DEG	FAIL
G12	95	T_halocnemoides_LH095	70.01		PASS	DEG	FAIL
H12	96	T_halocnemoides_LH096	87.01		PASS	DEG	FAIL
HM	E-Gel High Range Ladder						

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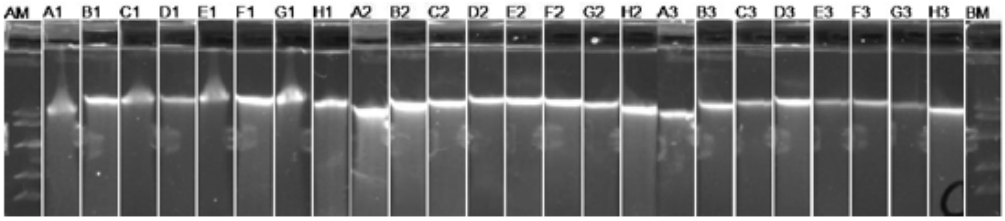

Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
AM	E-Gel High Range Ladder						
A1	97	T_halocnemoides_LH097	82.66		PASS	DEG	FAIL
B1	98	T_halocnemoides_LH098	87.91		PASS	DEG	FAIL
C1	99	T_halocnemoides_LH099	74.62		PASS	DEG	FAIL
D1	100	T_halocnemoides_LH100	51.42		PASS	DEG	FAIL
E1	101	T_halocnemoides_LH101	85.00		PASS	DEG	FAIL
F1	102	T_halocnemoides_LH102	94.30		PASS	DEG	FAIL
G1	103	T_halocnemoides_LH103	121.79		PASS	DEG	FAIL
H1	104	T_halocnemoides_LH104	110.33		PASS	DEG	FAIL
A2	105	T_halocnemoides_LH105	140.85		PASS	DEG	FAIL
B2	106	T_halocnemoides_LH106	128.86		PASS	DEG	FAIL
C2	107	T_halocnemoides_LH107	106.88		PASS	DEG	FAIL
D2	108	T_halocnemoides_LH108	79.20		PASS	DEG	FAIL
E2	109	T_halocnemoides_LH109	93.56		PASS	DEG	FAIL
F2	110	T_halocnemoides_LH110	81.85		PASS	DEG	FAIL
G2	111	T_halocnemoides_LH111	68.21		PASS	DEG	FAIL
H2	112	T_halocnemoides_LH112	109.55		PASS	DEG	FAIL
A3	113	T_halocnemoides_LH113	65.70		PASS	DEG	FAIL
B3	114	T_halocnemoides_LH114	64.16		PASS	DEG	FAIL
C3	115	T_halocnemoides_LH115	52.80		PASS	DEG	FAIL
D3	116	T_halocnemoides_LH116	98.90		PASS	DEG	FAIL
E3	117	T_halocnemoides_LH117	40.40		PASS	DEG	FAIL
F3	118	T_halocnemoides_LH118	46.42		PASS	DEG	FAIL
G3	119	T_halocnemoides_LH119	34.54		PASS	DEG	FAIL
H3	120	T_halocnemoides_LH120	75.66		PASS	DEG	FAIL
BM	E-Gel High Range Ladder						

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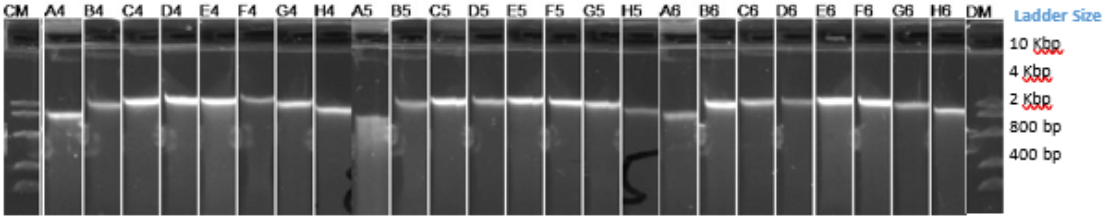
CAGRF #	CAGRF23120103
Lab ID	15758
Date	
DNA Conc. (ng/µL)	7.7



Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
CM	E-Gel High Range Ladder						
A4	121	T_halocnemoides_LH121	65.65		PASS	DEG	FAIL
B4	122	T_halocnemoides_LH122	48.56		PASS	DEG	FAIL
C4	123	T_halocnemoides_LH123	79.61		PASS	DEG	FAIL
D4	124	T_halocnemoides_LH124	89.40		PASS	DEG	FAIL
E4	125	T_halocnemoides_LH125	95.64		PASS	DEG	FAIL
F4	126	T_halocnemoides_LH126	42.49		PASS	DEG	FAIL
G4	127	T_halocnemoides_LH127	62.45		PASS	DEG	FAIL
H4	128	T_halocnemoides_LH128	66.87		PASS	DEG	FAIL
A5	129	T_halocnemoides_LH129	86.79		PASS	DEG	FAIL
B5	130	T_halocnemoides_LH130	54.20		PASS	DEG	FAIL
C5	131	T_halocnemoides_LH131	80.15		PASS	DEG	FAIL
D5	132	T_halocnemoides_LH132	48.15		PASS	DEG	FAIL
E5	133	T_halocnemoides_LH133	72.81		PASS	DEG	FAIL
F5	134	T_halocnemoides_LH134	66.57		PASS	DEG	FAIL
G5	135	T_halocnemoides_LH135	66.98		PASS	DEG	FAIL
H5	136	T_halocnemoides_LH136	34.92		PASS	DEG	FAIL
A6	137	T_halocnemoides_LH137	47.25		PASS	DEG	FAIL
B6	138	T_halocnemoides_LH138	74.95		PASS	DEG	FAIL
C6	139	T_halocnemoides_LH139	58.14		PASS	DEG	FAIL
D6	140	T_halocnemoides_LH140	45.64		PASS	DEG	FAIL
E6	141	T_halocnemoides_LH141	91.55		PASS	DEG	FAIL
F6	142	T_halocnemoides_LH142	84.28		PASS	DEG	FAIL
G6	143	T_halocnemoides_LH143	52.62		PASS	DEG	FAIL
H6	144	T_halocnemoides_LH144	62.66		PASS	DEG	FAIL
DM	E-Gel High Range Ladder						

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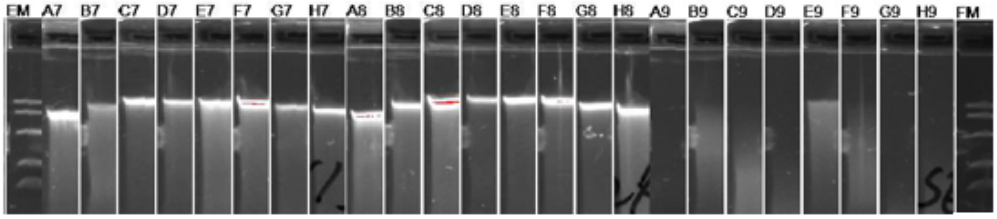

Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
EM	E-Gel High Range Ladder						
A7	145	T_halocnemoides_LH145	115.53		PASS	DEG	FAIL
B7	146	T_halocnemoides_LH146	88.40		PASS	DEG	FAIL
C7	147	T_halocnemoides_LH147	81.66		PASS	DEG	FAIL
D7	148	T_halocnemoides_LH148	87.80		PASS	DEG	FAIL
E7	149	T_halocnemoides_LH149	138.13		PASS	DEG	FAIL
F7	150	T_halocnemoides_LH150	135.68		PASS	DEG	FAIL
G7	151	T_halocnemoides_LH151	82.39		PASS	DEG	FAIL
H7	152	T_halocnemoides_LH152	96.51		PASS	DEG	FAIL
A8	153	T_halocnemoides_LH153	145.13		PASS	DEG	FAIL
B8	154	T_halocnemoides_LH154	105.43		PASS	DEG	FAIL
C8	155	T_halocnemoides_LH155	176.22		PASS	DEG	FAIL
D8	156	T_halocnemoides_LH156	63.42		PASS	DEG	FAIL
E8	157	T_halocnemoides_LH157	85.53		PASS	DEG	FAIL
F8	158	T_halocnemoides_LH158	114.05		PASS	DEG	FAIL
G8	159	T_halocnemoides_LH159	93.17		PASS	DEG	FAIL
H8	160	T_halocnemoides_LH160	183.02		PASS	DEG	FAIL
A9	161	T_halocnemoides_KS1364	6.20		FAIL	NV	FAIL
B9	162	T_halocnemoides_KS1366	58.55		PASS	DEG	FAIL
C9	163	T_halocnemoides_KS1368	52.45		PASS	DEG	FAIL
D9	164	T_halocnemoides_KS1369	21.22		PASS	NV	FAIL
E9	165	T_halocnemoides_KS1371A	67.91		PASS	DEG	FAIL
F9	166	T_halocnemoides_KS1372	45.41		PASS	DEG	FAIL
G9	167	T_halocnemoides_KS1373	15.62		PASS	NV	FAIL
H9	168	T_halocnemoides_KS1340	23.84		PASS	NV	FAIL
FM	E-Gel High Range Ladder						

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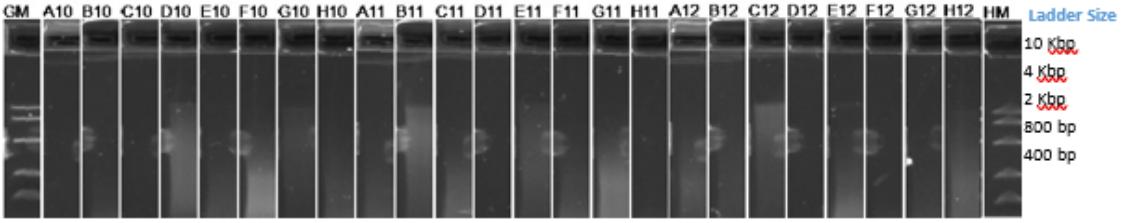

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GM	E-Gel High Range Ladder						
A10	169	T_halocnemoides_KS1341	5.62		FAIL	NV	FAIL
B10	170	T_halocnemoides_KS1344	18.39		PASS	NV	FAIL
C10	171	T_halocnemoides_KS1346	9.75		PASS	NV	FAIL
D10	172	T_halocnemoides_KS1347	46.96		PASS	DEG	FAIL
E10	173	T_halocnemoides_KS1349	23.22		PASS	DEG	FAIL
F10	174	T_halocnemoides_KS1360	51.37		PASS	DEG	FAIL
G10	175	T_halocnemoides_KS1359	29.26		PASS	DEG	FAIL
H10	176	T_halocnemoides_KS1339	21.48		PASS	DEG	FAIL
A11	177	T_halocnemoides_KS1338	18.30		PASS	DEG	FAIL
B11	178	T_halocnemoides_KS1337	47.11		PASS	DEG	FAIL
C11	179	T_halocnemoides_KS1361	28.51		PASS	DEG	FAIL
D11	180	T_halocnemoides_KS1362	12.16		PASS	NV	FAIL
E11	181	T_halocnemoides_KS1363	38.85		PASS	DEG	FAIL
F11	182	T_halocnemoides_KS1351	22.68		PASS	DEG	FAIL
G11	183	T_halocnemoides_KS1352	48.07		PASS	DEG	FAIL
H11	184	T_halocnemoides_KS1353	9.88		PASS	NV	FAIL
A12	185	T_halocnemoides_KS1358	36.65		PASS	DEG	FAIL
B12	186	T_halocnemoides_KS1342	24.81		PASS	DEG	FAIL
C12	187	T_halocnemoides_KS1334	34.00		PASS	DEG	FAIL
D12	188	T_halocnemoides_KS1335	8.02		PASS	NV	FAIL
E12	189	T_halocnemoides_KS1336	28.97		PASS	DEG	FAIL
F12	190	T_halocnemoides_KS1333	6.25		FAIL	NV	FAIL
G12	191	T_halocnemoides_KS1332	17.39		PASS	NV	FAIL
H12	192	T_halocnemoides_KS1331	35.21		PASS	DEG	FAIL
HM	E-Gel High Range Ladder						

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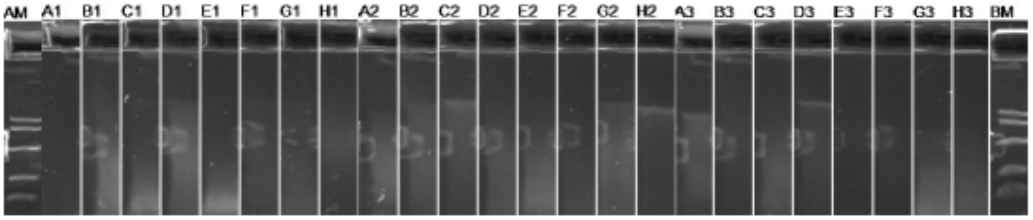

Lane	Sample ID	Client ID	Conc (ng/ul)	Total (ng)	Quant	Qual	Agg. Result
AM	E-Gel High Range Ladder						
A1	193	T_halocnemoides_KS1329	14.09		PASS	NV	FAIL
B1	194	T_halocnemoides_KS1327	41.69		PASS	DEG	FAIL
C1	195	T_halocnemoides_KS1326	32.34		PASS	DEG	FAIL
D1	196	T_halocnemoides_KS1325	38.00		PASS	DEG	FAIL
E1	197	T_halocnemoides_KS1324	22.67		PASS	DEG	FAIL
F1	198	T_halocnemoides_KS1330	19.40		PASS	NV	FAIL
G1	199	T_halocnemoides_KS1328	27.16		PASS	NV	FAIL
H1	200	T_ssp_longispicata_KS1365	7.83		PASS	NV	FAIL
A2	201	T_ssp_tenuis_KS1374	35.95		PASS	DEG	FAIL
B2	202	T_ssp_tenuis_KS1371	35.40		PASS	DEG	FAIL
C2	203	T_ssp_tenuis_KS1370	34.29		PASS	DEG	FAIL
D2	204	T_ssp_tenuis_KS1367	27.80		PASS	DEG	FAIL
E2	205	T_ssp_tenuis_KS1357	33.12		PASS	DEG	FAIL
F2	206	T_ssp_tenuis_KS1355	20.72		PASS	NV	FAIL
G2	207	T_ssp_tenuis_KS1354	40.49		PASS	DEG	FAIL
H2	208	T_ssp_tenuis_KS1348	22.48		PASS	PASS	PASS
A3	209	T_ssp_tenuis_KS1350	35.80		PASS	DEG	FAIL
B3	210	T_ssp_longispicata_KS1343	15.56		PASS	NV	FAIL
C3	211	T_ssp_tenuis_KS1345	29.19		PASS	DEG	FAIL
D3	212	T_halocnemoides_09518576	25.31		PASS	DEG	FAIL
E3	213	T_ssp_tenuis_02481189	11.38		PASS	NV	FAIL
F3	214	T_large_seed_07478224	10.87		PASS	NV	FAIL
G3	215	T_halocnemoides_06396984	26.84		PASS	DEG	FAIL
H3	216	T_halocnemoides_05770270	27.19		PASS	DEG	FAIL
BM	E-Gel High Range Ladder						

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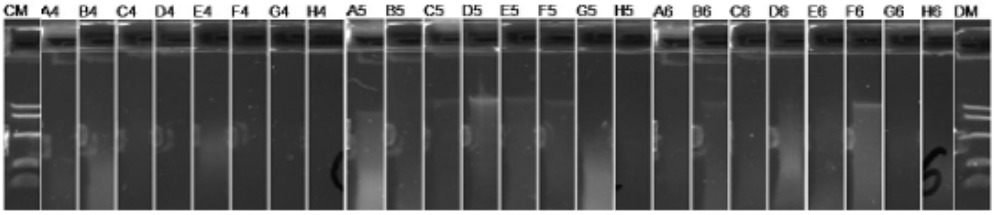

Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
CM	E-Gel High Range Ladder						
A4	217	T_halocnemoides_06208916	13.40		PASS	NV	FAIL
B4	218	T_halocnemoides_08026114	26.44		PASS	DEG	FAIL
C4	219	T_halocnemoides_08026122	13.31		PASS	NV	FAIL
D4	220	T_halocnemoides_02479818	11.96		PASS	NV	FAIL
E4	221	T_halocnemoides_03089819	10.03		PASS	DEG	FAIL
F4	222	T_halocnemoides_02479907	12.16		PASS	NV	FAIL
G4	223	T_halocnemoides_02481499	7.91		PASS	NV	FAIL
H4	224	T_halocnemoides_02669641	10.02		PASS	NV	FAIL
A5	225	T_halocnemoides_08377596	68.82		PASS	DEG	FAIL
B5	226	T_halocnemoides_08178690	22.77		PASS	DEG	FAIL
C5	227	T_halocnemoides_09518525	22.02		PASS	DEG	FAIL
D5	228	T_halocnemoides_09518614	38.59		PASS	DEG	FAIL
E5	229	T_round_seed_09046461	33.58		PASS	DEG	FAIL
F5	230	T_round_seed_09046453	29.44		PASS	DEG	FAIL
G5	231	T_beaked_seed_07451059_	42.24		PASS	DEG	FAIL
H5	232	T_ssp_longispicata_02480743	9.06		PASS	NV	FAIL
A6	233	T_ssp_longispicata_02479184	7.84		PASS	NV	FAIL
B6	234	T_ssp_longispicata_09033319	25.32		PASS	DEG	FAIL
C6	235	T_longispicata_08938105	18.89		PASS	DEG	FAIL
D6	236	T_ssp_caudata_07359594_	39.84		PASS	DEG	FAIL
E6	237	T_halocnemoides_07624646	20.69		PASS	NV	FAIL
F6	238	T_ssp_caudata_08591180_	52.92		PASS	DEG	FAIL
G6	239	T_ssp_caudata_02478919	9.28		PASS	NV	FAIL
H6	240	T_haloc_0478331	5.40		FAIL	NV	FAIL
DM	E-Gel High Range Ladder						

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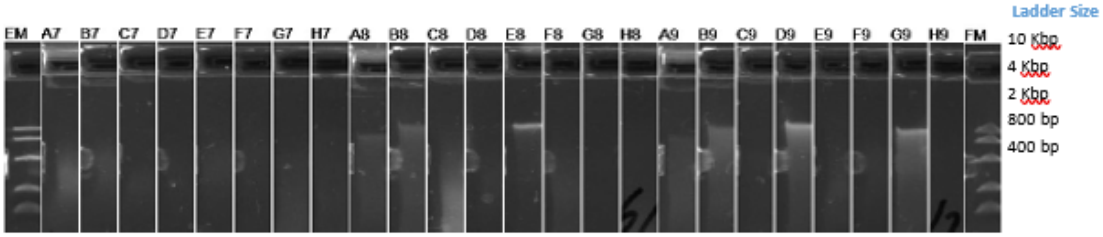

Lane	Sample ID	Client ID	Conc (ng/µl)	Total (ng)	Quant	Qual	Agg. Result
EM	E-Gel High Range Ladder						
A7	241	T_ssp_catenulata_07250231	13.84		PASS	DEG	FAIL
B7	242	T_ssp_catenulata_02478501_	10.94		PASS	NV	FAIL
C7	243	T_halocnemoides_02480271	4.40		FAIL	NV	FAIL
D7	244	T_halocnemoides_02479761	8.40		PASS	NV	FAIL
E7	245	T_haloc_02479753	12.37		PASS	NV	FAIL
F7	246	T_haloc_02478684	9.61		PASS	NV	FAIL
G7	247	T_halocnemoides_09031448	20.72		PASS	NV	FAIL
H7	248	T_ssp_tenuis_09127674	20.18		PASS	NV	FAIL
A8	249	T_ssp_tenuis_09127666	26.26		PASS	DEG	FAIL
B8	250	T_ssp_tenuis_09127658	34.38		PASS	DEG	FAIL
C8	251	T_halocnemoides_09023534	36.21		PASS	DEG	FAIL
D8	252	T_halocnemoides_09031499	5.92		FAIL	NV	FAIL
E8	253	T_halocnemoides_08976902	30.81		PASS	PASS	PASS
F8	254	T_ssp_tenuis_07542283	24.67		PASS	NV	FAIL
G8	255	T_ssp_tenuis_02480115	11.35		PASS	NV	FAIL
H8	256	T_ssp_tenuis_04754085	16.29		PASS	NV	FAIL
A9	257	T_ssp_tenuis_08680701	30.04		PASS	DEG	FAIL
B9	258	T_ssp_tenuis_08586144	43.82		PASS	DEG	FAIL
C9	259	T_ssp_tenuis_09241159	13.67		PASS	NV	FAIL
D9	260	T_ssp_tenuis_09033327	48.02		PASS	DEG	FAIL
E9	261	T_tuberculate_09134506	15.66		PASS	NV	FAIL
F9	262	T_tuberculate_09134565	11.36		PASS	NV	FAIL
G9	263	T_aff_caudata_08591148	47.24		PASS	DEG	FAIL
H9	264	T_large_seed_02481006	9.37		PASS	NV	FAIL
FM	E-Gel High Range Ladder						

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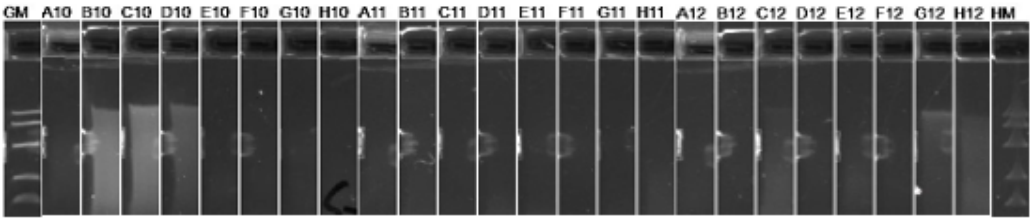


Lane	Sample ID	Client ID	Conc (ng/ul)	Total (ng)	Quant	Qual	Agg. Result
GM	E-Gel High Range Ladder						
A10	265	T_large_seed_02479745	14.11		PASS	NV	FAIL
B10	266	T_halocnemoides_09241124	73.69		PASS	DEG	FAIL
C10	267	T_large_seed_08832692	68.30		PASS	DEG	FAIL
D10	268	T_large_seed_08832714	41.02		PASS	DEG	FAIL
E10	269	T_large_seed_02479265	8.07		PASS	NV	FAIL
F10	270	T_large_seed_02481340	14.58		PASS	NV	FAIL
G10	271	T_large_seed_02481022	13.40		PASS	NV	FAIL
H10	272	T_large_seed_02480263	14.09		PASS	NV	FAIL
A11	273	T_large_seed_02481359	16.13		PASS	NV	FAIL
B11	274	T_large_seed_04974492	18.44		PASS	NV	FAIL
C11	275	T_large_seed_02480158	10.08		PASS	NV	FAIL
D11	276	T_large_seed_02479729	6.08		FAIL	NV	FAIL
E11	277	T_large_seed_02479419	15.54		PASS	NV	FAIL
F11	278	T_large_seed_02478579	11.13		PASS	NV	FAIL
G11	279	T_large_seed_02479176	11.99		PASS	NV	FAIL
H11	280	T_large_seed_08955247	12.97		PASS	NV	FAIL
A12	281	T_large_seed_02479877	14.35		PASS	NV	FAIL
B12	282	T_large_seed_02481391	15.71		PASS	NV	FAIL
C12	283	T_large_seed_06989357	32.81		PASS	DEG	FAIL
D12	284	T_haloc_02481464	14.69		PASS	NV	FAIL
E12	285	T_large_seed_02478544_	14.54		PASS	NV	FAIL
F12	286	T_large_seed_02481456	9.99		PASS	NV	FAIL
G12	287	T_halocnemoides_08178712	32.07		PASS	DEG	FAIL
H12	288	T_large_seed_08178704	38.90		PASS	DEG	FAIL
HM	E-Gel High Range Ladder						

Phylogenetic analyses

Data cleaning, assembly, extraction and alignment

Initial steps in phylogenomic data analysis were conducted using a newly developed assembly toolkit called CAPTUS (Ortiz *et al.*, bioRxiv). Firstly, adaptor trimming as well as quality trimming and filtering were performed using the option 'captus_assembly clean' integrated into the CAPTUS pipeline, by removing read regions with phred quality score under 20, as well as complete reads with average minimum phred quality score under 20. Secondly, 'captus_assembly assemble' clean reads were used for a *de novo* assembly with MEGAHIT. To avoid short and low-coverage contigs resulting from short and erroneous reads, we set the minimum contig depth to 3, increased the prune level to 3 and increased the minimum contig length to 100. Thirdly, we used the function 'captus_assembly extract', which uses BLAT and Scipio algorithms to extract the assembled loci against the manually provided target file, as well as in system integrated sets of seed plant chloroplast and mitochondrial proteins. Hits were only retained if the minimum percentage of identity to the reference protein was above 75% and the minimum percentage of coverage of the reference protein was above 50%. Finally, we used MAFFT to align the recovered loci and ClipKIT to trim (i.e. remove) gappy columns where the missing data exceeded 90% as well as exceptionally short sequences that were shorter than 40% of the average locus length they were assigned to, both integrated in the 'captus_assembly align' option. We used a paralogue filtering approach integrated in the CAPTUS pipeline that identifies orthologoues sequences as those being the most similar to the reference sequence. More advanced orthologue/paralogue identification pipelines were used on a reduced dataset and retrieved almost identical results that did not influence either the interpretation of the phylogenetic tree or species identification reliability (data not shown).

Phylogenetic data

The phylogenetic analyses shows that *Tecticornia* is a monophyletic genus (meaning all of its species group together in one large clade and representatives from other genera are excluded) (Figure 13). Outgroup species (not shown) include representatives from the genus *Salicornia* (including the former genus *Sarcocornia*), which placed sister to *Tecticornia*, confirming it as the closest relative. This is consistent with previous molecular studies based on sanger sequencing of smaller spacer regions with small datasets of about 1000 nucleotides (Shepherd *et al.* 2004, Dakin 2021). While these studies confirmed *Tecticornia* as monophyletic relationships among species remained unclear. In contrast, the target enrichment approach using custom baits in this study generated a massive matrix of 485 loci spanning over 500,000 nucleotides, providing enough resolution power to reliably differentiate between individual species and subspecies.

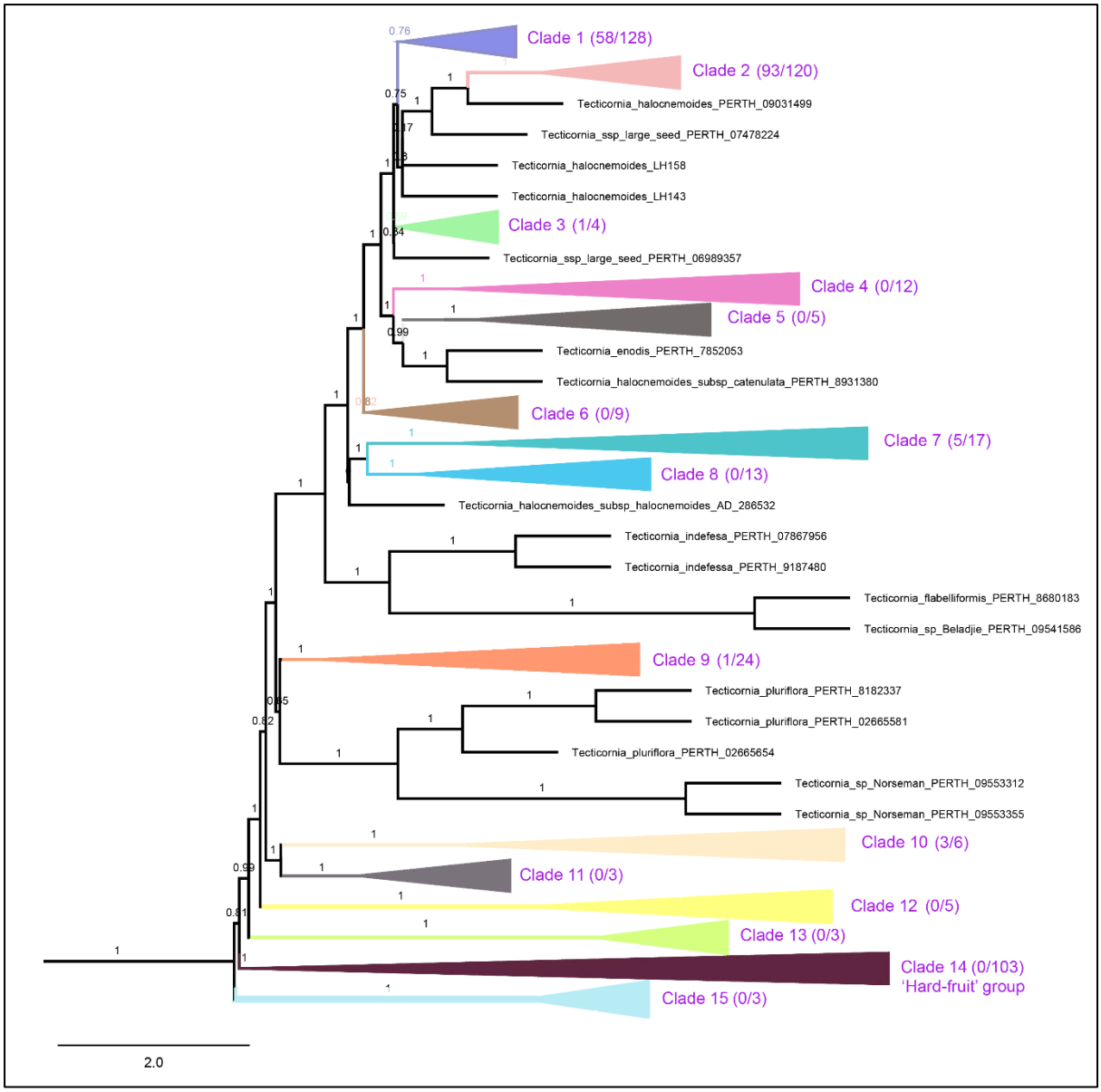
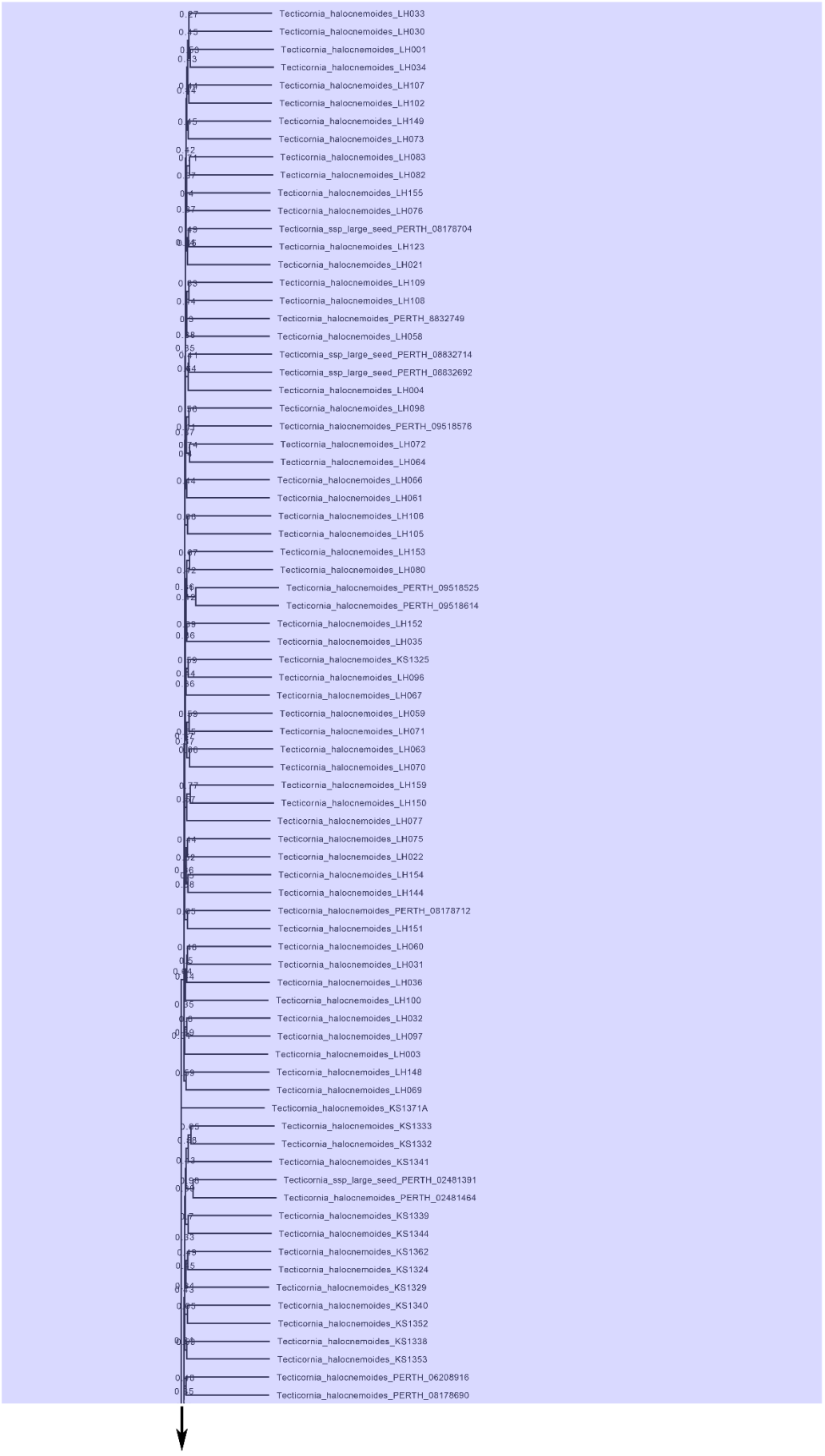


Figure 13. Summary *Tecticornia* phylogenetic tree focusing on the 'soft-fruit' group (Clade 14 is the 'hard-fruited' clade representing 103 accessions and multiple well-supported subclades representing different species). All major clades are collapsed, with colours corresponding to subclades that are expanded in full in Figure 14 (and denoted in Appendix 1). For each collapsed clade the total number of ESSP samples/total number of samples in each subclade are given in brackets. Numbers above branches represent local posterior probabilities, ranging from 0 (not supported) to 1 (fully supported).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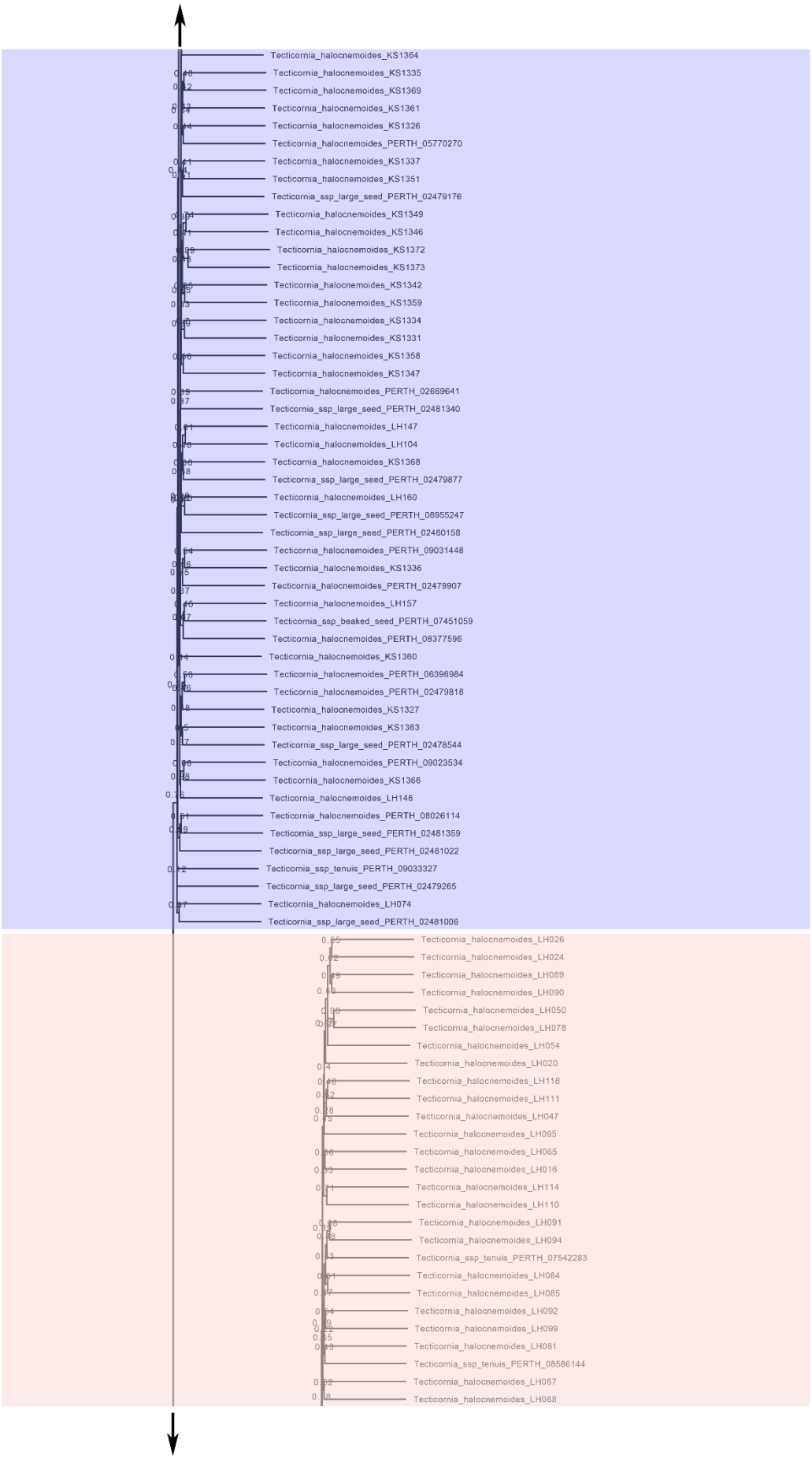
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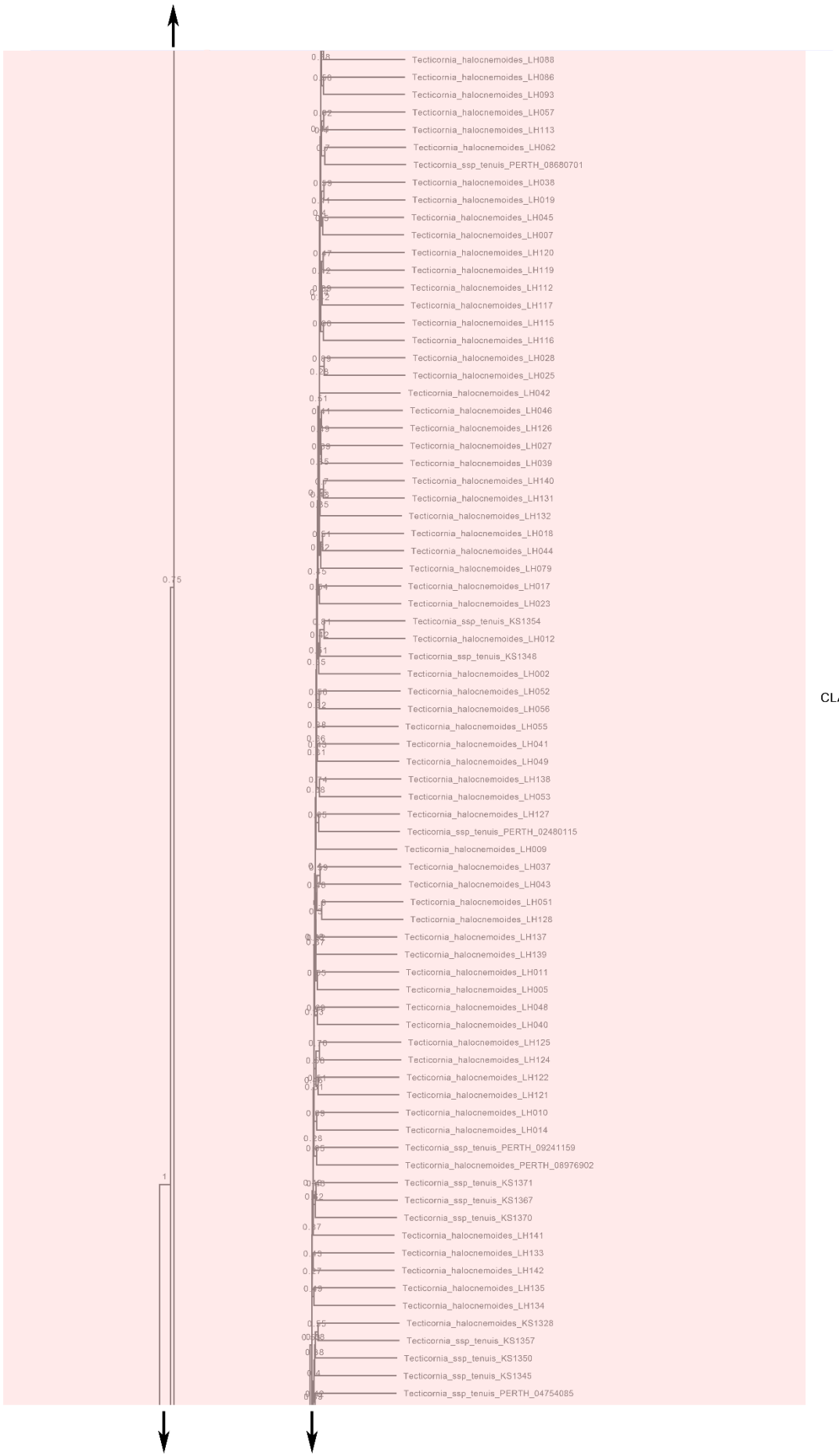
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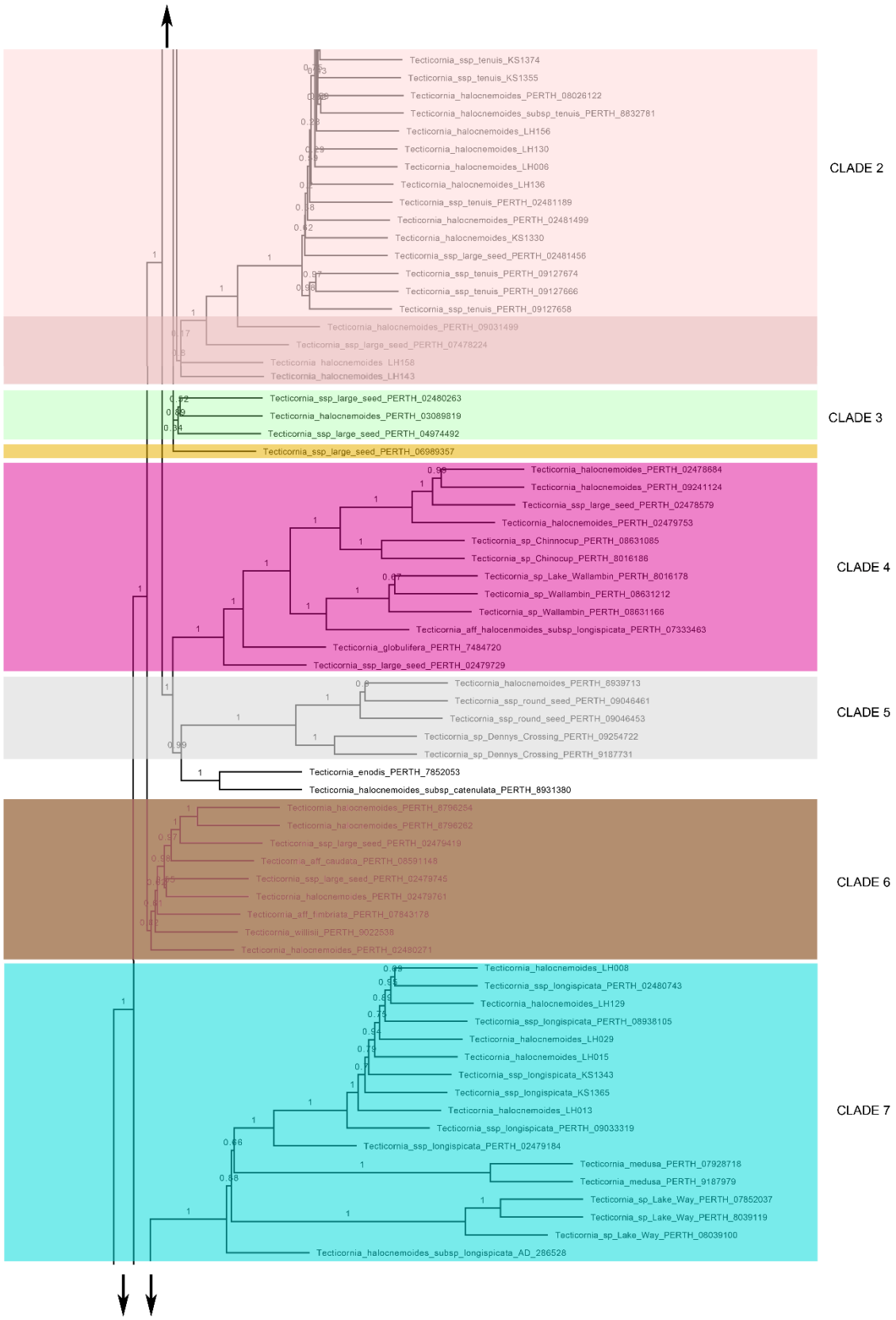
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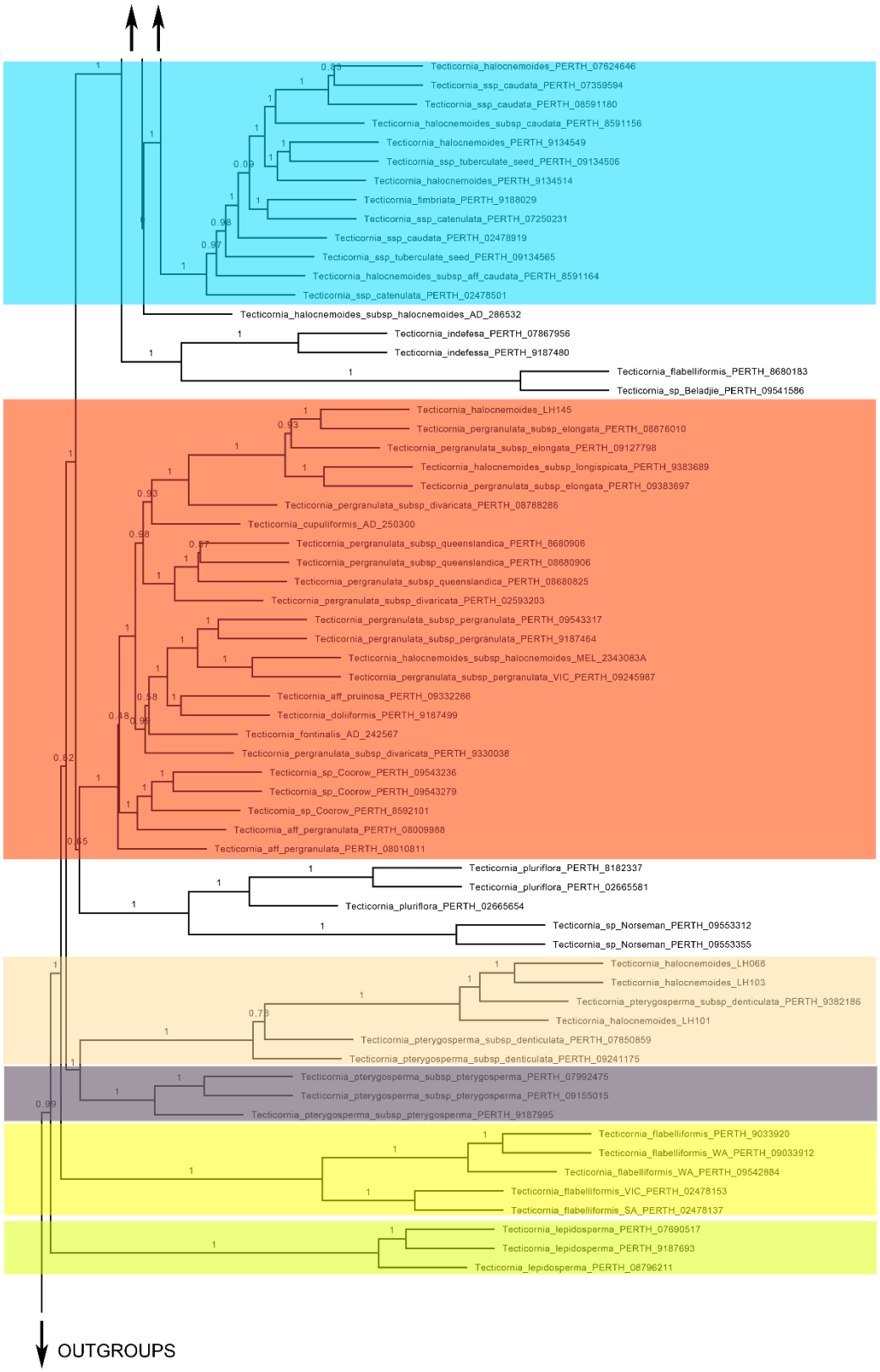
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CLADE 13
OUTGROUPS

Figure 14. *Tecticornia* phylogenetic tree including all specimens sequenced during this study (voucher information in Appendix 1) as well as samples sequenced for a prior Genomics for Australian Plants project (vouchers not included in Appendix 1). 103 samples from the 'hard-fruited' clade and outgroups are excluded. The numbers above branches represent local posterior probabilities, ranging from 0 (not supported) to 1 (fully supported). Clade colours correspond to collapsed subclades in Figure 13 and in Appendix 1.

Clade 1 – *Tecticornia* sp. nov. 'large ovate seed'

Focusing on taxa of interest, Clade 1 includes accessions of a potentially new unnamed species *Tecticornia* sp. nov. 'large ovate seed' (Figures 13 & 14). This clade represents the largest number of samples in this study, with a significant number of samples collected on the ESSP site, but this taxon was present off site and is widespread along the Pilbara coast from Carnarvon to Derby (Figures 15 and 16), so it is not likely to be a taxon of conservation concern.

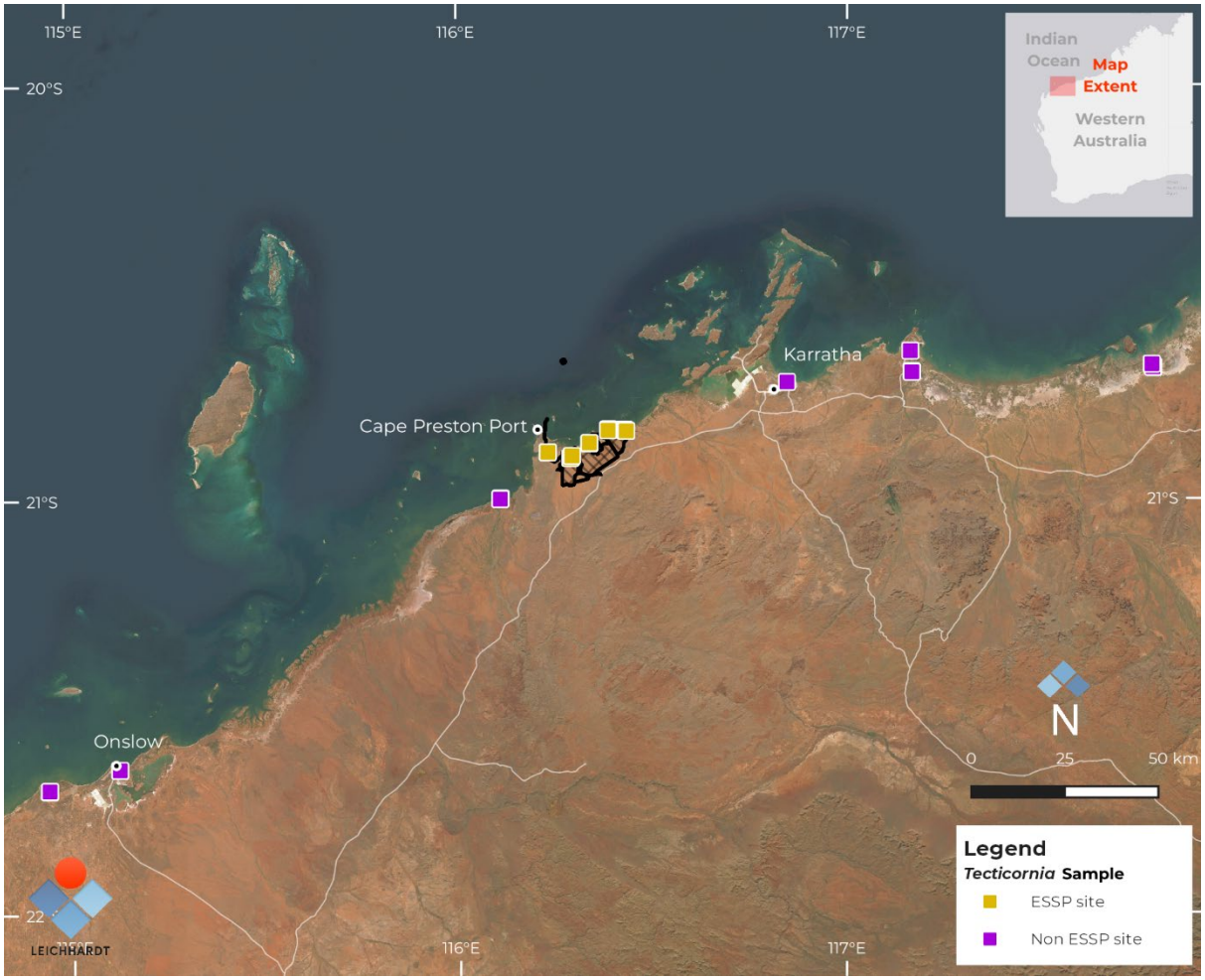

Figure 15. Distribution of *Tecticornia* Clade 1 taxon, a potentially new undescribed species *T.* sp. nov. 'large ovate seed' sampled during the study (sample number prefix 'LH') on the ESSP site (■) and to the north and south of the site (■).

Figure 16. Distribution of *Tecticornia* Clade 1 taxon, a potentially new undescribed species *T.* sp. nov. 'large ovate seed' (■), based on samples included in this study currently lodged in the Western Australian Herbarium (see Appendix 1).

There is some variation evident in the morphology of the habit and seeds of this taxon (Appendix 2). Overall, the vegetative articles are short, and have a dull epidermis (i.e. not glossy), and the apex of the individual articles often have a tiny apiculus (point) (e.g. KS 1352 – last image). The fruiting inflorescences are short (3 to 7 nodes long), dull grey or fawn, and the individual fruitlets extend beyond the edge of the subtending bracts (e.g. KS 1371A). The seeds are more variable than expected within this group. They range from 0.9–1.3 mm long and are dark brown, black or dark reddish brown in colour, ovate to elliptic in shape, with a beak (e.g. KS 1338) or without (e.g. KS 1329). The ornamentation on the outer surface is also variable but generally the sides of the seeds are smooth with 3 or more small rows of tiny bumps on the outer margin (e.g. KS 1339), which are sometimes simply fused faint rows on the outer margin and the tiny bumps are not always obvious (e.g. KS 1349, KS 1358).

Clade 2 – *Tecticornia halocnemoides* subsp. *tenuis* group

The large core group of Clade 2 represents *T. halocnemoides* subsp. *tenuis* (Figures 13 & 14, Appendix 3). It is apparent there is some genetic variation in this group, as towards the base of this clade (darker shading at the base of Clade 2 and labelled Clade 2A in Appendix 1 and Appendix 4) represented by samples *Tecticornia halocnemoides* (PERTH 09031499), *Tecticornia* 'ssp large seed' (PERTH 07478224), *Tecticornia halocnemoides* (LH158) and *Tecticornia halocnemoides* (LH143) are genetically divergent

from core Clade 2. Further taxonomic investigation is needed to understand this unresolved grade towards the base of Clade 2 to confirm if there are any morphological differences that correspond to the observed genetic variation in this group (identified as 'aff. *T. halocnemoides* subsp. *tenuis*' in Appendix 1). *Tecticornia* 'ssp large seed' (PERTH 07478224) is from the Burrup Peninsular and does have larger seeds than typical *T. halocnemoides* subsp. *tenuis* of core Clade 2 (Appendix 3). The PERTH 09031499 specimen is from the Sandalwood Island in the Exmouth Gulf, while *Tecticornia halocnemoides* LH143 and LH158 samples are from north of Balla Balla and Point Sampson respectively. Some or all of these accessions across this unresolved grade may also represent hybrids. If any of these samples are a potentially new taxon (or taxa) divergent from typical *T. halocnemoides* subsp. *tenuis*, they are not present on the ESSP site so would not be impacted by any development in the immediate area.

Morphologically, *T. halocnemoides* subsp. *tenuis* in the core Clade 2 (Appendix 3) plants are quite similar in general appearance to specimens in Clade 1, with both groups having short vegetative articles, many of which have a tiny apiculus (point). However, the article epidermis of plants in the *T. halocnemoides* subsp. *tenuis* in Clade 2 is often quite glossy rather than dull. Also, the outer face of the bracts in the flowering inflorescences can be rounded, appearing to bulge slightly outwards (e.g. LH044) and the apex of the flowers are exposed (e.g. KS 1357, KS 1345). The fruiting inflorescences range from 3 to 15 nodes long, are pale fawn colour when dry, and the individual fruitlets extend beyond the edge of the subtending bracts (e.g. LH020, KS 1348, KS 1367). The seeds are relatively consistent, especially compared to the variation observed in samples across Clade 1. The seeds range in size from 0.8–0.9 mm long and are reddish brown to dark reddish brown, round, with an obvious beak (e.g. KS 1328). The ornamentation covers the outer surface of the seed and consists of small bumps or short papillae ('finger-like' projections), particularly on the outer margin of the seed.

Based on this study and other ongoing research, it is apparent that each of the subspecies of *Tecticornia halocnemoides* do not group together as expected if they were all subspecies of a single species. It is evident that each of the subspecies of *T. halocnemoides* are more closely related to other species of *Tecticornia* then to other *T. halocnemoides*. Consequently, each of the subspecies should be recognised as distinct species in their own right. In most cases the name of the subspecies can be used as the specific epithet (the second part of the Latin binomial name), so *T. halocnemoides* subsp. *catenulata* could be renamed as *T. catenulata*. However, in the case of *T. halocnemoides* subsp. *tenuis*, there is already a species of *T. tenuis* recognised in the genus, which is morphologically and genetically well-characterised and placed outside of *T. halocnemoides* in the 'hard-fruited clade'. So, this *T. halocnemoides* subspecies would require a completely new Latin name for the specific epithet.

Clades 3 to 6 – *Tecticornia halocnemoides s.l.* and allied phrase-named species

Clades 3 to 6 represent significant morphological variation but do not include any representatives from the ESSP site. Many specimens also included in the *T. halocnemoides* 'large ovate seed' aggregate are present in Clades 3, 4, and 6 (Figure 14), supporting the hypothesis that this broad aggregate likely includes several genetically distinct species. Clade 4 also includes representatives of the phrase named taxa *T.* sp. Lake Wallambin (K.A. Shepherd KS 1157) and *T.* sp. Chinocup (K.A. Shepherd KS 1191), as well as *T. globulifera*, a priority 1 species from inland Pilbara and the Great Sandy Desert (Shepherd and van Leeuwen 2011).

Clade 5 includes the phrase-named *T.* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) and another potentially new taxon informally tagged as *T.* sp. nov. 'round seed aggregate', which placed sister to the recently described *T. enodis* (Shepherd 2020) and a sample of *T. halocnemoides* subsp. *catenulata* that is apparently very genetically distinct from other samples of this subspecies present

in Clade 8 (see below). Clade 6 represents another very morphologically complex group and the recently described *T. willisii* (Shepherd 2018).

Clade 7 – *Tecticornia halocnemoides* subsp. *longispicata*

The main subclade of Clade 7 includes several 'LH' specimens from the ESSP site collected in December 2023. These samples group together with known collections of *Tecticornia halocnemoides* subp. *longispicata* and are identified as such. This well supported clade placed sister to a clade including representatives of *T. medusa*, a Priority 3 species from the Pilbara first discovered on Fortescue Marsh (Shepherd and van Leeuwen 2011) (Figure 14). Other subclades include samples of the phrase-named species *T.* sp. Lake Way (P. Armstrong 05/961) and a sample of *T. halocnemoides* subp. *longispicata* (AD 286528) from South Australia, which may represent a distinct species.

Tecticornia halocnemoides subp. *longispicata* is morphologically distinct within *T. halocnemoides* (Appendix 5) due to its bright green articles, which are longer and wider than other subspecies (e.g. LH129, KS 1343), glossy, and without an apiculus at the apex. The inflorescences are usually much longer (15 – 35 nodes long) than in other *T. halocnemoides* species. The seeds are of similar size to taxa in Clade 1 being 1 – 1.2 mm long, but they are light brown to brown in colour and are usually without an obvious beak. The sides of the seeds are also smooth with 4 to 5 ridges of small bumps on the outer margin.

It is evident that *T. halocnemoides* subp. *longispicata* requires further taxonomic investigation to confirm the distinctiveness of the South Australian taxon; however, the typical form of this subspecies has a widespread distribution. So, while it is present on the ESSP site (e.g. LH008, LH013, LH015, LH029 and LH129), it is not considered to be a taxon of conservation concern.

Clade 8 – *Tecticornia halocnemoides* subsp. *caudata*, subsp. *catenulata s.l.* and allied species

Clades 8 represent significant morphological variation across the *T. halocnemoides s.l.* group including representatives of subsp. *catenulata* and subsp. *caudata* but does not include any specimens from the ESSP site. This is a taxonomically very complex clade that also includes samples from the *T. halocnemoides* 'tuberculate seed' group, as well as typical *T. fimbriata*; a Priority 3 species from east of Geraldton. A single specimen of *T. halocnemoides* subsp. *halocnemoides* from South Australia (AD 286532) placed sister to this clade and its true identity remains elusive until a more comprehensive sampling of South Australian *T. halocnemoides* subsp. *halocnemoides* is conducted.

Tecticornia indefessa a mat-like Priority 2 species from near the south coast of Western Australia (Shepherd 2007) is placed sister to two samples collected from the same population on Lake Beladjie (*T. flabelliformis* PERTH 8680183 and sp. Lake Beladjie 09541586), which is supported as a distinct species (and is also morphologically very distinct) and should be named as a new, narrow range species likely with a Priority 1 conservation status, as it is currently only known from a single population. Neither of these clades occur on the ESSP site.

Clade 9 – *Tecticornia pergranulata* and allied species

Clade 9 includes several subclades, each likely representing one or more distinct species across the *T. pergranulata s.l.* group; however, it has been retained here as a broad group to simplify this discussion. Samples in the first subclade include an accession that was collected during this study north of the ESSP site near Point Sampson and in the field determined as *T. halocnemoides* LH145. However, upon genomic analysis we redetermined it as *T. pergranulata* subsp. *elongata* (Appendix 6). This specimen has glaucous blueish green to pale pink articles, and long, narrow inflorescences where the fruiting

articles do not extend beyond the subtending bracts (so the outline appears smooth and cylindrical). When ripe, we anticipate it will have dark brown to black seeds with distinct rows of tight round bumps over the entire surface consistent with other collections of this subspecies. *Tecticornia pergranulata* subsp. *elongata* is widely distributed across Western Australia, South Australia, the Northern Territory and Queensland, and is as such not a subspecies of conservation concern (https://avh.ala.org.au/occurrences/search?taxa=Tecticornia+pergranulata+subsp.+elongata#tab_mapView).

There is a lot of complexity in Clade 9 as entities previously identified as *T. pergranulata* subsp. *divaricata* do not group together, so may represent multiple distinct taxa. Although a more comprehensive sampling is required to definitively ascertain the species identity of *T. pergranulata* subsp. *pergranulata* and *T. pergranulata* subsp. *queenslandica*, it appears that these two (sub)species concepts are valid for the time being, pending formal elevation to the species level. This clade also includes the widespread WA species *T. doliiformis*, and non-WA species *T. cupuliformis* and *T. fontinalis* from Central Australia. The final subclade includes representatives of the potentially new taxon *T.* sp. Coorow (P.G. Wilson 12750), a Priority 1 taxon currently only known from Lake Kobbabie in the Acon Wheatbelt. However, neither of these occur on the ESSP site.

Sister to this larger group is a subclade including representatives of *T. pluriflora*, a species from Central Australia that is closely related to a potentially new species that is currently informally named *T.* 'sp. Norseman' on Clade 15. This potentially new taxon has not yet been phrase-named. It is currently only known from a single salt lake and therefore likely to be recognised as a Priority 1 species of conservation concern and is a priority to name and describe. Again, neither of these species are present on the ESSP site.

Clades 10 and 11 – *Tecticornia pterygosperma s.l.*

Clade 10 includes representatives of *Tecticornia pterygosperma* subsp. *denticulata*, so the specimen from the ESSP site (LH068) and off site (LH103 and LH101) can be identified as this subspecies (Appendix 7). This subshrub has wide inflorescences that when dry have a pale fawn colour, and the vegetative articles and bracts have a ciliate (fringed) margin. This subspecies has pale cream seeds with intricate rows of short spines that are united towards the base. It is apparent there is some genetic structuring in Clade 10 with the LH068, LH103 and LH101 samples grouping together with PERTH 0932186 but it is unclear if this variation represents more than one taxon. The ESSP LH068 sample is the same taxon as samples collected northwards at Point Sampson (LH103 and LH101) as well as from Babbage Island near Carnarvon (PERTH 09382186). So, even if eventually recognised as something distinct, it is widespread and therefore would likely not represent a taxon of conservation concern.

Clade 11 includes representatives of the typical subspecies of *T. pterygosperma*, which is also widespread from Carnarvon extending south and eastwards with populations present in South Australia, Victoria and New South Wales. This subspecies is similar to *T.* subsp. *denticulata* but the margins of the articles and bracts are entire and the white seeds have scale-like ribs. While more taxonomic work is required on this group, dense sampling revealed no plants of this subspecies to occur on the ESSP site.

Clades 12 and 13 – *Tecticornia flabelliformis* and *T. lepidosperma*

Clade 12 includes two subclades that are split between the Western Australian populations of *T. flabelliformis* from around Kalgoorlie and the non-WA specimens of this species from Victoria and South Australia. Further taxonomic work on this group is required to confirm if this divergence is due

to genetic isolation between these populations or if there are also corresponding morphological differences, which would suggest they could represent two distinct taxa.

Clade 13 represents *T. lepidosperma*, another widespread species with disjunct distribution in Western Australia and South Australia. Only WA samples of this species were included in this study, so it is unclear if the non-WA populations are genetically disjunct as observed in other groups. No samples of this subspecies seem to occur on the ESSP site.

Efficacy of the molecular methods

Despite seven (of 288) samples failing the AGRF DNA concentration test and 257 (of 288) failing the DNA quality test (Table 5), only one sample (PERTH 02478331) failed to sequence altogether. The DNA concentration for this sample was the second lowest recorded (5.40 ng/ul); however, it is noteworthy that the PERTH 02480271 sample with the lowest DNA concentration (4.40 ng/ul) successfully sequenced. This suggests that AGRFs quality control levels are very conservative, and it is recommended that future projects should proceed with sequencing if DNA concentrations are above 4.40–5.40 ng/ul.

Genetic structuring was observed across the phylogeny with supported subclades recovered, which by and large appear to represent consistent morphological groups. This suggests that going forward, bait capture sequencing using the custom 'SaliBaits' kit may be a very effective tool in identifying specimens of *Tecticornia* even if the material is sterile. However, while this method is still relatively expensive when costs are extrapolated down to a single specimen, its potential for maintaining high accuracy in genetic characterisation of species persists. Thus, we believe that in time we can optimise this approach to become more cost effective in the future, particularly as accuracy will continue to increase with the addition of further sequence data over time and the recognition of unnamed new taxa.

Conclusions

Target enrichment bait capture using bespoke 'Salibaits' has been shown to be an appropriate method for genetically discriminating between different species and subspecies of *Tecticornia*, visualised via a phylogenetic tree. Phylogenetic analyses also confirm the presence of many well supported subclades, which may represent potentially new taxa across the genus.

This study was undertaken to confirm if:

a) known *Tecticornia* species are present and restricted to the ESSP site only;
b) known *Tecticornia* species are present on both the ESSP site and elsewhere;
c) potentially new, undescribed *Tecticornia* taxa are present and restricted to the ESSP site only;
d) potentially new, undescribed *Tecticornia* taxa are present on both the ESSP site and elsewhere.

Our results demonstrate that none of the currently known species of *Tecticornia* are restricted to the ESSP site only, confirming that all known species present on the proposed footprint, also occur elsewhere (Aim b). The large numbers of samples of the potentially new undescribed taxon Clade 1 *T.* sp. nov. 'large ovate seed' sequenced in this study confirm that this taxon is present on both the ESSP site (Figure 15) and elsewhere (Aim d), having a widespread distribution along the coast from Carnarvon to Derby (Figure 16). Similarly, the genetically divergent subclade of *Tecticornia pterygosperma* subsp. *denticulata* includes a sample from the ESSP site (LH068), which is genetically similar to samples with a widespread distribution from near Carnarvon to Point Sampson. If further

research supports this subclade as morphologically distinct and warrants taxonomic recognition, it represents another potentially new, undescribed *Tecticornia*, which is present on both the ESSP site and elsewhere (aim d).

Significant further morphological and molecular work is required to resolve the taxonomic status of many potentially new taxa across *Tecticornia* (including many within the 'hard-fruited clade'), which if supported as distinct need to be named and described in detail. By naming and describing species their distribution and conservation status can be more accurately assessed.

It is evident that the target enrichment bait capture method can provide a more accurate assessment of the true biodiversity present across samphire vegetation types in saline habitats across Australia, with the potential of identifying sterile material and helping to confirm the genetic distinctiveness of potentially new species. In future, this could offer a means to identify samphires accurately and confidently without requiring specialist knowledge.

Acknowledgements

Leichhardt staff Regina Flugge, Lisa Carswell, Billy McKee, and Alan Kerr are gratefully acknowledged for providing logistics and field support to undertake sample collections in the Pilbara, and Sam Wilson for producing maps used in various figures. Professor Stephen van Leeuwen, Natalie Mippy and staff at Curtin university are thanked for administrative and contract support as are DBCA staff Dr John Huisman, Dr Carl Gosper and Sandy Grose. Western Australian Herbarium (DBCA) curation staff and volunteers are also thanked for mounting and databasing herbarium specimens. Professor Gudrun Kadereit and Dr Diego Morales-Brionesand at Ludwig Maximilian University of Munich are acknowledged for their development of the custom 'Salibaits' for target enrichment bait capture. AGRF staff Kelsey Maloney, Shan Zong and Dr David Chandler (Node Manager, Perth) are also thanked for their patience and prompt responses to queries.

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Appendix 1. *Tecticornia* samples included in this study for DNA sequencing, excluding samples previously sequenced in a prior Genomics for Australian Plants study. Sample numbers with an 'LH' prefix were collected in December 2023 as part of the Leichhardt Eramurra Solar Salt Project (ESSP), samples LH001–LH080 were from the project site, samples LH081–LH160 were collected north and south of the ESSP; sample numbers with a 'KS' prefix were collected by Kelly A. Shepherd in 2009 from near Port Hedland; sample numbers with a 'PP' prefix represent various specimens from the *Tecticornia halocnemoides* complex currently lodged at the Western Australian Herbarium (PERTH) first column numbers and colours correspond to subclades in Figures 13 and 14; 'F' sample failed to sequence, 'ns' sample not sequenced. GPS datum GDA94.

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
1	LH001	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89119444	116.23081	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH001	4/12/23		T. sp. nov. 'large ovate seed'
1	LH003	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89108333	116.23017	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH003	4/12/23		T. sp. nov. 'large ovate seed'
1	LH004	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89113889	116.23108	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH004	4/12/23		T. sp. nov. 'large ovate seed'
1	LH021	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90527778	116.28867	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH021	4/12/23		T. sp. nov. 'large ovate seed'
1	LH022	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90530556	116.28881	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH022	4/12/23		T. sp. nov. 'large ovate seed'
1	LH030	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90080556	116.29244	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH030	4/12/23		T. sp. nov. 'large ovate seed'
1	LH031	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90041667	116.29275	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH031	4/12/23		T. sp. nov. 'large ovate seed'
1	LH032	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.9	116.29286	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH032	4/12/23		T. sp. nov. 'large ovate seed'
1	LH033	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86983333	116.33731	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH033	4/12/23		T. sp. nov. 'large ovate seed'
1	LH034	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86986111	116.33758	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH034	4/12/23		T. sp. nov. 'large ovate seed'

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
1	LH035	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86963889	116.33778	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH035	4/12/23		T. sp. nov. 'large ovate seed'
1	LH036	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86875	116.33767	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH036	4/12/23		T. sp. nov. 'large ovate seed'
1	LH058	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83680556	116.42769	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH058	5/12/23		T. sp. nov. 'large ovate seed'
1	LH059	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83716667	116.42697	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH059	5/12/23		T. sp. nov. 'large ovate seed'
1	LH060	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83691667	116.42608	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH060	5/12/23		T. sp. nov. 'large ovate seed'
1	LH061	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83883333	116.42778	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH061	5/12/23		T. sp. nov. 'large ovate seed'
1	LH063	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83944444	116.43197	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH063	5/12/23		T. sp. nov. 'large ovate seed'
1	LH064	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83991667	116.43261	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH064	5/12/23		T. sp. nov. 'large ovate seed'
1	LH066	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83705556	116.38744	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH066	5/12/23		T. sp. nov. 'large ovate seed'
1	LH067	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83694444	116.38778	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH067	5/12/23		T. sp. nov. 'large ovate seed'
1	LH069	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83697222	116.38764	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH069	5/12/23		T. sp. nov. 'large ovate seed'
1	LH070	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83677778	116.38825	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH070	5/12/23		T. sp. nov. 'large ovate seed'
1	LH071	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83619444	116.38794	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH071	5/12/23		T. sp. nov. 'large ovate seed'
1	LH072	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83627778	116.38767	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH072	5/12/23		T. sp. nov. 'large ovate seed'
1	LH073	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83638889	116.38694	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH073	5/12/23		T. sp. nov. 'large ovate seed'

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
1	LH074	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83641667	116.38669	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH074	5/12/23		T. sp. nov. 'large ovate seed'
1	LH075	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83647222	116.38639	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH075	5/12/23		T. sp. nov. 'large ovate seed'
1	LH076	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83680556	116.38614	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH076	5/12/23		T. sp. nov. 'large ovate seed'
1	LH077	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83766667	116.38561	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH077	5/12/23		T. sp. nov. 'large ovate seed'
1	LH080	halocnemoides	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83847222	116.38567	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH080	5/12/23		T. sp. nov. 'large ovate seed'
1	LH082	halocnemoides	Onslow area	-21.65247222	115.12211	A. Zerdoner Čalasan & B. McKee	LH082	6/12/23		T. sp. nov. 'large ovate seed'
1	LH083	halocnemoides	Onslow area	-21.65219444	115.12217	A. Zerdoner Čalasan & B. McKee	LH083	6/12/23		T. sp. nov. 'large ovate seed'
1	LH096	halocnemoides	near mouth of Ashburton River	-21.70261111	114.94	A. Zerdoner Čalasan & B. McKee	LH096	6/12/23		T. sp. nov. 'large ovate seed'
1	LH097	halocnemoides	near mouth of Ashburton River	-21.70133333	114.93989	A. Zerdoner Čalasan & B. McKee	LH097	6/12/23		T. sp. nov. 'large ovate seed'
1	LH098	halocnemoides	near mouth of Ashburton River	-21.70144444	114.93989	A. Zerdoner Čalasan & B. McKee	LH098	6/12/23		T. sp. nov. 'large ovate seed'
1	LH100	halocnemoides	near mouth of Ashburton River	-21.70130556	114.94011	A. Zerdoner Čalasan & B. McKee	LH100	6/12/23		T. sp. nov. 'large ovate seed'
1	LH102	halocnemoides	Fortescue River Rd, Mardie	-21.00211111	116.10872	A. Zerdoner Čalasan & B. McKee	LH102	6/12/23		T. sp. nov. 'large ovate seed'
1	LH104	halocnemoides	Fortescue River Rd, Mardie	-21.00205556	116.10872	A. Zerdoner Čalasan & B. McKee	LH104	6/12/23		T. sp. nov. 'large ovate seed'
1	LH105	halocnemoides	Fortescue River Rd, Mardie	-21.00183333	116.10856	A. Zerdoner Čalasan & B. McKee	LH105	6/12/23		T. sp. nov. 'large ovate seed'

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
1	LH106	halocnemoides	Fortescue River Rd, Mardie	-21.00291667	116.10833	A. Zerdoner Čalasan & B. McKee	LH106	6/12/23		T. sp. nov. 'large ovate seed'
1	LH107	halocnemoides	Fortescue River Rd, Mardie	-21.00319444	116.10822	A. Zerdoner Čalasan & B. McKee	LH107	6/12/23		T. sp. nov. 'large ovate seed'
1	LH108	halocnemoides	Fortescue River Rd, Mardie	-21.00336111	116.10808	A. Zerdoner Čalasan & B. McKee	LH108	6/12/23		T. sp. nov. 'large ovate seed'
1	LH109	halocnemoides	Fortescue River Rd, Mardie	-21.0035	116.10794	A. Zerdoner Čalasan & B. McKee	LH109	6/12/23		T. sp. nov. 'large ovate seed'
1	LH123	halocnemoides	Karratha	-20.7225	116.84553	A. Zerdoner Čalasan & B. McKee	LH123	7/12/23		T. sp. nov. 'large ovate seed'
1	LH144	halocnemoides	Point Samson	-20.64677778	117.16258	A. Zerdoner Čalasan & B. McKee	LH144	7/12/23		T. sp. nov. 'large ovate seed'
1	LH146	halocnemoides	Point Samson	-20.69644444	117.16553	A. Zerdoner Čalasan & B. McKee	LH146	7/12/23		T. sp. nov. 'large ovate seed'
1	LH147	halocnemoides	Point Samson	-20.69625	117.16572	A. Zerdoner Čalasan & B. McKee	LH147	7/12/23		T. sp. nov. 'large ovate seed'
1	LH148	halocnemoides	Point Samson	-20.69722222	117.16653	A. Zerdoner Čalasan & B. McKee	LH148	7/12/23		T. sp. nov. 'large ovate seed'
1	LH149	halocnemoides	Point Samson	-20.69763889	117.16661	A. Zerdoner Čalasan & B. McKee	LH149	7/12/23		T. sp. nov. 'large ovate seed'
1	LH150	halocnemoides	Point Samson	-20.698	117.16636	A. Zerdoner Čalasan & B. McKee	LH150	7/12/23		T. sp. nov. 'large ovate seed'
1	LH151	halocnemoides	N of Balla Balla	-20.68494444	117.78675	A. Zerdoner Čalasan & B. McKee	LH151	7/12/23		T. sp. nov. 'large ovate seed'
1	LH152	halocnemoides	N of Balla Balla	-20.68452778	117.78669	A. Zerdoner Čalasan & B. McKee	LH152	7/12/23		T. sp. nov. 'large ovate seed'
1	LH153	halocnemoides	N of Balla Balla	-20.68416667	117.78689	A. Zerdoner Čalasan & B. McKee	LH153	7/12/23		T. sp. nov. 'large ovate seed'
1	LH154	halocnemoides	N of Balla Balla	-20.68361111	117.78661	A. Zerdoner Čalasan & B. McKee	LH154	7/12/23		T. sp. nov. 'large ovate seed'

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
1	LH155	halocnemoides	N of Balla Balla	-20.68386111	117.78567	A. Zerdoner Čalasan & B. McKee	LH155	7/12/23		T. sp. nov. 'large ovate seed'
1	LH157	halocnemoides	N of Balla Balla	-20.6765	117.78225	A. Zerdoner Čalasan & B. McKee	LH157	7/12/23		T. sp. nov. 'large ovate seed'
1	LH159	halocnemoides	N of Balla Balla	-20.67702778	117.78189	A. Zerdoner Čalasan & B. McKee	LH159	7/12/23		T. sp. nov. 'large ovate seed'
1	LH160	halocnemoides	N of Balla Balla	-20.67672222	117.78278	A. Zerdoner Čalasan & B. McKee	LH160	7/12/23		T. sp. nov. 'large ovate seed'
1	KS 1324	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327417	118.63442	K.A. Shepherd & T.A. Edwards	KS 1324	2/12/09	9662693	
1	KS 1325	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327361	118.63439	K.A. Shepherd & T.A. Edwards	KS 1325	2/12/09	9662731	
1	KS 1326	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327361	118.63439	K.A. Shepherd & T.A. Edwards	KS 1326	2/12/09	9662782	
1	KS 1327	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327417	118.6345	K.A. Shepherd T.A. Edwards	KS 1327	2/12/09	9662820	
1	KS 1329	halocnemoides	Road 7 works, BHP Nelson Point site, Port Hedland	-20.316361	118.61806	K.A. Shepherd, T.A. Edwards & B. Poole	KS 1329	3/12/09	9662928	
1	KS 1331	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327361	118.63469	K.A. Shepherd & T.A. Edwards	KS 1331	3/12/09	9663002	
1	KS 1332	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327389	118.63472	K.A. Shepherd & T.A. Edwards	KS 1332	3/12/09	9662936	
1	KS 1333	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327389	118.63475	K.A. Shepherd & T.A. Edwards	KS 1333	3/12/09	9663010	
1	KS 1334	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327389	118.63469	K.A. Shepherd & T.A. Edwards	KS 1334	3/12/09	9662979	
1	KS 1335	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327194	118.63439	K.A. Shepherd & T.A. Edwards	KS 1335	3/12/09	9662553	
1	KS 1336	halocnemoides	3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.327528	118.63403	K.A. Shepherd & T.A. Edwards	KS 1336	3/12/09	9662618	
1	KS 1337	halocnemoides	c. 3.3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.328889	118.63464	K.A. Shepherd & T.A. Edwards	KS 1337	3/12/09	9662650	
1	KS 1338	halocnemoides	c. 3.3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.328361	118.63514	K.A. Shepherd & T.A. Edwards	KS 1338	3/12/09	9662812	
1	KS 1339	halocnemoides	c. 3.3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.328361	118.63519	K.A. Shepherd & T.A. Edwards	KS 1339	3/12/09	9662855	

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1	KS 1340	halocnemoides	c. 3.3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-20.335806	118.63378	K.A. Shepherd & T.A. Edwards	KS 1340	3/12/09	9662901	
1	KS 1341	halocnemoides	c. 3.3 km S along BHP railway line from BHP Port Nelson site, Port Hedland	-202020.3363	118.63364	K.A. Shepherd & T.A. Edwards	KS 1341	3/12/09	9662952	
1	KS 1342	halocnemoides	4.97 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.330306	118.63531	K.A. Shepherd & T.A. Edwards	KS 1342	3/12/09	9662537	
1	KS 1344	halocnemoides	4.97 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.33025	118.6345	K.A. Shepherd & T.A. Edwards	KS 1344	3/12/09	9662588	
1	KS 1346	halocnemoides	4.21 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.323861	118.63197	K.A. Shepherd & T.A. Edwards	KS 1346	3/12/09	9662634	
1	KS 1347	halocnemoides	4.21 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.323917	118.63156	K.A. Shepherd & T.A. Edwards	KS 1347	3/12/09	9662677	
1	KS 1349	halocnemoides	4.21 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.320306	118.62669	K.A. Shepherd & T.A. Edwards	KS 1349	3/12/09	9662766	
1	KS 1351	halocnemoides	4.21 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.317389	118.61597	K.A. Shepherd & T.A. Edwards	KS 1351	3/12/09	9662804	
1	KS 1352	halocnemoides	1 km E along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.322833	118.59858	K.A. Shepherd & T.A. Edwards	KS 1352	3/12/09	9662847	
1	KS 1353	halocnemoides	1 km E along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.322861	118.59867	K.A. Shepherd & T.A. Edwards	KS 1353	3/12/09	9662898	
1	KS 1358	halocnemoides	0.3 km on Roche Rd from main road to Port Hedland near Redbank Bridge, then 1.9 km on Redbank St	-20.343083	118.61469	K.A. Shepherd & T.A. Edwards	KS 1358	4/12/09	9662995	
1	KS 1359	halocnemoides	0.3 km on Roche Rd from main road to Port Hedland near Redbank Bridge, then 1.9 km on Redbank St	-20.343139	118.61447	K.A. Shepherd & T.A. Edwards	KS 1359	4/12/09	9664556	
1	KS 1360	halocnemoides	0.3 km on Roche Rd from main road to Port Hedland near Redbank Bridge, then 2.4 km on Redbank St	-20.3435	118.61075	K.A. Shepherd & T.A. Edwards	KS 1360	4/12/09	9664599	
1	KS 1361	halocnemoides	0.3 km on Roche Rd from main road to Port Hedland near Redbank Bridge, then 2.4 km on Redbank St	-20.343556	118.61072	K.A. Shepherd & T.A. Edwards	KS 1361	4/12/09	9664580	
1	KS 1362	halocnemoides	0.3 km on Roche Rd from main road to Port Hedland near Redbank Bridge, then 1.1 km on Redbank St	-20.345167	118.61783	K.A. Shepherd & T.A. Edwards	KS 1362	4/12/09	9664629	
1	KS 1363	halocnemoides	0.6 km on Gray Rd from main road to Port Hedland from Great Northern Hwy	-20.33	118.64328	K.A. Shepherd & T.A. Edwards	KS 1363	4/12/09	9664726	
1	KS 1364	halocnemoides	0.6 km on Gray Rd from main road to Port Hedland from Great Northern Hwy	-20.329917	118.64342	K.A. Shepherd & T.A. Edwards	KS 1364	4/12/09	9664661	
1	KS 1366	halocnemoides	0.4 km from Cooke Point Drive along pipeline track parallel to main road to Port Hedland from Great Northern Hwy	-20.318167	118.62792	K.A. Shepherd & T.A. Edwards	KS 1366	4/12/09	9664777	
1	KS 1368	halocnemoides	Finucane Island, 0.8 km on road to boat ramp, Port Hedland	-20.302583	118.54869	K.A. Shepherd & T.A. Edwards	KS 1368	4/12/09	9662596	

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1	KS 1369	halocnemoides	Finucane Island, 0.8 km on road to boat ramp, Port Hedland	-20.302583	118.54869	K.A. Shepherd & T.A. Edwards	KS 1369	4/12/09	9662642	
1	KS 1371A	halocnemoides	1.2 km S on Wilsons Road from Roche Road, Sth Port Hedland	-20.355583	118.62394	K.A. Shepherd & T.A. Edwards	KS 1371A	4/12/09	9662774	
1	KS 1372	halocnemoides	1.2 km S on Wilsons Road from Roche Road, Sth Port Hedland	-20.355611	118.62403	K.A. Shepherd & T.A. Edwards	KS 1372	4/12/09	9662707	
1	KS 1373	halocnemoides	1.2 km S on Wilsons Road from Roche Road, Sth Port Hedland	-20.355611	118.62383	K.A. Shepherd & T.A. Edwards	KS 1373	4/12/09	9662790	
1	PP001	'large ovate seed aggregate'	Ca. 47 km SW of Dampier, 56.3 km SW of Karratha	-20.883023	116.32485	S. Findlay & M. Henson	ET013-4 col 2	19/09/2020	09518576	
1	PP004	halocnemoides	Broome. Dampier District	-17.95305556	122.24	S.W.L. Jacobs	8815	25/06/2002	06396984	
1	PP005	halocnemoides	Samphire 2 Site. Mandora Marsh area. IBRA: GSD	-19.75751618	121.3952	D. Duero, T. Handasyde & T. Willing	WES-4	15/10/1999	05770270	
1	PP006	halocnemoides	NE coast, Barrow Island [between K3 & L3]	-20.866666667	115.38333	D.W. Goodall	1235	1/07/1964	06208916	
1	PP007	halocnemoides	Samphire 2 Site, Mandora Marsh area (IBRA: GSD)	-19.75888889	121.39389	D. Duero, T. Handasyde & T. Willing	WES-4	15/10/1999	08026114	
1	PP009	halocnemoides	0.5 km N of Broome on North Coast Hwy	-17.966666667	122.23333	P.G. Wilson	12522	27/11/1986	02479818	
1	PP011	halocnemoides	Ca 25 km S of Vlaming Head on Yardie Creek Rd	-22.02972222	114.10333	A.S. George	6622	27/05/1965	02479907	
1	PP013	halocnemoides	North West Cape National Park, Mangrove Bay	-21.783333333	114.16667	J.Z. Weber	4954	4/10/1975	02669641	
1	PP014	halocnemoides	12.4 km SW of Onslow town site, 35 km E-SE of Serrurier Island and 31 km SE of Bessieres Island	-21.693222	115.00608	P. Hoffman & J. Fairhead	BES JCF 069	9/07/09	08377596	
1	PP015	halocnemoides	Pilbara coastline, ca 30 km N of CSI - Compressor Station 1, Mardie Station (at Apache pipeline)	-21.19556798	115.84746	V. Long	VL 2558 B-01	12/10/09	08178690	
1	PP016	'large ovate seed aggregate'	Ca. 39 km SW of Dampier, 48.9 km W of Karratha	-20.837837	116.38531	S. Findlay & M. Henson	ET004-3 col 1	17/09/2020	09518525	
1	PP017	'large ovate seed aggregate'	Ca. 39 km SW of Dampier, 48.9 km W of Karratha	-20.837837	116.38531	S. Findlay & M. Henson	ET004-3 col 2	17/09/2020	09518614	

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1	PP020	halocnemoides	Quadrat GIR - 104 on Sandalwood Peninsular in Giralia Station at S end of Exmouth Gulf	-22.49729562	114.23406	M. Maier	GIR 104 - 01	17/06/2004	07451059	
1	PP036	'large ovate seed aggregate'	North Island, Exmouth Gulf	-22.441667	114.14167	A.N. Start	ANS 573	10/11/1989	09031448	
1	PP040	tenuis	Vegetation Monitoring Plot 37, Barrow Island	-20.888361	115.38678	E.M. Mattiske & N.E. Casson	EM 20394	19/08/1993	09023534	
1	PP049	tenuis	In dry river bed of Salt Creek, 1.4 km W of Stromatolite Pool, Mandora Marsh / Walyarta Conservation Park Area.	-19.742168	121.52832	A. Markey & M. Caswell	MM 9858	5/09/2015	09033327	
1	PP053	halocnemoides	Black Rocks, Derby	-17.30333333	123.62333	V. Semeniuk	BR 6 a	/07/1975	02481006	
1	PP056	'large ovate seed aggregate'	SE margin of Lake Walyarta. Mandora Marsh / Walyarta Conservation Park Area.	-19.764222	121.37564	A. Markey & M. Caswell	MM 9705	1/09/2015	08832692	
1	PP057	'large ovate seed aggregate'	1.1 km ENE from Saunders Spring, Mandora Marsh / Walyarta Conservation Park Area.	-19.77912678	121.34865	A. Markey & M. Caswell	MM 9711	10/09/2015	08832714	
1	PP058	halocnemoides	Boat Harbour, Carnarvon	-24.88333333	113.66667	P.G. Wilson	12738	30/09/1987	02479265	
1	PP059	halocnemoides	Near Derby, Map ref. V 174006	-17.30333333	123.62333	V. Semeniuk	Bag 5	/07/1975	02481340	
1	PP060	halocnemoides	42 km from Exmouth on Yardie Creek Rd, Cape Range National Park	-22.3	113.81667	K.F. Kenneally	7311	26/07/1980	02481022	
1	PP062	halocnemoides	Derby	-17.3	123.61667	V. Semeniuk	28	20/08/1975	02481359	
1	PP064	halocnemoides	Cape Keraudren	-19.98333333	119.76667	A.S. George	14826	13/08/1977	02480158	
1	PP068	halocnemoides	8 km NE of Karratha	-20.71666667	116.91667	V. Semeniuk	s.n.	/09/1978	02479176	
1	PP069	halocnemoides	C. 5 km S of Port Hedland. Immediately W of Wedgefield Industrial Estate	-20.364333	118.56364	T. Edwards	ENV 200	19/08/2010	08955247	
1	PP070	halocnemoides	Near Exmouth on Rd to Mildura wreck; 1 mile from dunes	-21.93472222	114.12333	T. & J. Whaite	4205	27/09/1976	02479877	
1	PP071	halocnemoides	Purracumurra, S of Port Hedland	-20.31166667	118.59472	G. Craig	301 a	29/09/1981	02481391	

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1	PP073	halocnemoides	Purracumurra, S of Port Hedland	-20.31166667	118.59472	G. Craig	301/5	29/09/1981	02481464	
1	PP074	halocnemoides	"Purracumurra", S of Port Hedland	-20.31166667	118.59472	G. Craig	301	29/09/1981	02478544	
1	PP076	halocnemoides	Mardie Station, Pilbara coastline, ca 30 km N of Compressor Station 1 (CSI) at Apache pipeline	-21.21625574	115.85673	V. Long	VL 2558 B-03	12/10/09	08178712	
1	PP077	halocnemoides	Pilbara coastline, Mardie Station where Apache Pipeline crosses coastline and 30 km N of Compressor Station 1 (CSI), Mardie Station	-21.22340865	115.85909	V. Long	VL 2558 B-09	12/10/09	08178704	
2	LH002	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89102778	116.23047	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH002	4/12/23		T. halocnemoides subsp. tenuis
2	LH005	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89675	116.23508	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH005	4/12/23		T. halocnemoides subsp. tenuis
2	LH006	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89713889	116.235	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH006	4/12/23		T. halocnemoides subsp. tenuis
2	LH007	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89716667	116.23547	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH007	4/12/23		T. halocnemoides subsp. tenuis
2	LH009	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90586111	116.24061	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH009	4/12/23		T. halocnemoides subsp. tenuis
2	LH010	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90611111	116.24078	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH010	4/12/23		T. halocnemoides subsp. tenuis
2	LH011	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90669444	116.24094	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH011	4/12/23		T. halocnemoides subsp. tenuis
2	LH012	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90675	116.24147	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH012	4/12/23		T. halocnemoides subsp. tenuis
2	LH014	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90733333	116.24883	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH014	4/12/23		T. halocnemoides subsp. tenuis
2	LH016	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90761111	116.24883	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH016	4/12/23		T. halocnemoides subsp. tenuis
2	LH017	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90611111	116.28461	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH017	4/12/23		T. halocnemoides subsp. tenuis

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
2	LH018	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90611111	116.28478	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH018	4/12/23		T. halocnemoides subsp. tenuis
2	LH019	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90616667	116.28483	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH019	4/12/23		T. halocnemoides subsp. tenuis
2	LH020	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90633333	116.28453	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH020	4/12/23		T. halocnemoides subsp. tenuis
2	LH023	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90538889	116.28875	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH023	4/12/23		T. halocnemoides subsp. tenuis
2	LH024	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.9055	116.28847	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH024	4/12/23		T. halocnemoides subsp. tenuis
2	LH025	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89916667	116.28239	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH025	4/12/23		T. halocnemoides subsp. tenuis
2	LH026	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89891667	116.28264	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH026	4/12/23		T. halocnemoides subsp. tenuis
2	LH027	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89916667	116.28278	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH027	4/12/23		T. halocnemoides subsp. tenuis
2	LH028	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89927778	116.28269	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH028	4/12/23		T. halocnemoides subsp. tenuis
2	LH037	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86330556	116.35453	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH037	4/12/23		T. halocnemoides subsp. tenuis
2	LH038	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.8635	116.35458	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH038	4/12/23		T. halocnemoides subsp. tenuis
2	LH039	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86361111	116.35444	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH039	4/12/23		T. halocnemoides subsp. tenuis
2	LH040	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86402778	116.35422	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH040	4/12/23		T. halocnemoides subsp. tenuis
2	LH041	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86169444	116.35089	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH041	4/12/23		T. halocnemoides subsp. tenuis
2	LH042	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86163889	116.35117	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH042	4/12/23		T. halocnemoides subsp. tenuis

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2	LH043	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86127778	116.35131	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH043	4/12/23		T. halocnemoides subsp. tenuis
2	LH044	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86113889	116.35139	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH044	4/12/23		T. halocnemoides subsp. tenuis
2	LH045	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86847222	116.35042	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH045	4/12/23		T. halocnemoides subsp. tenuis
2	LH046	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86822222	116.35058	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH046	4/12/23		T. halocnemoides subsp. tenuis
2	LH047	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86783333	116.35069	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH047	4/12/23		T. halocnemoides subsp. tenuis
2	LH048	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.86775	116.35078	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH048	4/12/23		T. halocnemoides subsp. tenuis
2	LH049	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83152778	116.42828	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH049	5/12/23		T. halocnemoides subsp. tenuis
2	LH050	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83175	116.42808	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH050	5/12/23		T. halocnemoides subsp. tenuis
2	LH051	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83183333	116.42797	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH051	5/12/23		T. halocnemoides subsp. tenuis
2	LH052	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83227778	116.42728	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH052	5/12/23		T. halocnemoides subsp. tenuis
2	LH053	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83363889	116.42714	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH053	5/12/23		T. halocnemoides subsp. tenuis
2	LH054	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83375	116.42714	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH054	5/12/23		T. halocnemoides subsp. tenuis
2	LH055	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83369444	116.42708	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH055	5/12/23		T. halocnemoides subsp. tenuis
2	LH056	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83358333	116.42686	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH056	5/12/23		T. halocnemoides subsp. tenuis
2	LH057	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83669444	116.42764	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH057	5/12/23		T. halocnemoides subsp. tenuis

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2	LH062	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83944444	116.43172	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH062	5/12/23		T. halocnemoides subsp. tenuis
2	LH065	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83711111	116.42061	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH065	5/12/23		T. halocnemoides subsp. tenuis
2	LH078	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83808333	116.38633	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH078	5/12/23		T. halocnemoides subsp. tenuis
2	LH079	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83838889	116.38619	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH079	5/12/23		T. halocnemoides subsp. tenuis
2	LH081	sp.	Onslow area	-21.65280556	115.12189	A. Zerdoner Čalasan & B. McKee	LH081	6/12/23		T. halocnemoides subsp. tenuis
2	LH084	sp.	Onslow area	-21.65183333	115.12247	A. Zerdoner Čalasan & B. McKee	LH084	6/12/23		T. halocnemoides subsp. tenuis
2	LH085	sp.	Onslow area	-21.65361111	115.12169	A. Zerdoner Čalasan & B. McKee	LH085	6/12/23		T. halocnemoides subsp. tenuis
2	LH086	sp.	Onslow area	-21.64041667	115.10633	A. Zerdoner Čalasan & B. McKee	LH086	6/12/23		T. halocnemoides subsp. tenuis
2	LH087	sp.	Onslow area	-21.6405	115.10619	A. Zerdoner Čalasan & B. McKee	LH087	6/12/23		T. halocnemoides subsp. tenuis
2	LH088	sp.	Onslow area	-21.64091667	115.10578	A. Zerdoner Čalasan & B. McKee	LH088	6/12/23		T. halocnemoides subsp. tenuis
2	LH089	sp.	Onslow area	-21.64108333	115.10553	A. Zerdoner Čalasan & B. McKee	LH089	6/12/23		T. halocnemoides subsp. tenuis
2	LH090	sp.	Onslow area	-21.64138889	115.10492	A. Zerdoner Čalasan & B. McKee	LH090	6/12/23		T. halocnemoides subsp. tenuis
2	LH091	sp.	near mouth of Ashburton River	-21.70386111	114.94053	A. Zerdoner Čalasan & B. McKee	LH091	6/12/23		T. halocnemoides subsp. tenuis
2	LH092	sp.	near mouth of Ashburton River	-21.70377778	114.94061	A. Zerdoner Čalasan & B. McKee	LH092	6/12/23		T. halocnemoides subsp. tenuis
2	LH093	sp.	near mouth of Ashburton River	-21.70361111	114.94075	A. Zerdoner Čalasan & B. McKee	LH093	6/12/23		T. halocnemoides subsp. tenuis

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
2	LH094	sp.	near mouth of Ashburton River	-21.70388889	114.94056	A. Zerdoner Čalasan & B. McKee	LH094	6/12/23		T. halocnemoides subsp. tenuis
2	LH095	sp.	near mouth of Ashburton River	-21.70397222	114.9405	A. Zerdoner Čalasan & B. McKee	LH095	6/12/23		T. halocnemoides subsp. tenuis
2	LH099	sp.	near mouth of Ashburton River	-21.7015	114.94	A. Zerdoner Čalasan & B. McKee	LH099	6/12/23		T. halocnemoides subsp. tenuis
2	LH110	sp.	Fortescue River Rd, Mardie	-21.00369444	116.10786	A. Zerdoner Čalasan & B. McKee	LH110	6/12/23		T. halocnemoides subsp. tenuis
2	LH111	sp.	Fortescue River Rd, Mardie	-21.01841667	116.11089	A. Zerdoner Čalasan & B. McKee	LH111	6/12/23		T. halocnemoides subsp. tenuis
2	LH112	sp.	Fortescue River Rd, Mardie	-21.01830556	116.11106	A. Zerdoner Čalasan & B. McKee	LH112	6/12/23		T. halocnemoides subsp. tenuis
2	LH113	sp.	Fortescue River Rd, Mardie	-21.01805556	116.11128	A. Zerdoner Čalasan & B. McKee	LH113	6/12/23		T. halocnemoides subsp. tenuis
2	LH114	sp.	Fortescue River Rd, Mardie	-21.01830556	116.11169	A. Zerdoner Čalasan & B. McKee	LH114	6/12/23		T. halocnemoides subsp. tenuis
2	LH115	sp.	Fortescue River Rd, Mardie	-21.0185	116.11175	A. Zerdoner Čalasan & B. McKee	LH115	6/12/23		T. halocnemoides subsp. tenuis
2	LH116	sp.	Fortescue River Rd, Mardie	-21.01855556	116.11072	A. Zerdoner Čalasan & B. McKee	LH116	6/12/23		T. halocnemoides subsp. tenuis
2	LH117	sp.	Fortescue River Rd, Mardie	-21.01847222	116.11058	A. Zerdoner Čalasan & B. McKee	LH117	6/12/23		T. halocnemoides subsp. tenuis
2	LH118	sp.	Fortescue River Rd, Mardie	-21.01833333	116.11047	A. Zerdoner Čalasan & B. McKee	LH118	6/12/23		T. halocnemoides subsp. tenuis
2	LH119	sp.	Fortescue River Rd, Mardie	-21.01847222	116.11028	A. Zerdoner Čalasan & B. McKee	LH119	6/12/23		T. halocnemoides subsp. tenuis
2	LH120	sp.	Fortescue River Rd, Mardie	-21.01866667	116.11031	A. Zerdoner Čalasan & B. McKee	LH120	6/12/23		T. halocnemoides subsp. tenuis
2	LH121	sp.	Karratha	-20.72230556	116.84508	A. Zerdoner Čalasan & B. McKee	LH121	7/12/23		T. halocnemoides subsp. tenuis

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
2	LH122	sp.	Karratha	-20.7225	116.84533	A. Zerdoner Čalasan & B. McKee	LH122	7/12/23		T. halocnemoides subsp. tenuis
2	LH124	sp.	Karratha	-20.72219444	116.84561	A. Zerdoner Čalasan & B. McKee	LH124	7/12/23		T. halocnemoides subsp. tenuis
2	LH125	sp.	Karratha	-20.72241667	116.84481	A. Zerdoner Čalasan & B. McKee	LH125	7/12/23		T. halocnemoides subsp. tenuis
2	LH126	sp.	Karratha	-20.73327778	116.89644	A. Zerdoner Čalasan & B. McKee	LH126	7/12/23		T. halocnemoides subsp. tenuis
2	LH127	sp.	Karratha	-20.73319444	116.89606	A. Zerdoner Čalasan & B. McKee	LH127	7/12/23		T. halocnemoides subsp. tenuis
2	LH128	sp.	Karratha	-20.73333333	116.89578	A. Zerdoner Čalasan & B. McKee	LH128	7/12/23		T. halocnemoides subsp. tenuis
2	LH130	sp.	Karratha	-20.73361111	116.89578	A. Zerdoner Čalasan & B. McKee	LH130	7/12/23		T. halocnemoides subsp. tenuis
2	LH131	sp.	SE of Cleaverville	-20.67175	117.01631	A. Zerdoner Čalasan & B. McKee	LH131	7/12/23		T. halocnemoides subsp. tenuis
2	LH132	sp.	SE of Cleaverville	-20.67163889	117.01611	A. Zerdoner Čalasan & B. McKee	LH132	7/12/23		T. halocnemoides subsp. tenuis
2	LH133	sp.	SE of Cleaverville	-20.67161111	117.01606	A. Zerdoner Čalasan & B. McKee	LH133	7/12/23		T. halocnemoides subsp. tenuis
2	LH134	sp.	SE of Cleaverville	-20.67213889	117.01556	A. Zerdoner Čalasan & B. McKee	LH134	7/12/23		T. halocnemoides subsp. tenuis
2	LH135	sp.	SE of Cleaverville	-20.67277778	117.01553	A. Zerdoner Čalasan & B. McKee	LH135	7/12/23		T. halocnemoides subsp. tenuis
2	LH136	sp.	SE of Cleaverville	-20.67675	117.01019	A. Zerdoner Čalasan & B. McKee	LH136	7/12/23		T. halocnemoides subsp. tenuis
2	LH137	sp.	SE of Cleaverville	-20.67669444	117.01056	A. Zerdoner Čalasan & B. McKee	LH137	7/12/23		T. halocnemoides subsp. tenuis
2	LH138	sp.	SE of Cleaverville	-20.67661111	117.01069	A. Zerdoner Čalasan & B. McKee	LH138	7/12/23		T. halocnemoides subsp. tenuis

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2	LH139	sp.	SE of Cleaverville	-20.67727778	117.01069	A. Zerdoner Čalasan & B. McKee	LH139	7/12/23		T. halocnemoides subsp. tenuis
2	LH140	sp.	SE of Cleaverville	-20.67769444	117.01031	A. Zerdoner Čalasan & B. McKee	LH140	7/12/23		T. halocnemoides subsp. tenuis
2	LH141	sp.	Point Samson	-20.64725	117.16303	A. Zerdoner Čalasan & B. McKee	LH141	7/12/23		T. halocnemoides subsp. tenuis
2	LH142	sp.	Point Samson	-20.64727778	117.16292	A. Zerdoner Čalasan & B. McKee	LH142	7/12/23		T. halocnemoides subsp. tenuis
2	LH156	sp.	N of Balla Balla	-20.67655556	117.78261	A. Zerdoner Čalasan & B. McKee	LH156	7/12/23		T. halocnemoides subsp. tenuis
2	KS 1328	tenuis	Road 7 works, BHP Nelson Point site, Port Hedland	-20.316333	118.61789	K.A. Shepherd, T.A. Edwards & B. Poole	KS 1328	3/12/09	9662863	
2	KS 1330	tenuis	Road 7 works, BHP Nelson Point site, Port Hedland	-20.316361	118.61836	K.A. Shepherd, T.A. Edwards & B. Poole	KS 1330	3/12/09	9662960	
2	KS 1345	tenuis	4.97 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.330361	118.63283	K.A. Shepherd & T.A. Edwards	KS 1345	3/12/09	9664688	
2	KS 1348	tenuis	3.6 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.320056	118.62717	K.A. Shepherd & T.A. Edwards	KS 1348	3/12/09	9662715	
2	KS 1350	tenuis	2.44 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.317389	118.61597	K.A. Shepherd & T.A. Edwards	KS 1350	3/12/09	9664548	
2	KS 1354	tenuis	79 m E of Bell Street near Railway track, Port Hedland	-20.359833	118.63375	K.A. Shepherd & T.A. Edwards	KS 1354	4/12/09	9664505	
2	KS 1355	tenuis	0.7 km NE on Bell Street from Great Northern Hwy, Port Hedland	-20.358361	118.633	K.A. Shepherd & T.A. Edwards	KS 1355	4/12/09	9662987	
2	KS 1357	tenuis	100 m from Great Northern Hwy on main road to Port Hedland, lookout track at Redbank Bridge	-20.345194	118.63139	K.A. Shepherd & T.A. Edwards	KS 1357	4/12/09	9662944	
2	KS 1367	tenuis	0.4 km from Cooke Point Drive along pipeline track parallel to main road to Port Hedland from Great Northern Hwy	-20.318167	118.62792	K.A. Shepherd & T.A. Edwards	KS 1367	4/12/09	9662545	
2	KS 1370	tenuis	Finucane Island, 1.3 km from railway line on road to boat ramp, Port Hedland	-20.303167	118.556	K.A. Shepherd & T.A. Edwards	KS 1370	4/12/09	9662685	
2	KS 1371	tenuis	Finucane Island, 1.3 km from railway line on road to boat ramp, Port Hedland	-20.303194	118.55603	K.A. Shepherd & T.A. Edwards	KS 1371	4/12/09	9662723	
2	KS 1374	tenuis	1.2 km S on Wilsons Road from Roche Road, Sth Port Hedland	-20.355611	118.62383	K.A. Shepherd & T.A. Edwards	KS 1374	4/12/09	9662871	
2	PP002	tenuis	60 km SW Onslow, W of Yankagee Claypan	-22.35638889	114.56972	A.A. Mitchell	516	17/11/1977	02481189	

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
2	PP008	halocnemoides	Samphire 2 Site, Mandora Marsh area. IBRA: GSD	-19.75888889	121.39389	D. Duero, T. Handasyde & T. Willing	WES-5	15/10/1999	08026122	
2	PP012	tenuis	Purracumurra, S of Port Hedland	-20.31166667	118.59472	G. Craig	301	29/09/1981	02481499	
2	PP037	tenuis	Carnot Bay area, Dampier Peninsula, c. 95 km N of Broome, 6.4 km N of Carnot Bay Community	-17.114424	122.32722	M.N. Lyons	KMS 168	7/08/2017	09127674	
2	PP038	tenuis	Carnot Bay area, Dampier Peninsula, c. 88.7 km N of Broome, 2.1 km N of Carnot Bay Community. Quadrat KMS17 on NW side of large Bunda Bunda Spring.	-17.151627	122.31831	M.N. Lyons & J. Pryde	KMS 167	7/08/2017	09127666	
2	PP039	tenuis	Carlton Hill Station, c. 99 km N of Kununurra, 1.3 km NNW of Haleys Spring	-14.881375	128.67496	M.N. Lyons	KMS 166	2/08/2017	09127658	
2	PP042	tenuis	22.4 km W of Mardie, 2.87 km S of Talga River	-21.12769444	115.93361	G. Wells	MS 201-01	9/12/2017	08976902	
2	PP043	tenuis	Beside Rd to Mesa camp	-22.00348333	113.93197	J. English	JE 137	15/06/2007	07542283	
2	PP044	tenuis	6 miles SW of Yardie Creek Homestead, North West Cape	-21.95	113.95	A.S. George	10312	6/09/1970	02480115	
2	PP045	tenuis	Mundabullingana Station ca. 100 km SW of Port Hedland	-20.38444444	118.31389	A.L. Payne	PRP 1547	12/11/1996	04754085	
2	PP046	tenuis	0.9 km along 'Model Aero Club' track next to Karratha Golf Course, Karratha	-20.71666667	116.83333	K.A. Shepherd	KS 810	11/08/2001	08680701	
2	PP047	tenuis	Site WH40, 16.5 km SW of Onslow townsite	-21.703713	114.97011	R. Butler & P. Chukowry	RB 010	16/04/09	08586144	
2	PP048	tenuis	2.6 km E from Back Beach carpark, Karratha	-20.729833	116.91019	K.A. Shepherd, J.A. Wege & R. Butcher	KS 1248	27/05/09	09241159	
2	PP075	large seed	Behind Karratha Golf Course	-20.73972222	116.84806	G. Craig	330	6/10/1981	02481456	
2A	LH143	sp.	Point Samson	-20.64705556	117.16269	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH143	7/12/23		aff. T. halocnemoides subsp. tenuis
2A	LH158	sp.	N of Balla Balla	-20.67652778	117.782	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH158	7/12/23		aff. T. halocnemoides subsp. tenuis
2A	PP003	large ovate seed aggregate'	Near Cowrie Cove, Burrup Peninsula	-20.78333333	116.76667	M.I. Blackwell	Bp 88	28/04/1982	07478224	

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
2A	PP041	tenuis	Sandalwood Island, Exmouth Gulf	-22.466667	114.24167	A.N. Start	ANS 589	12/11/1989	09031499	
3	PP010	halocnemoides	Shark Bay, Flint Cliff Telegraph Station at S end of Hamelin Pool	-26.38305556	114.2	W. Greuter	22541	5/10/1991	03089819	
3	PP061	halocnemoides	Carnarvon	-24.87972222	113.65806	P.G. Wilson	8355	28/07/1969	02480263	
3	PP063	halocnemoides	Birrida Tamala Station, 4.8 km S of homestead. (Site: cb9a).	-26.74041652	113.71169	G.J. Keighery & N. Gibson	965	20/08/1995	04974492	
	PP072	halocnemoides	Bruboodjoo Point Campround; 18.5 km N of Coral Bay Rd on Cardabia Ningaloo Rd	-22.96766944	113.81725	G. Cassis, M. Wall, C. Symonds, N. Tartanic & C. Weirauch	21-172	29/10/2004	06989357	
4	PP034	halocnemoides	Alfred Cove, Swan River	-32.03305556	115.79972	P.G. Wilson	10629	4/04/1972	02479753	
4	PP035	halocnemoides	Swan River at Alfred Cove	-32.03305556	115.79972	P.G. Wilson	8698	14/04/1970	2478684	
4	PP055	halocnemoides	Alfred Cove Nature Reserve, 40 m from gate into the reserve, City of Melville	-32.025833	115.81319	K.A. Shepherd & L. Wai-Leng	KS 1321	29/10/09	09241124	
4	PP065	halocnemoides	Swan River at Alfred Cove	-32.03305556	115.79972	P.G. Wilson	8697	14/04/1970	02479729	
4	PP067	halocnemoides	Lake Bagdad, Rottnest Island	-32	115.5	K.F. Kenneally	6549	19/02/1978	2478579	
5	PP018	round seed aggregate'	Mulga Downs Station. C. 30.2 km ENE of intersection of Great Northern Hwy and Nanutarra-Munjina Rd.	-22.349722	118.98464	M.N. Lyons & S.D. Lyons	FV 0399	30/07/2015	09046461	
5	PP019	round seed aggregate'	Mulga Downs Station. C. 30.2 km ENE of intersection of Great Northern Hwy and Nanutarra-Munjina Rd. 2.8 km SSE of Mulga Downs Outcamp, 2.3 km WNW of Cowra Line Camp, saline flat (quadrat FV04A)	-22.349722	118.98464	M.N. Lyons & S.D. Lyons	FV 0400	30/07/2015	09046453	
6	PP032	halocnemoides	Swan River by Garrett Rd bridge, ca 7 km E of Perth	-31.95472222	115.93583	P.G. Wilson	8257	30/03/1969	02480271	
6	PP033	halocnemoides	Garratt Rd bridge, Swan River, Ascot	-31.95472222	115.86139	A.S. George	6512	24/03/1965	02479761	
6	PP052	halocnemoides	Southern end Wallambin Lake, 1.3 km N on Fleming Rd from Wallambin Rd, NE of Wyalkatchem	-30.993806	117.66978	K.A. Shepherd	KS 1154	12/01/09	08591148	
6	PP054	halocnemoides	Alfred Cove, Swan River	-32.03305556	115.79972	P.G. Wilson	10630	4/04/1972	02479745	

	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
6	PP066	halocnemoides	Swan River by Garrett Rd bridge, ca 7 km E of Perth	-31.95472222	115.93583	P.G. Wilson	8260	30/03/1969	02479419	
7	LH008	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.89705556	116.23547	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH008	4/12/23		T. halocnemoides subsp. longispicata
7	LH013	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90708333	116.24858	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH013	4/12/23		T. halocnemoides subsp. longispicata
7	LH015	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90758333	116.24892	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH015	4/12/23		T. halocnemoides subsp. longispicata
7	LH029	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.90088889	116.29244	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH029	4/12/23		T. halocnemoides subsp. longispicata
7	LH129	sp.	E of Karratha	-20.73361111	116.89547	A. Zerdoner Čalasan & B. McKee	LH129	7/12/23		T. halocnemoides subsp. longispicata
7	KS 1343	halocnemoides	4.97 km S along BHP railway line from main gate at BHP Port Nelson site, Port Hedland	-20.330389	118.63533	K.A. Shepherd & T.A. Edwards	KS 1343	3/12/09	9664491	
7	KS 1365	halocnemoides	0.4 km from Cooke Point Drive along pipeline track parallel to main road to Port Hedland from Great Northern Hwy	-20.318056	118.62797	K.A. Shepherd & T.A. Edwards	KS 1365	4/12/09	9664734	
7	PP022	longispicata	8 km NE of Karratha	-20.71666667	116.91667	V. Semeniuk	s.n.	/09/1978	02479184	
7	PP021	longispicata	Near sandpits, E of Karratha	-20.73972222	116.84806	G. Craig	244	12/07/1981	02480743	
7	PP024	longispicata	W side of Rd, 450 m from Rd, Cleaverville Rd, 11.3 km N of North West Coastal Hwy, 7.3 km W of Mt Anketell, 17.2 km NE of Karratha	-20.6675	116.99661	S. van Leeuwen *et al.*	PBS 6867	14/05/2004	08938105	
7	PP023	longispicata	South-eastern margin of Lake Walyarta. Mandora Marsh / Walyarta Conservation Park Area.	-19.764231	121.37563	A. Markey & M. Caswell	MM 9859	1/09/2015	09033319	
8	PP025	halocnemoides	Southern shore of Lake Cowan. 5.5 km N of Norseman Post Office along Coolgardie Esperance Hwy.	-32.14194444	121.75972	B. Archer	2537	16/10/2004	07359594	
8	PP026	halocnemoides	2.3 km N of Newdegate-Ravensthorpe Rd, track leaves Rd 700 m NW of Muncaster Rd, Pallarup Nature Reserve, c. 17 km S of Lake King Townsite.	-33.24102445	119.76366	G.J. Keighery & N. Gibson	4168	12/05/1999	07624646	
8	PP027	halocnemoides	3.6 km W of Lake King on the Newdegate - Ravensthorpe Rd	-33.088639	119.62406	K.A. Shepherd	KS 1183	14/01/09	08591180	
8	PP028	halocnemoides	93 km N of Esperance	-33.025	121.88833	P.G. Wilson	10125	5/10/1970	02478919	

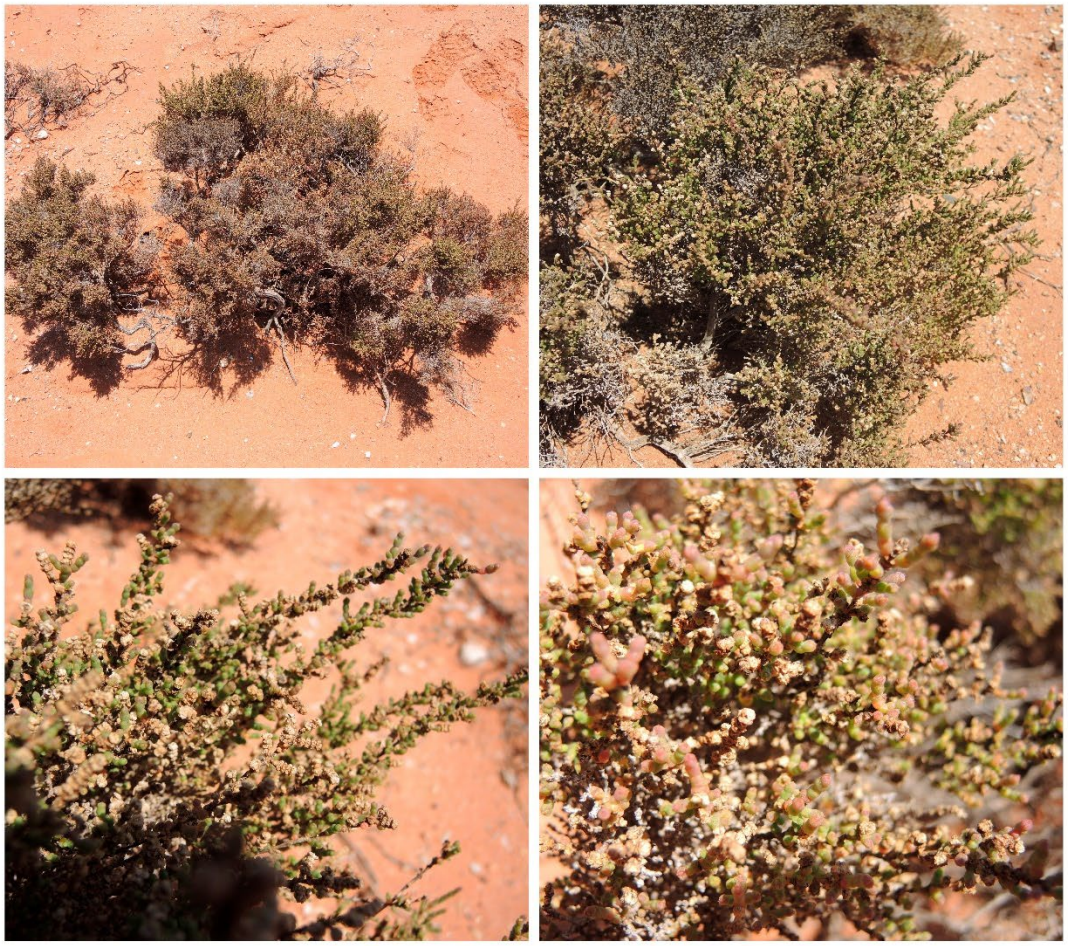
	AGRF Code	Species	Locality	Latitude	Longitude	Collector	Number	Date	Bar-code	UPDATED ID
8	PP030	halocnemoides	Burnerbinmah Station, Dawson Paddock, 3.7 km SSW of homestead, head waters of Lake Monger	-28.81206421	117.34199	S. Patrick *et al.*	s.n.	22/08/1997	07250231	
8	PP031	halocnemoides	12 km N of Glen Homestead, ca 56 km NW of Cue	-26.94527778	117.64472	P.G. Wilson	8584	5/08/1969	2478501	
8	PP050	'tuberculate seed aggregate'	Lake Maitland, ca. 100 km SE of Wiluna	-27.147255	121.07829	A.I. Craigie	TEC 7.12.1	26/11/2014	09134506	
8	PP051	'tuberculate seed aggregate'	Lake Maitland, ca. 100 km SE of Wiluna	-27.194882	121.08029	A.I. Craigie	TEC 074-005	15/10/2014	09134565	
9	LH145	sp.	Point Samson	-20.64669444	117.16261	A. Zerdoner Čalasan & B. McKee	LH145	7/12/23		T. pergranulata subsp. elongata
10	LH068	sp.	Eramurra Solar Salt Project (ESSP) site, WSW of Karratha	-20.83694444	116.38778	A. Zerdoner Čalasan, B. McKee & A. Kerr	LH068	5/12/23		T. pterygoserma subsp. denticulata
10	LH101	sp.	Fortescue River Rd, Mardie	-21.00211111	116.10869	A. Zerdoner Čalasan & B. McKee	LH101	6/12/23		T. pterygoserma subsp. denticulata
10	LH103	sp.	Fortescue River Rd, Mardie	-21.00205556	116.10869	A. Zerdoner Čalasan & B. McKee	LH103	6/12/23		T. pterygoserma subsp. denticulata
F	PP029	halocnemoides	48 km N of Mount Magnet town	-27.71472222	118.43667	P.G. Wilson	8564	4/08/1969	02478331	
NS	KS 1356	auriculata	0.7 km NE on Bell Street from Great Northern Hwy, Port Hedland	-20.358361	118.633	K.A. Shepherd & T.A. Edwards	KS 1356	4/12/09	9664637	

Appendix 2. Field photographs of the Clade 1 *Tecticornia* (*T.* sp. nov. 'large ovate seed') plants sampled from the ESSP area and Pilbara coast in December 2023 (LH prefix) and in Port Hedland 2009 (KS prefix). Voucher information for sample numbers provided in Appendix 1. Scale bar 1 mm. Images by: A.Z. Čalasan (LH), K.A. Shepherd (KS).

LH 001

LH 003

LH 004



LH 021

LH 022

LH 030

LH 031

LH 032

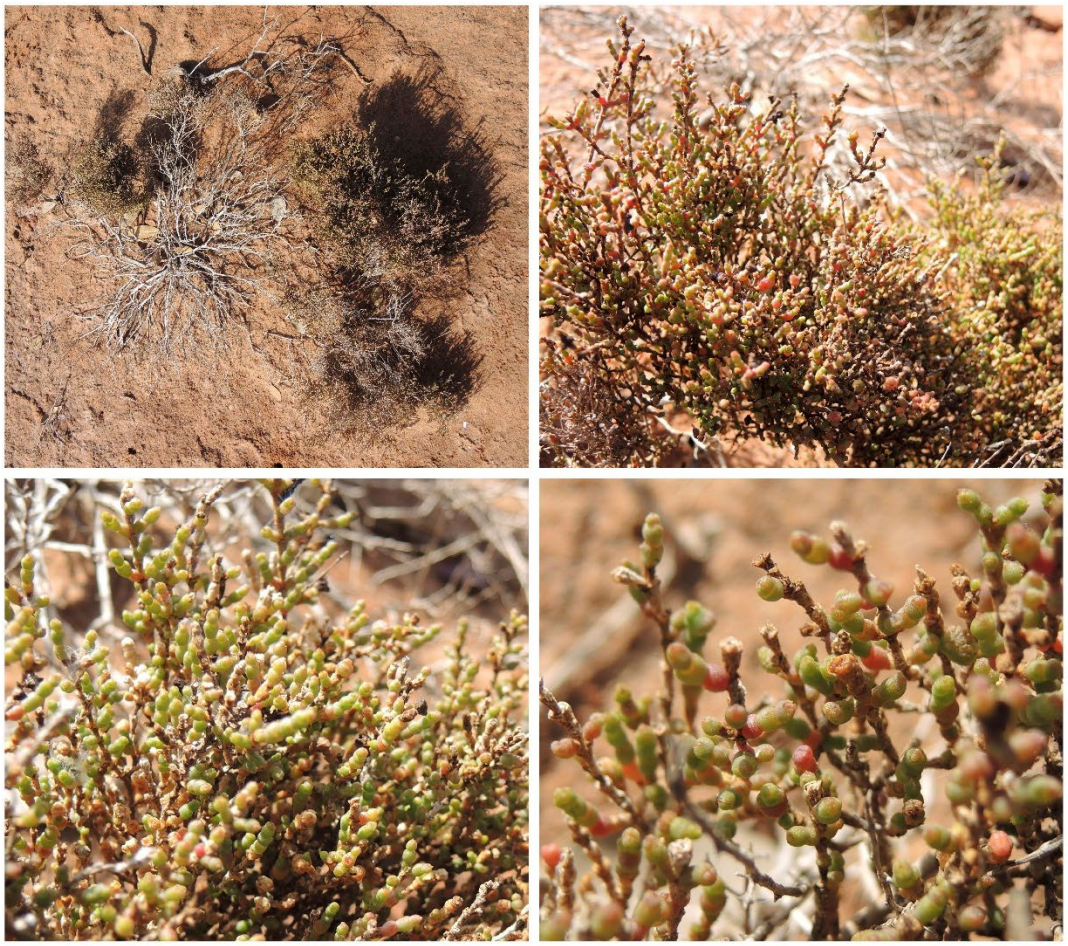
LH 033

LH 034

LH 035

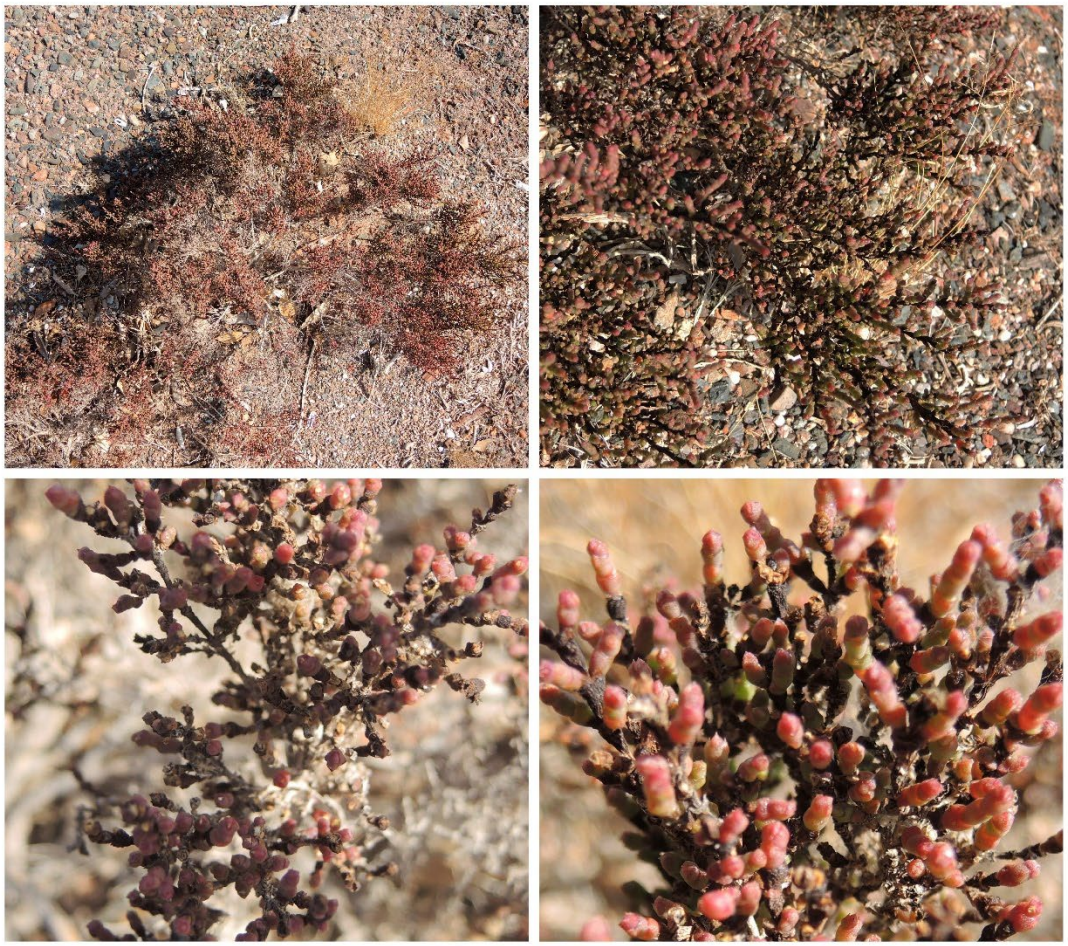
LH 036

LH 058



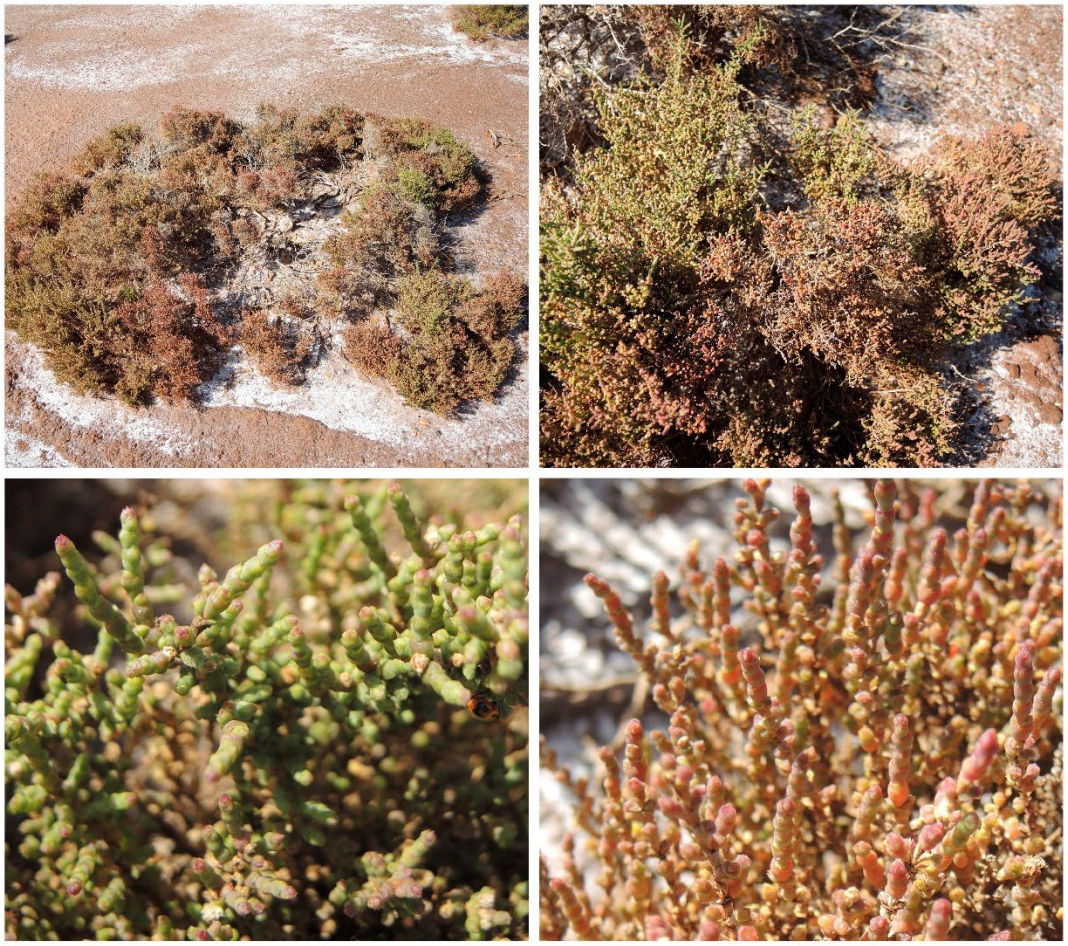
LH 059

LH 060



LH 061

LH 063



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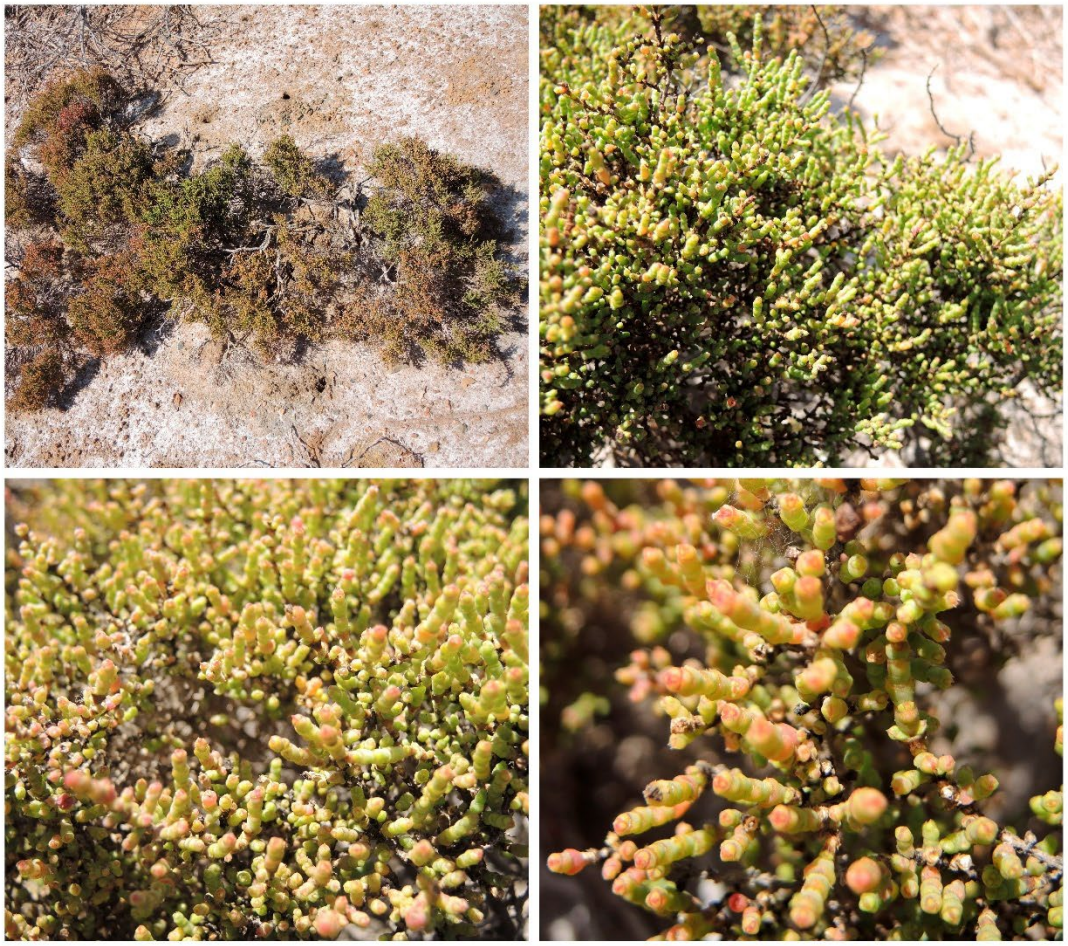
LH 066

LH 067



LH 069

LH 070

LH 071

LH 072

LH 073

LH 074

LH 075

LH 076

LH 077

LH 080

LH 082

LH 083

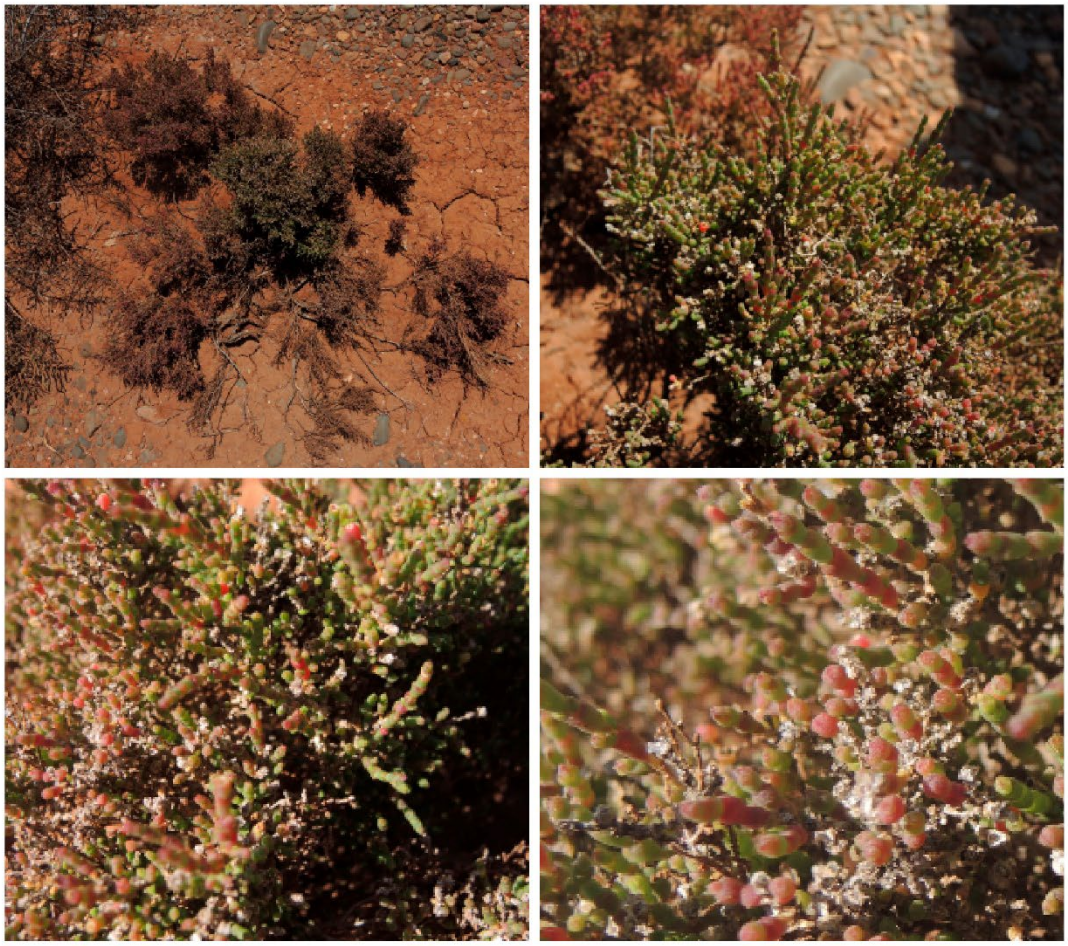
LH 096

LH 097

LH 098

LH 100

LH 102



LH 104

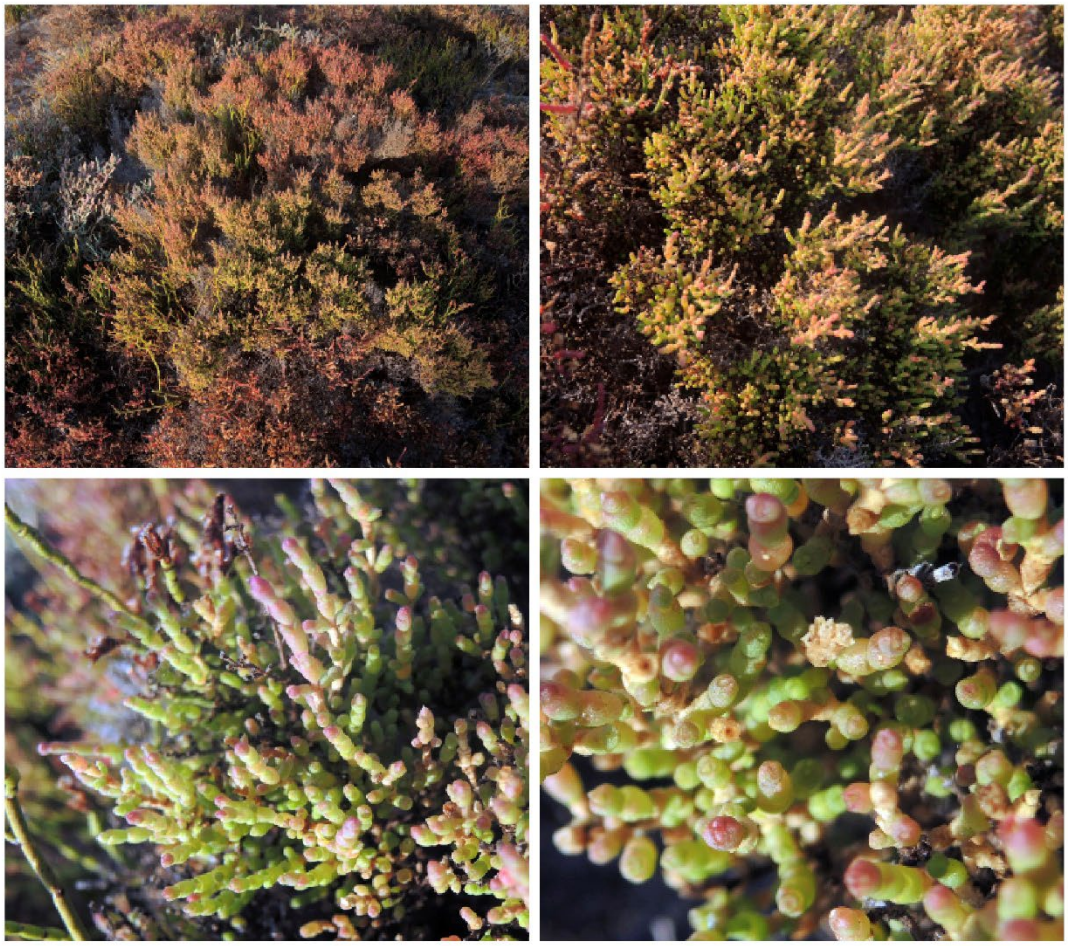
LH 105

LH 106

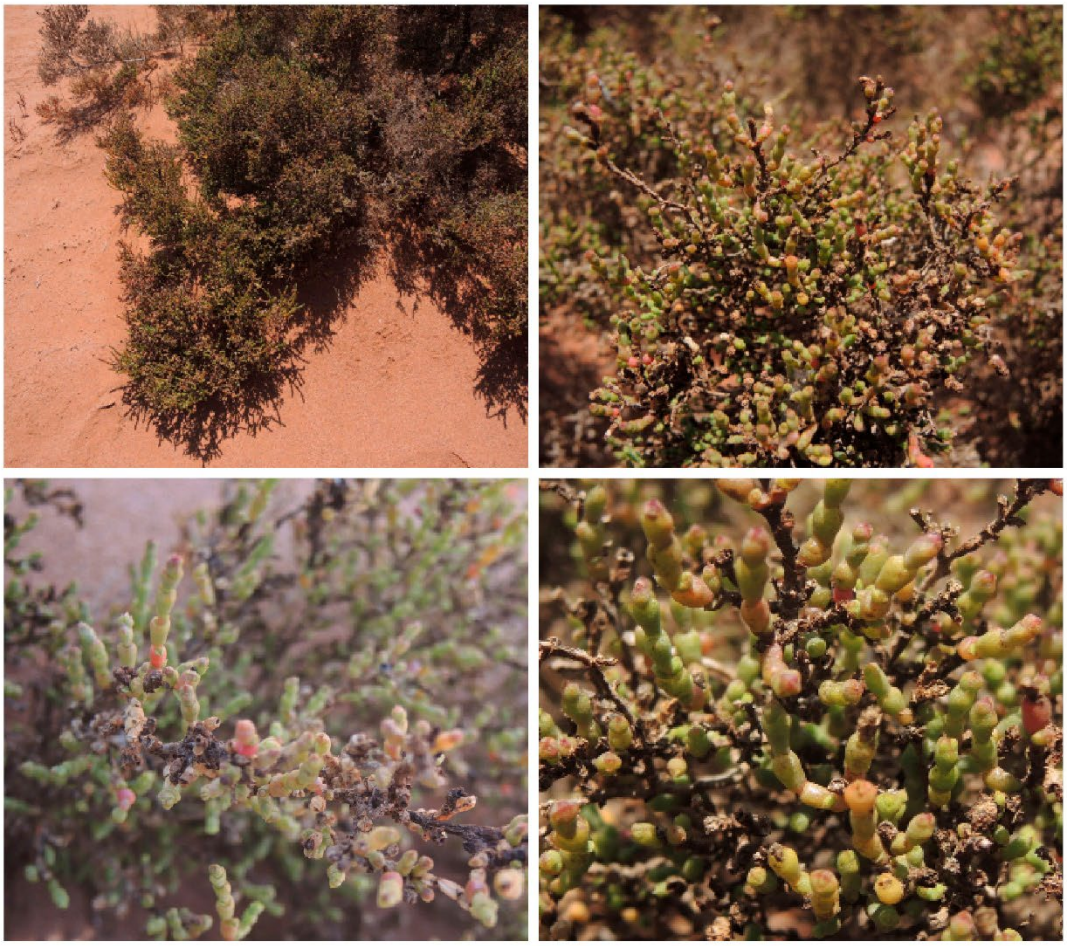
LH 107

LH 108

LH 109

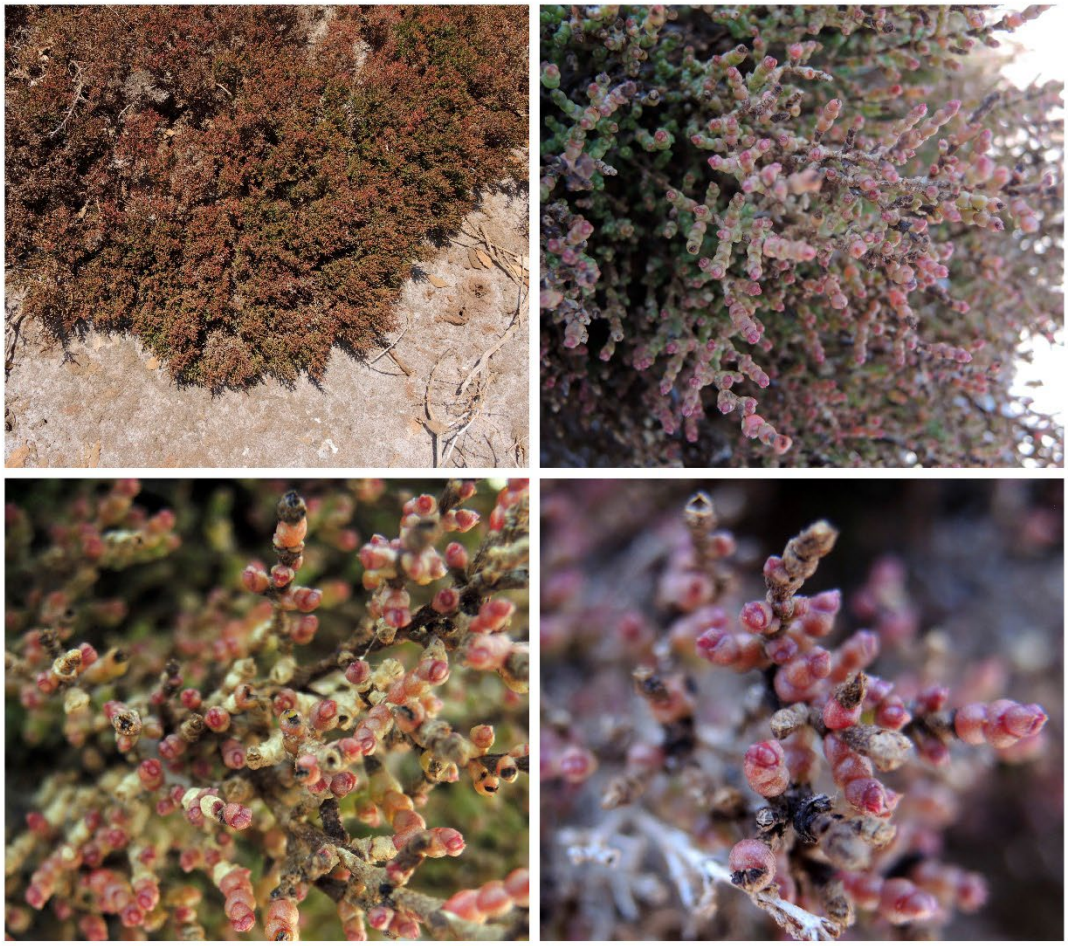


LH 123



LH 144

LH 146



LH 147

LH 148

LH 149

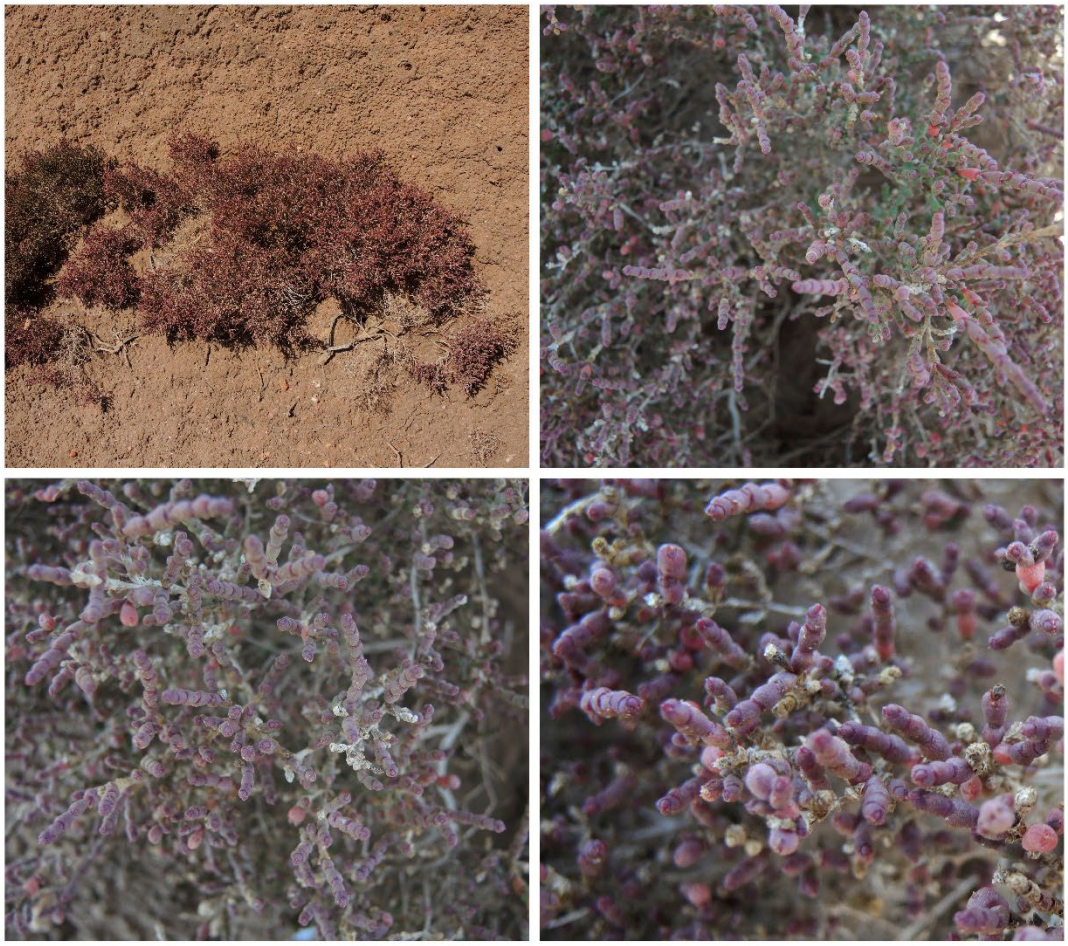
LH 150

LH 151

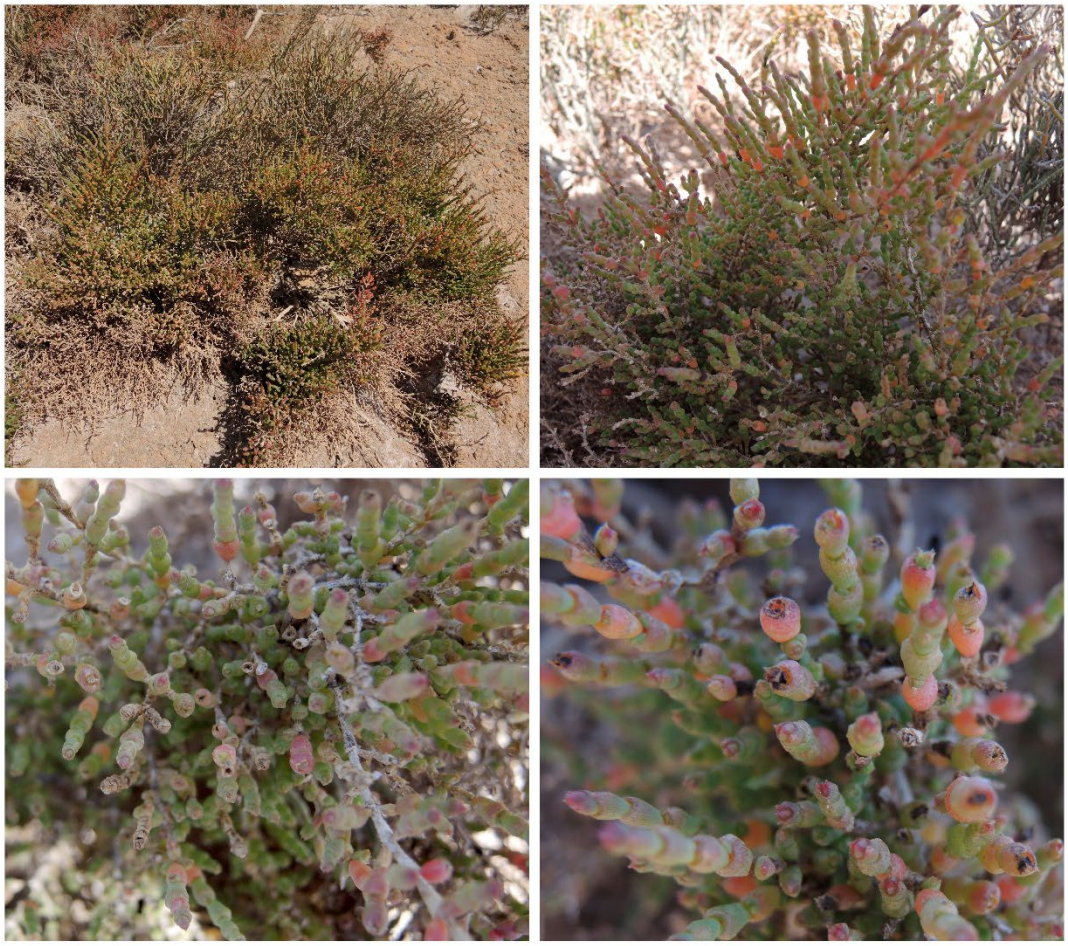
LH 152

LH 153

LH 154



LH 155



LH 157

LH 159

LH 160

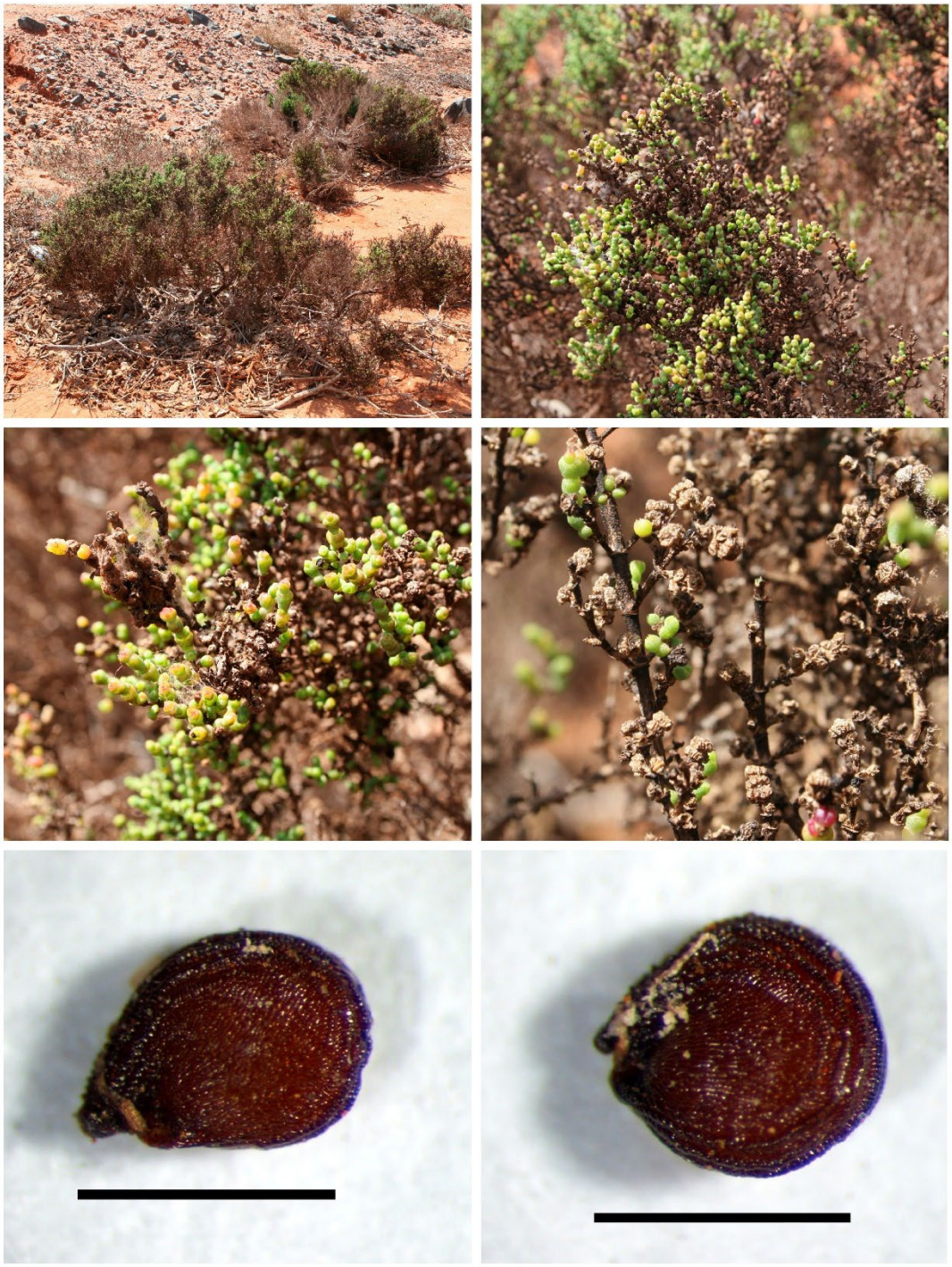
KS1324

KS1325

KS1326

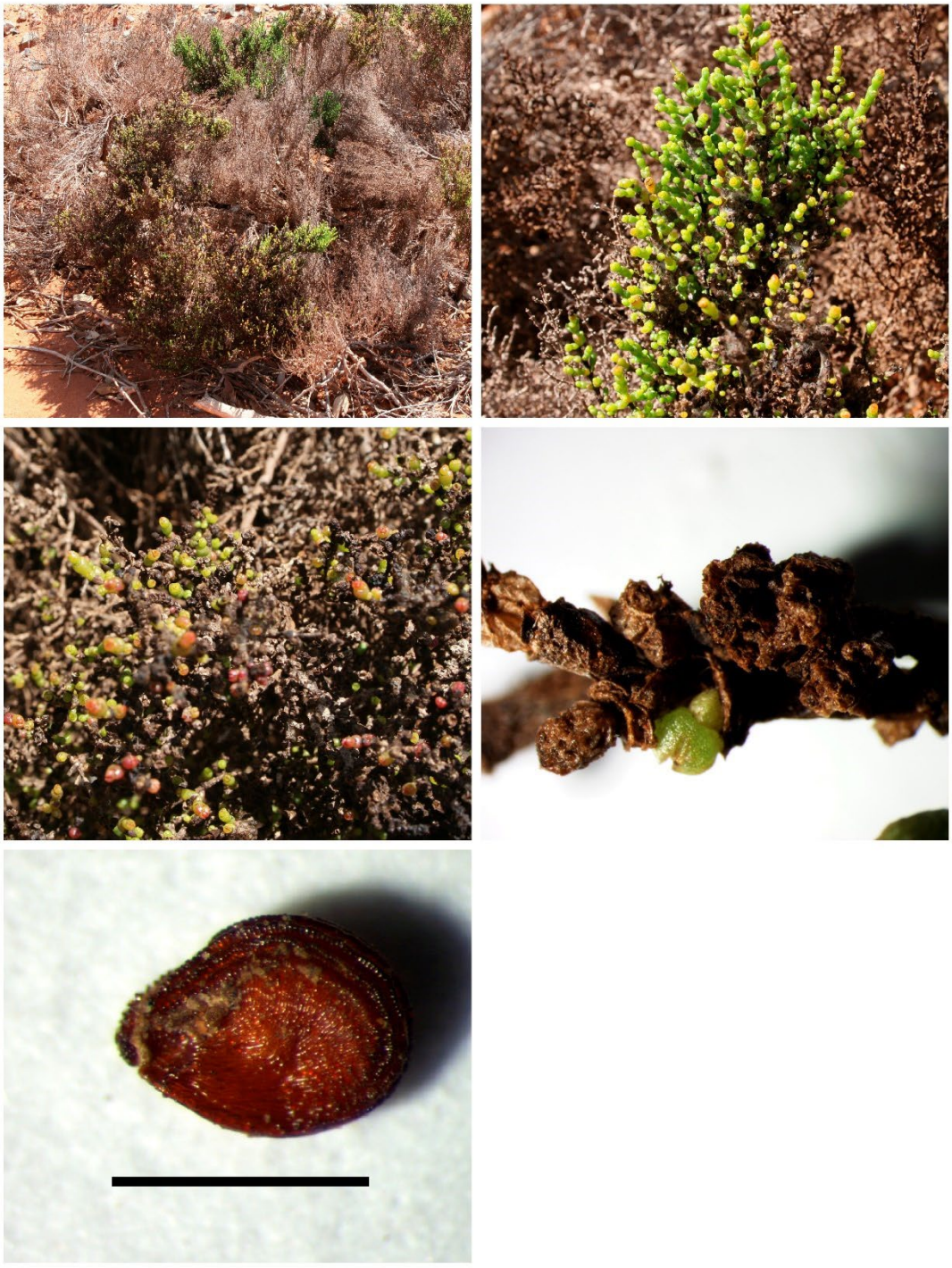
KS1327

KS1329



KS1331

KS1332

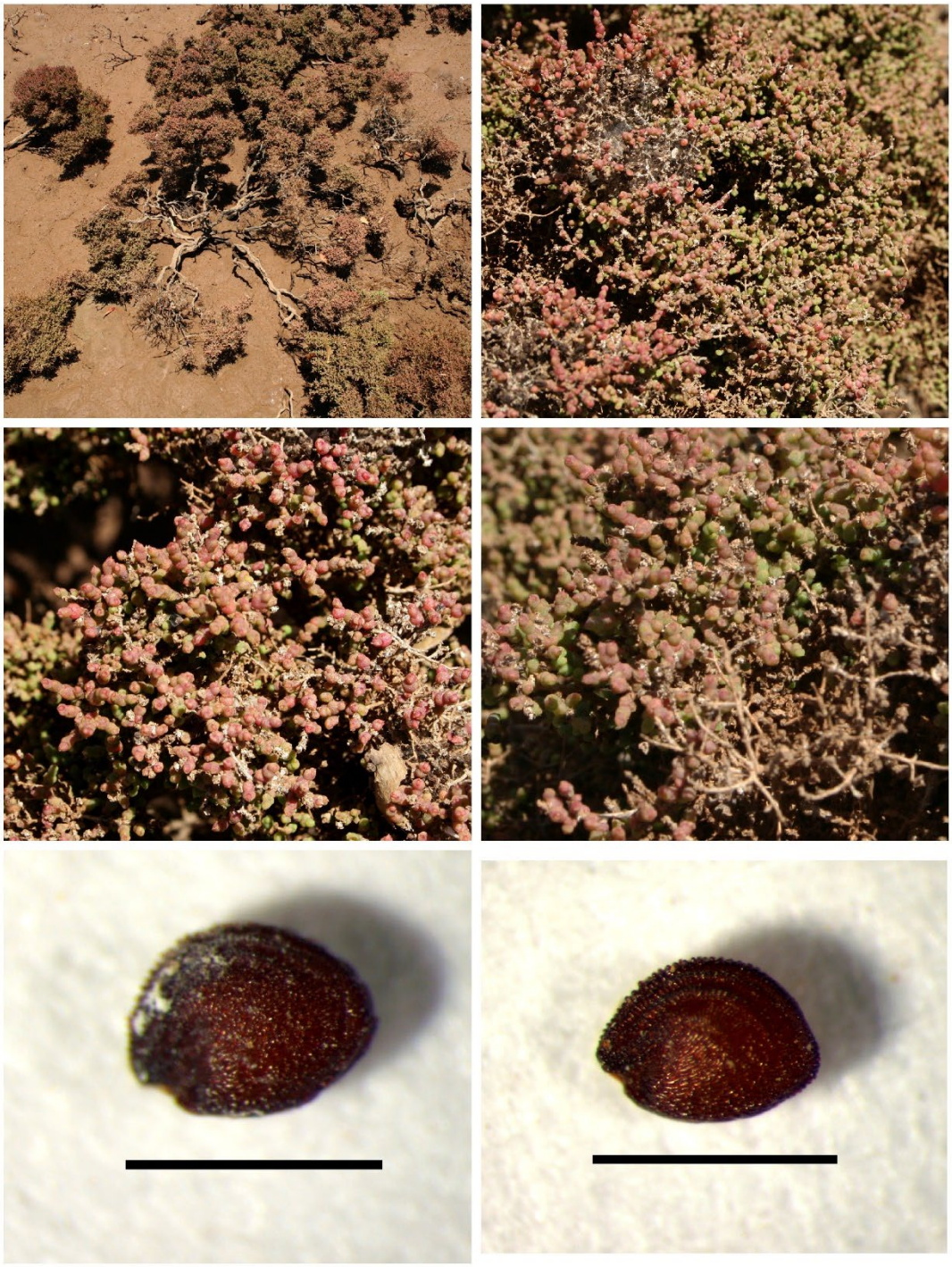


KS1333

KS1334

KS1335

KS1336

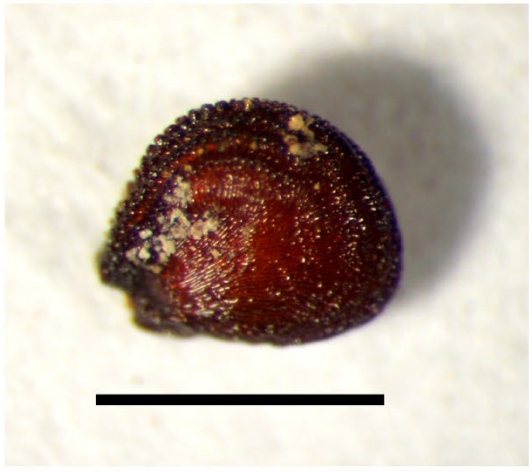


KS1337

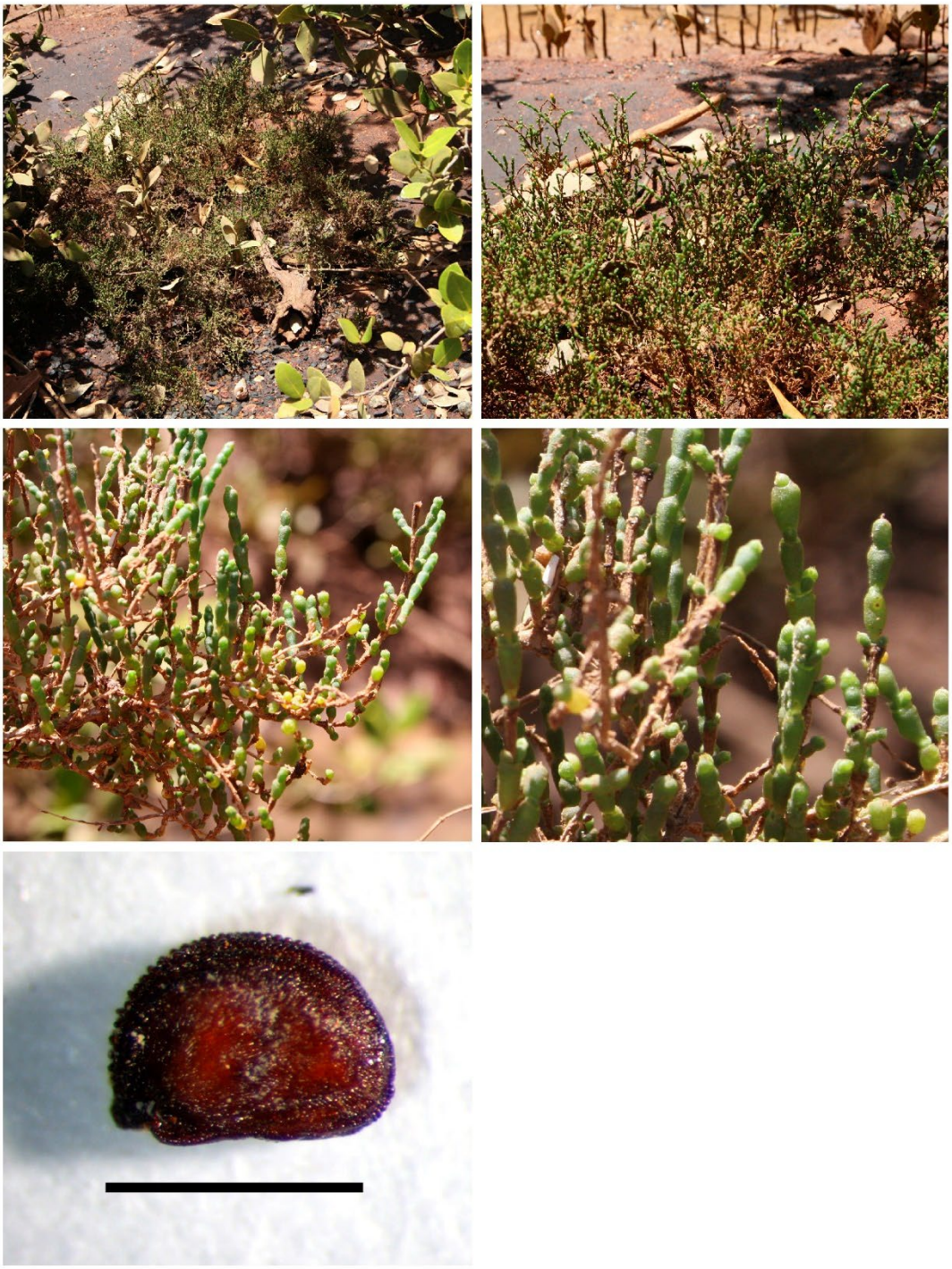
KS1338







KS1339

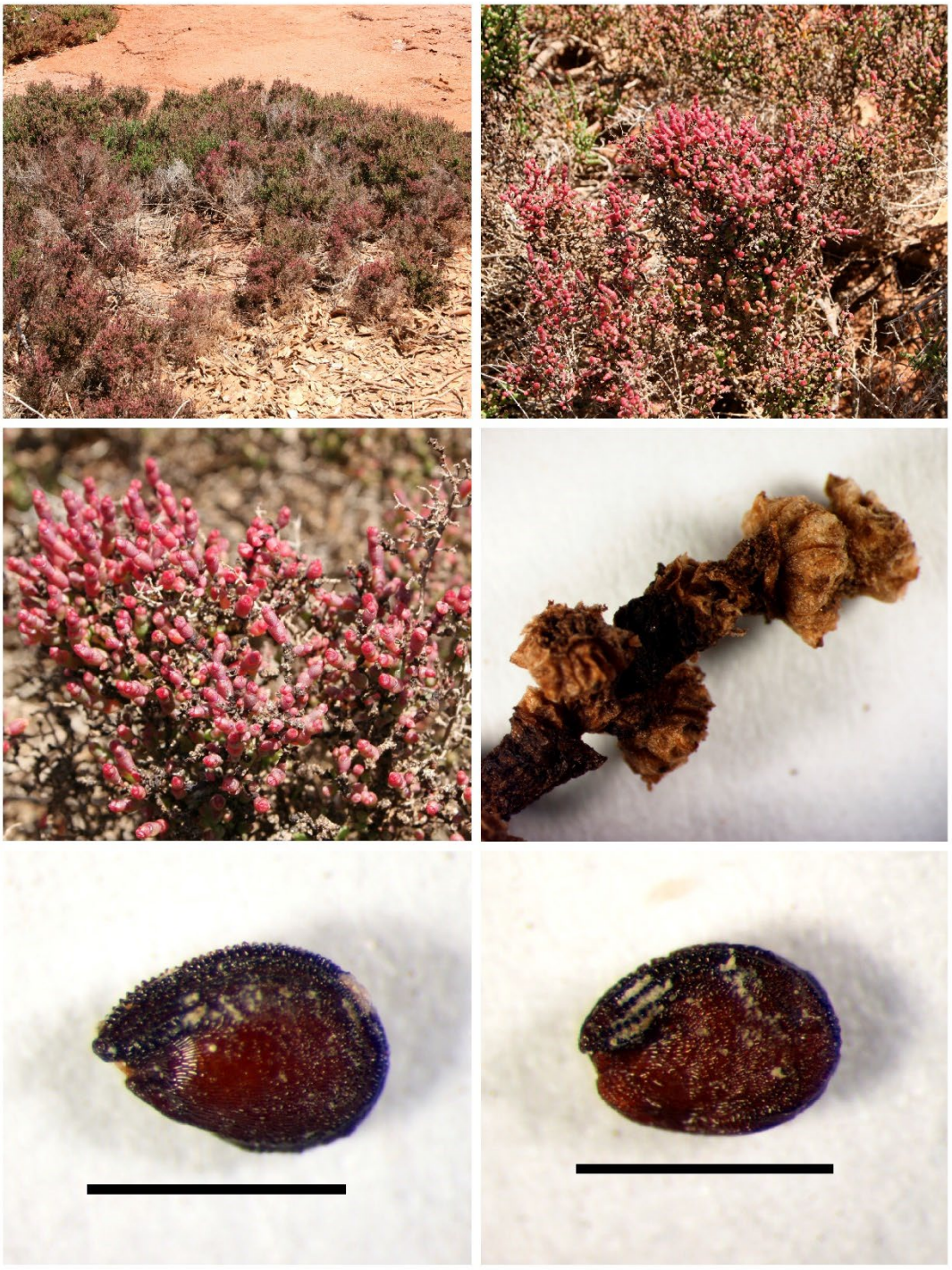


KS1340

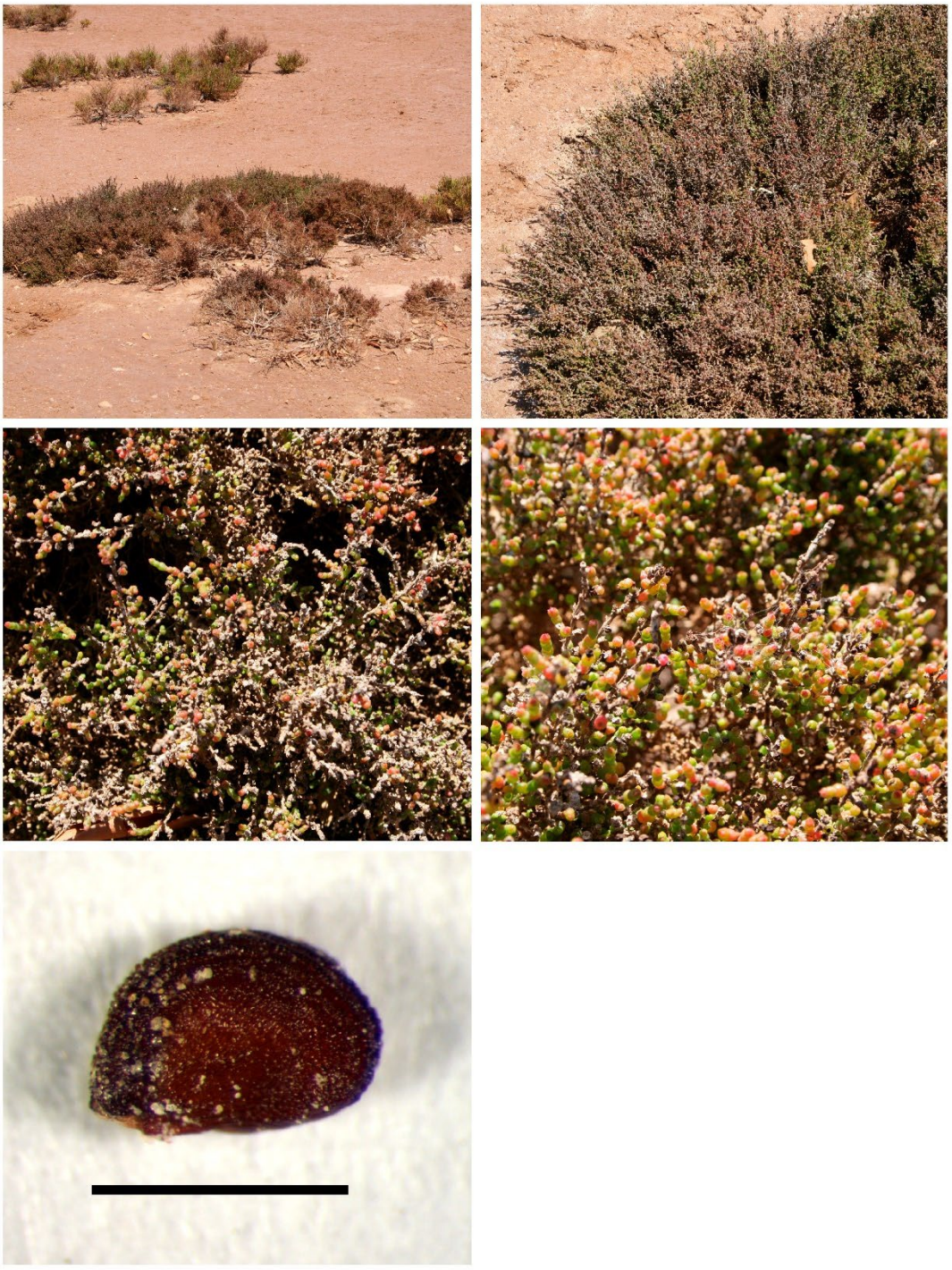




KS1341



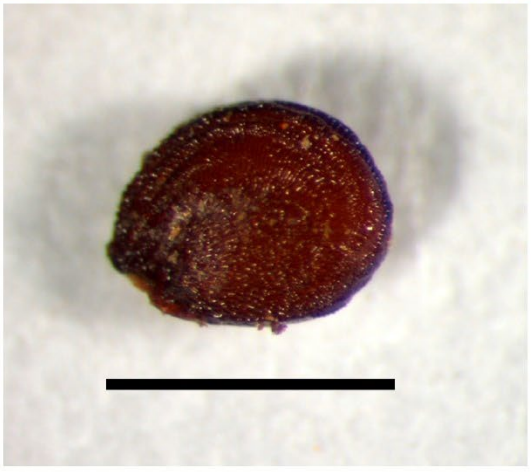
KS1342



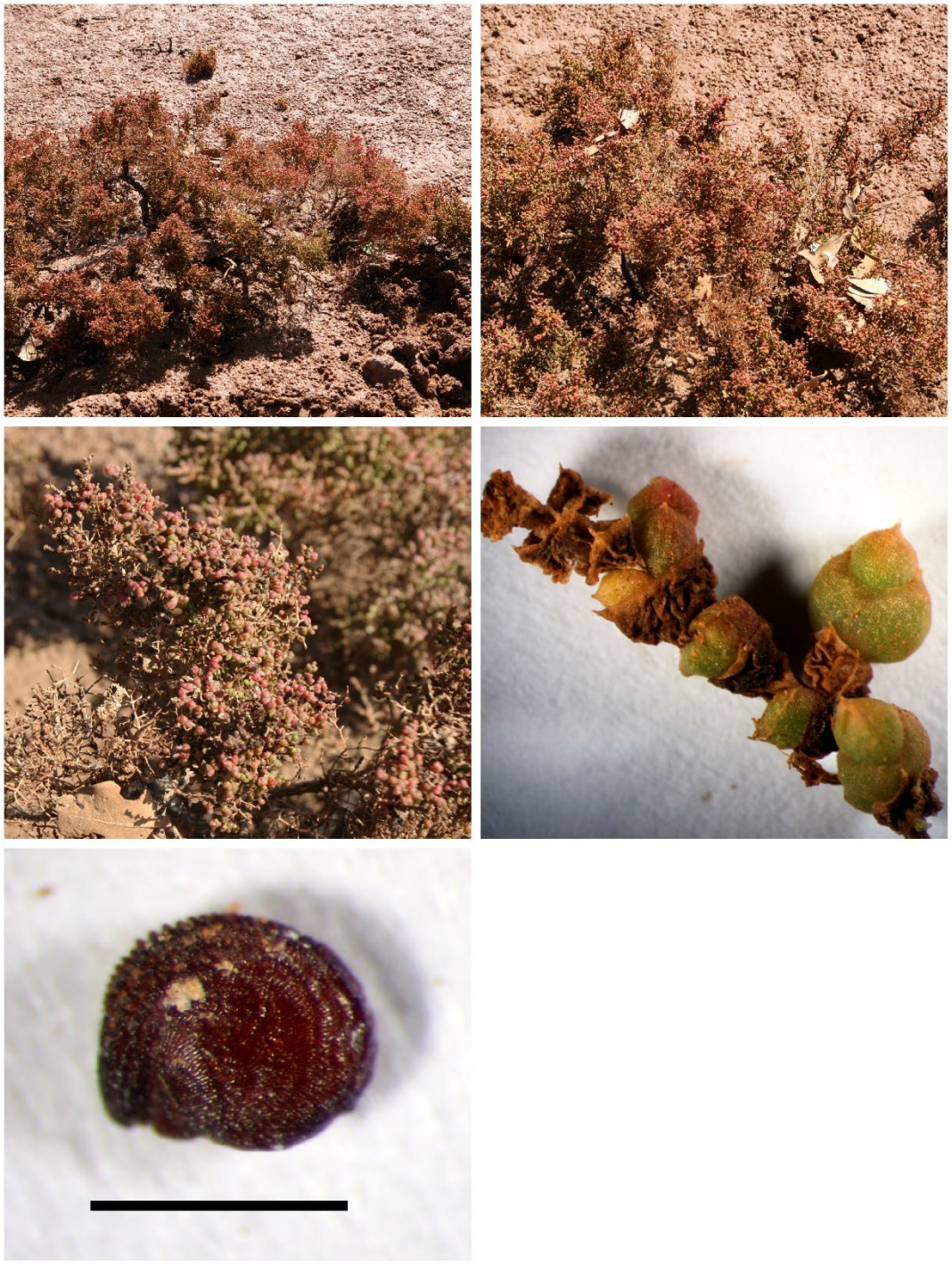
KS1344







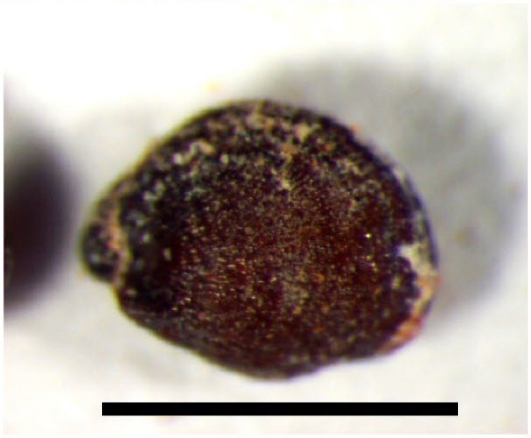
KS1346



KS1347





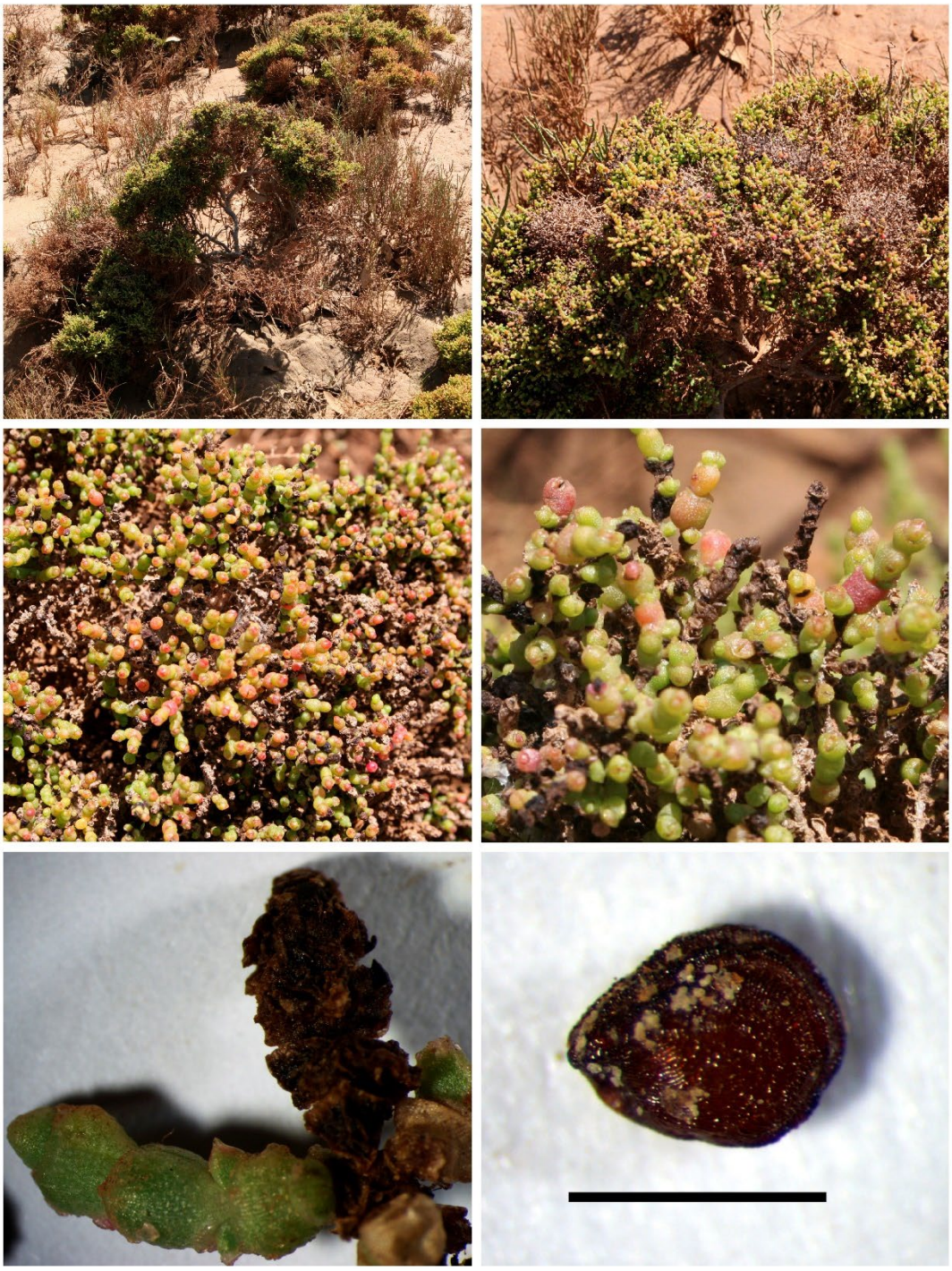


KS1349

KS1351

KS1352

KS1353



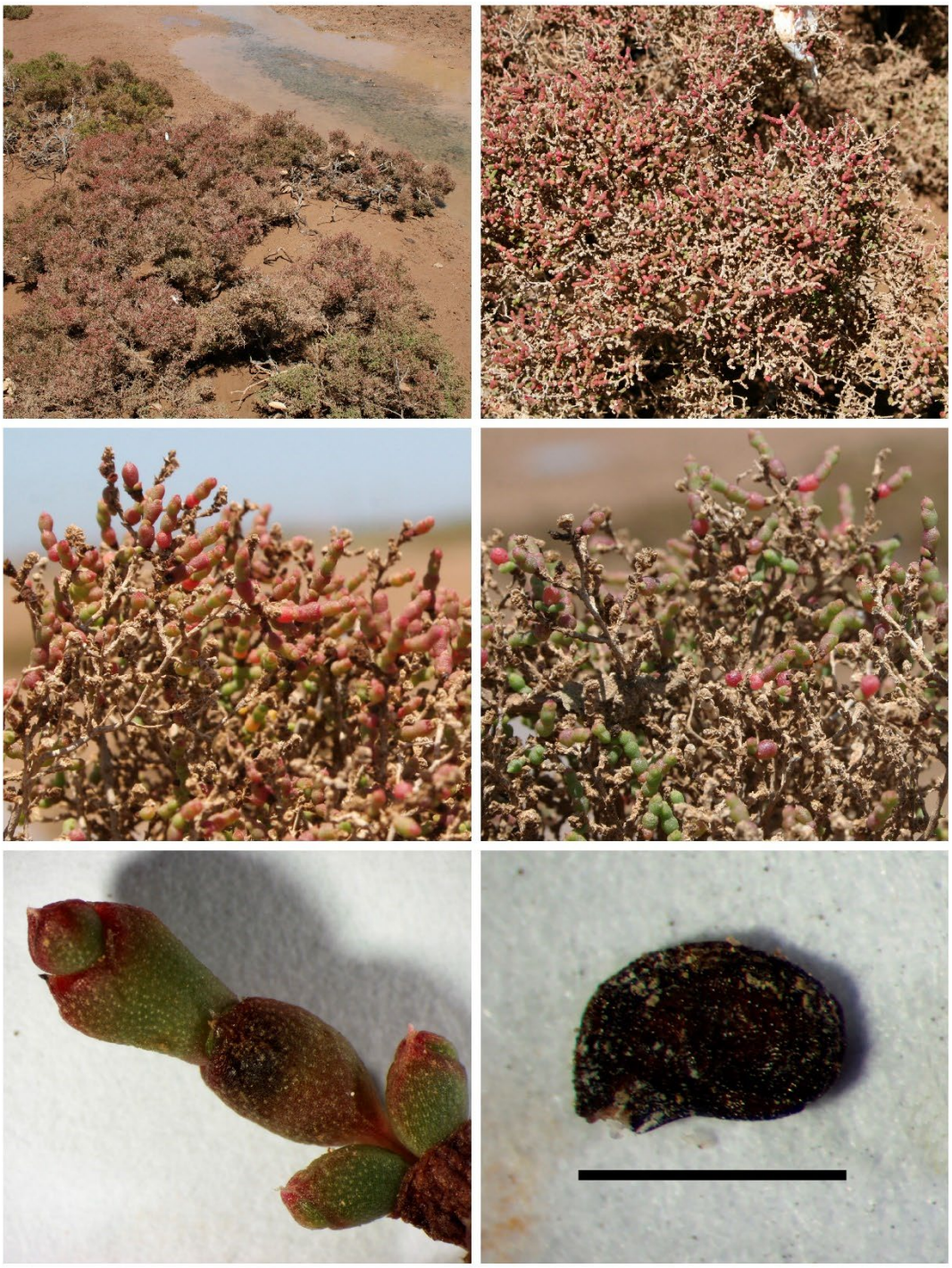
KS1358

KS1359

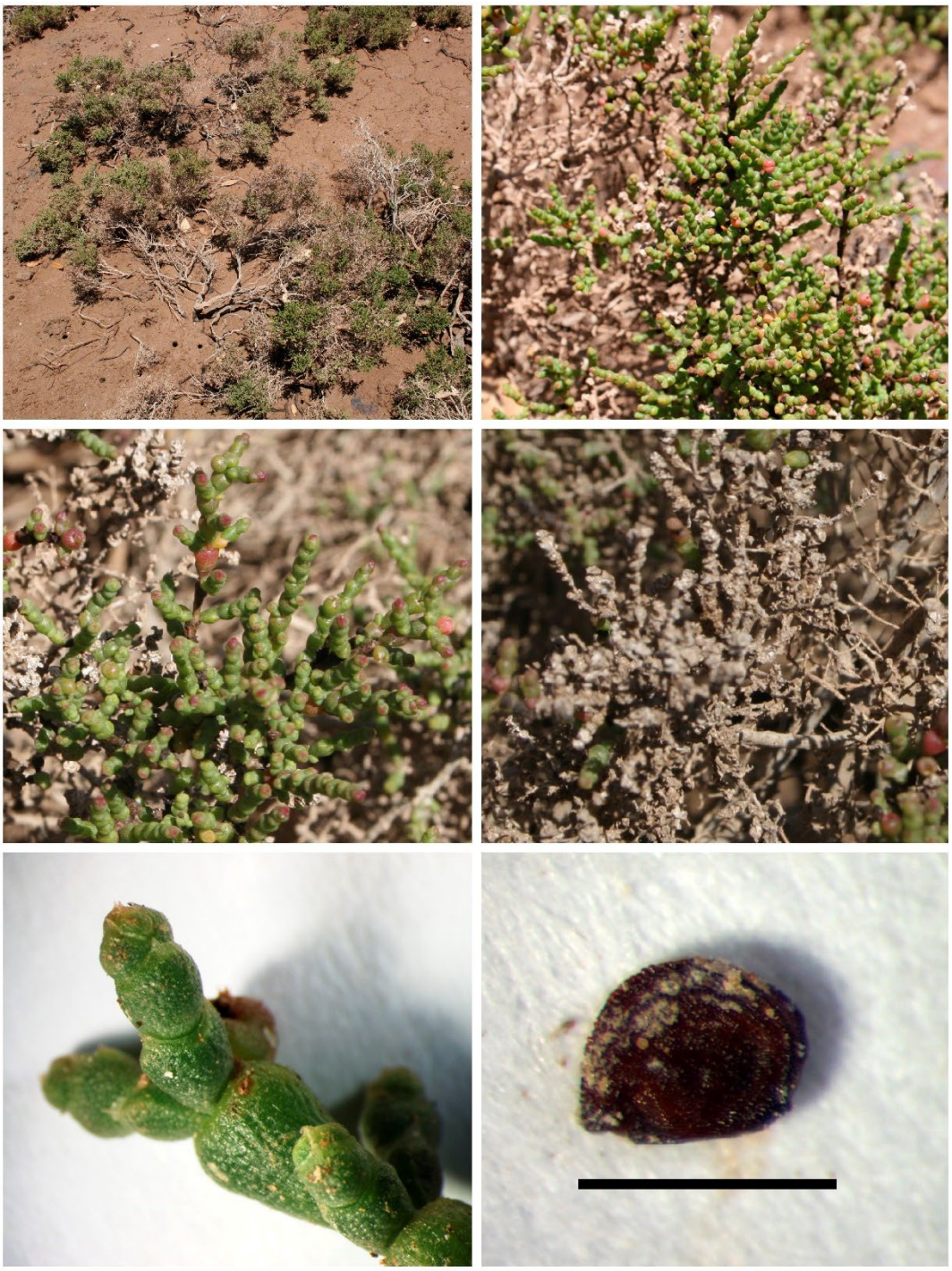
KS1360

KS1361

KS1362



KS1363



KS1364

KS1366

KS1368

KS1369

KS1371A

KS1372

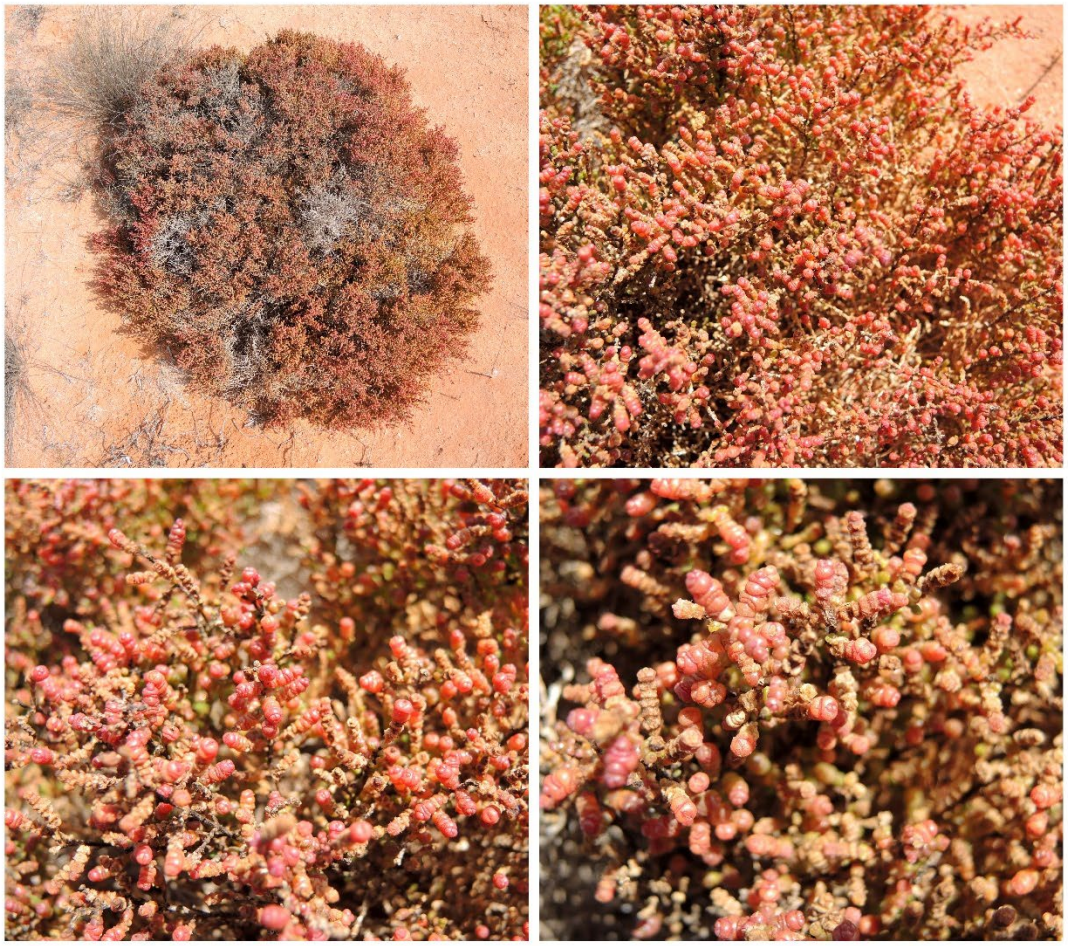
KS1373

Appendix 3. Field photographs of the Clade 2 *Tecticornia halocnemoides* subsp. *tenuis* sampled from the ESSP area and Pilbara coast in December 2023 (LH prefix) and in Port Hedland 2009 (KS prefix). Voucher information for sample numbers provided in Appendix 1. Scale bar 1 mm. Images by: A.Z. Čalasan (LH), K.A. Shepherd (KS).

LH 002

LH 005

LH 006



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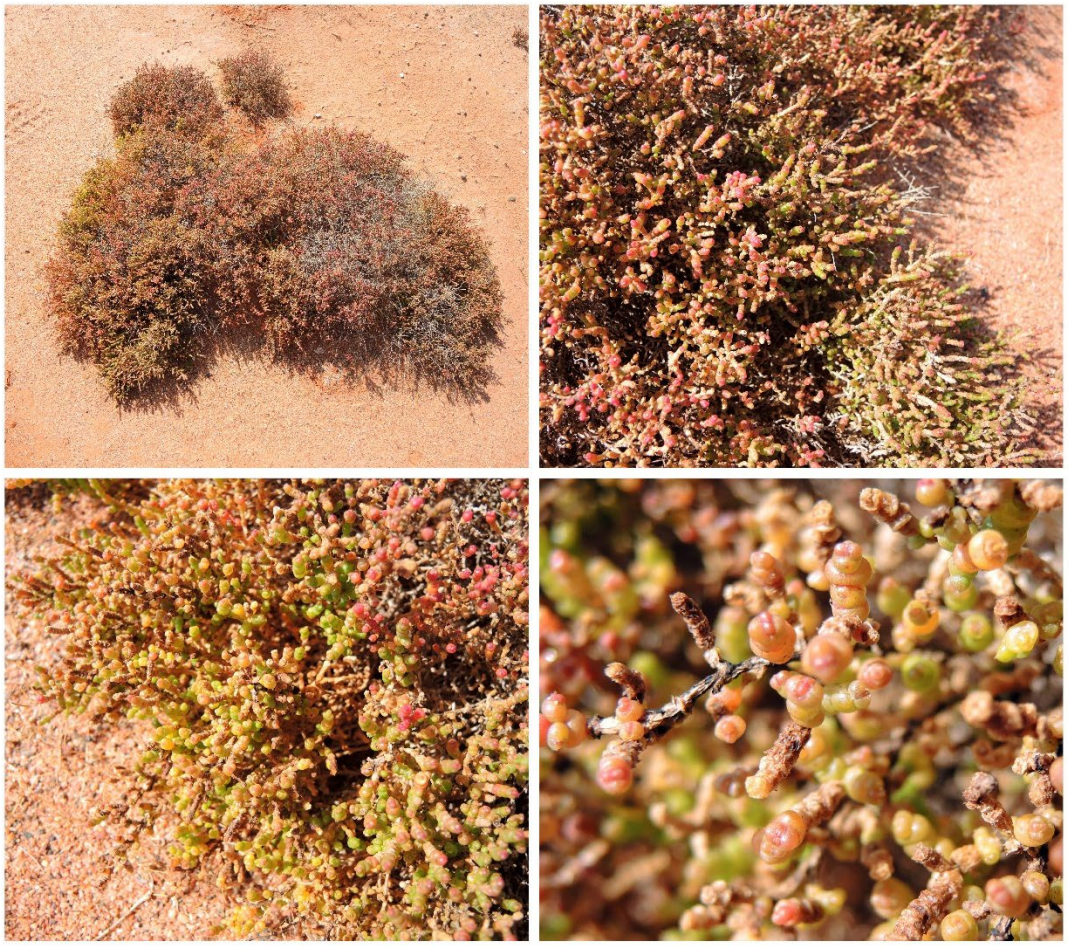

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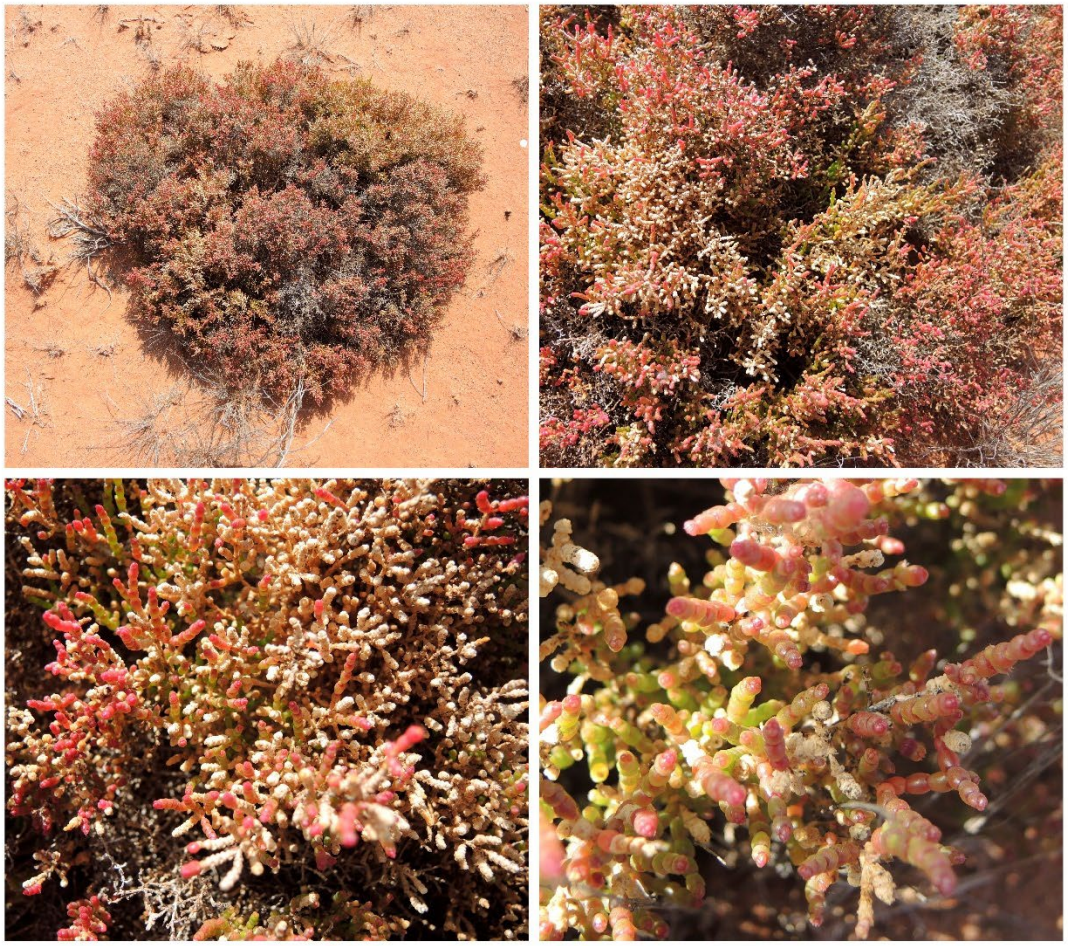
LH 010

LH 011



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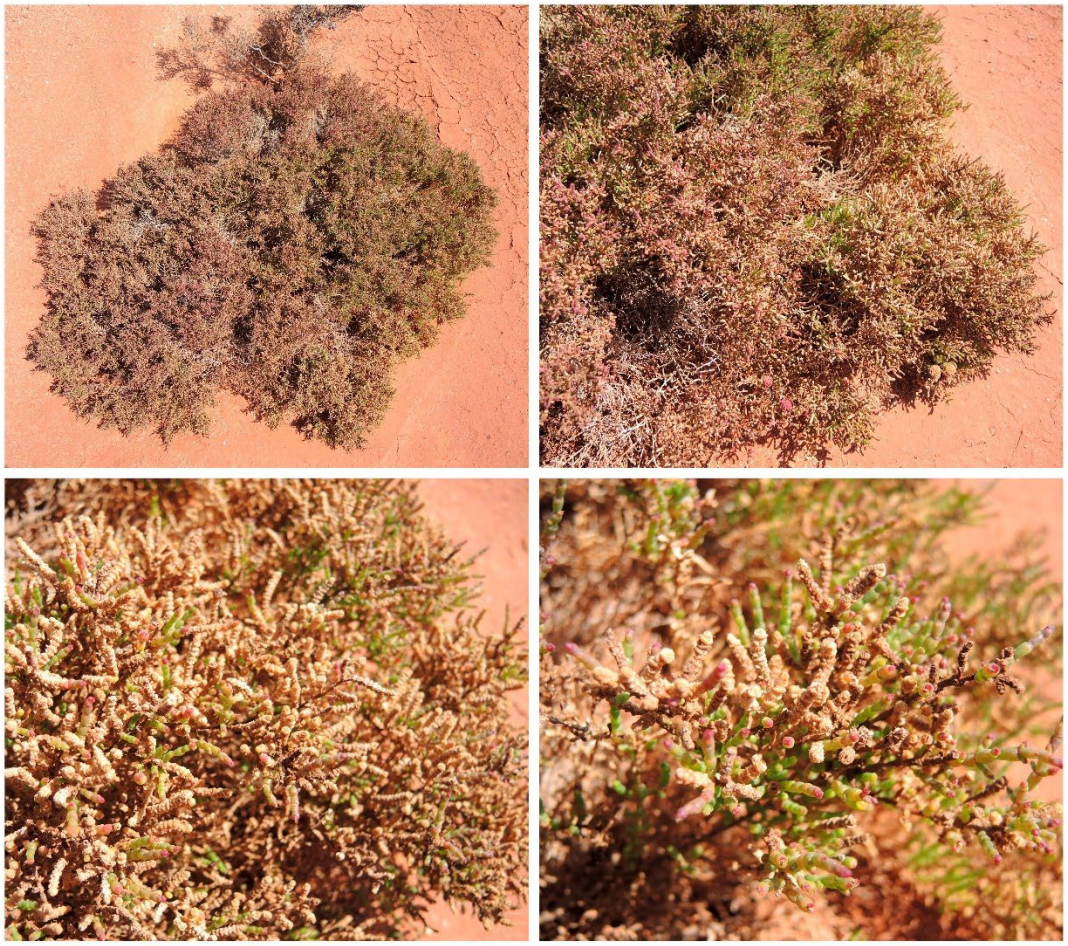
LH 014



LH 016

LH 017

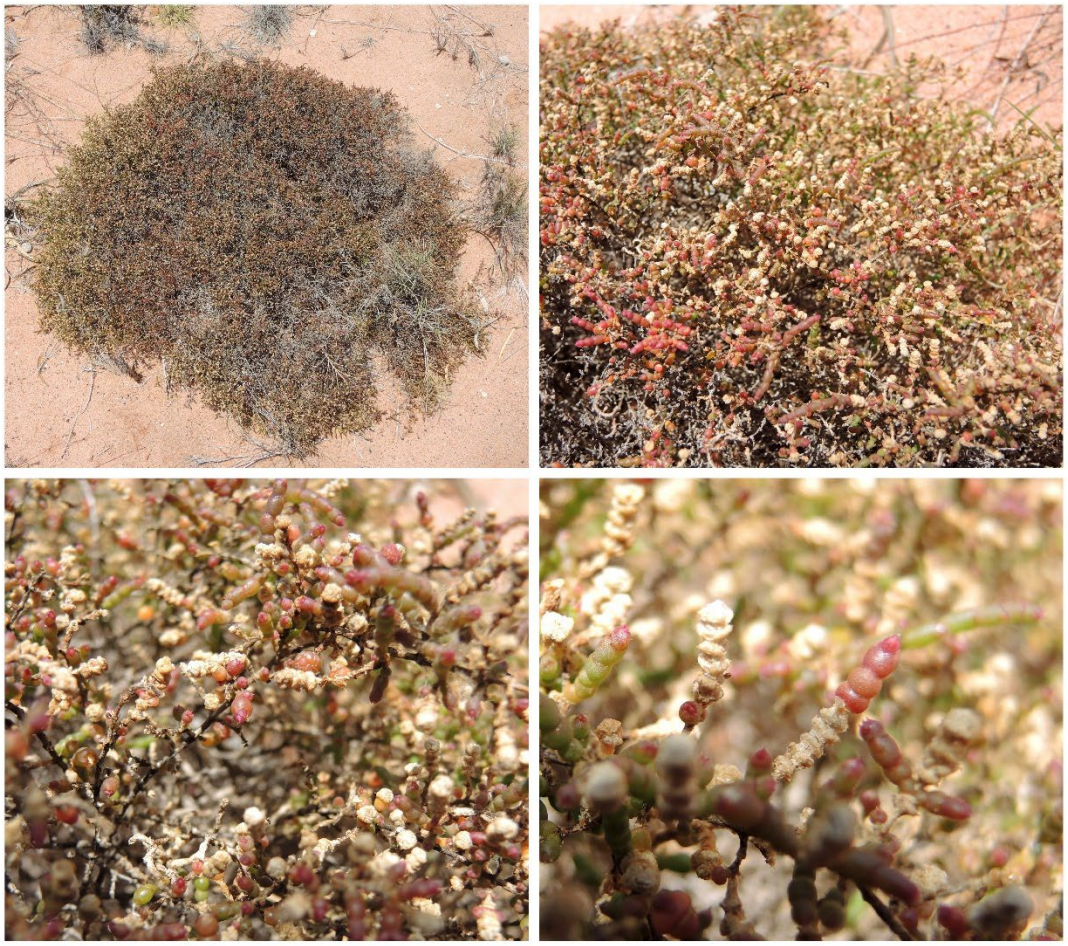
LH 018

LH 019

LH 020

LH 023

LH 024



LH 025

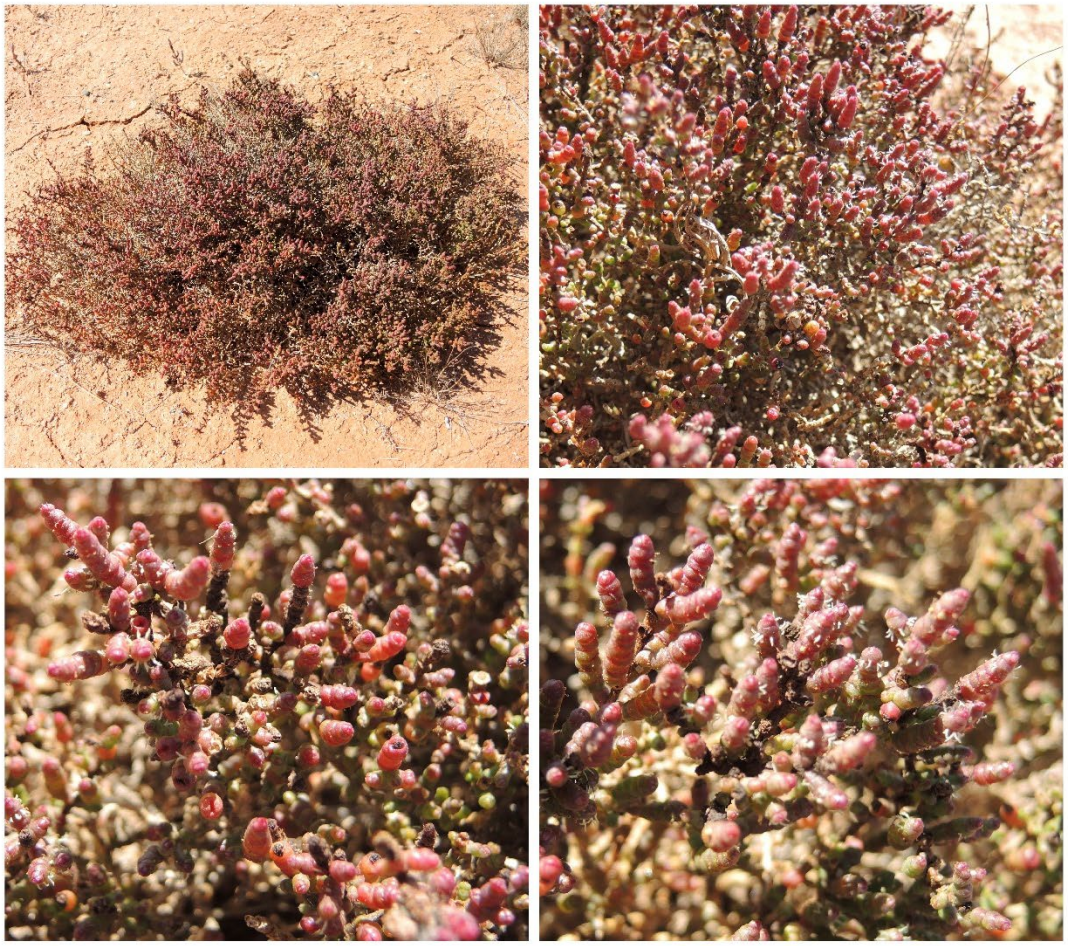
LH 026

LH 027

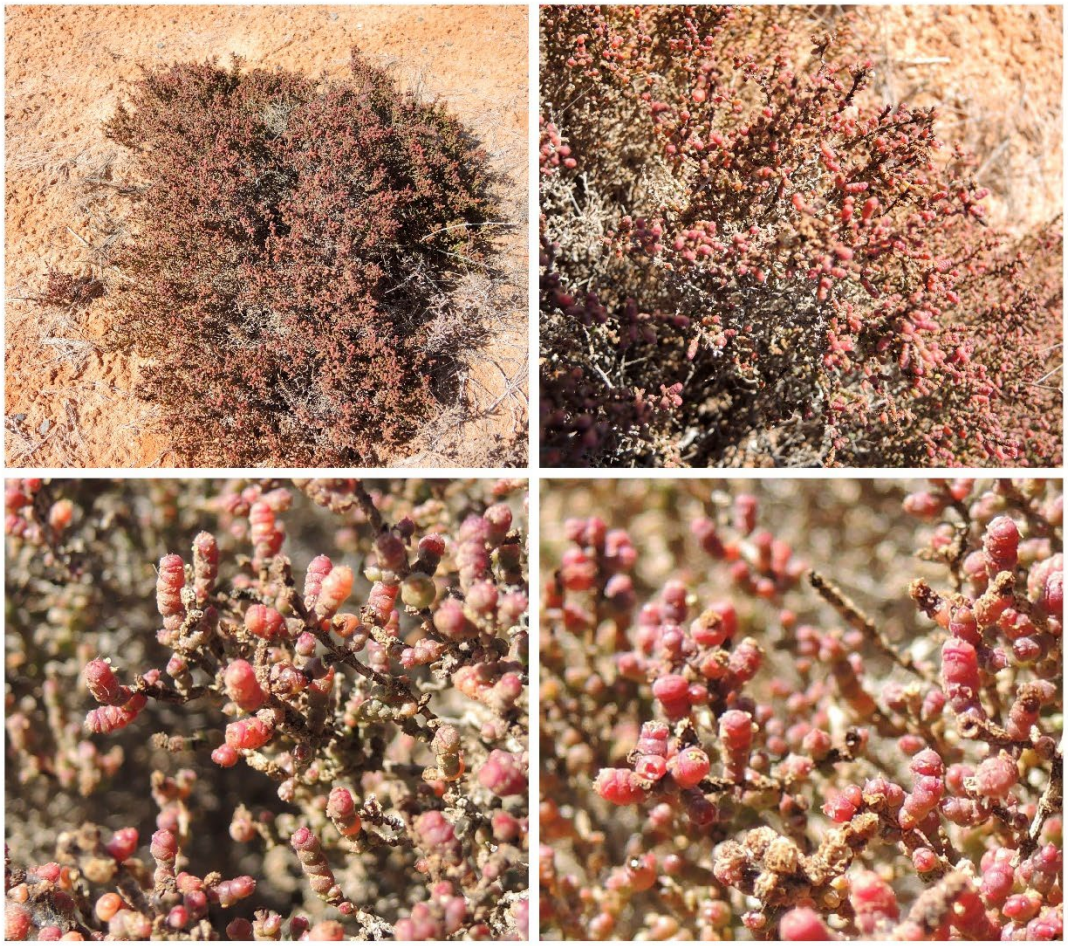
LH 028

LH 037

LH 038

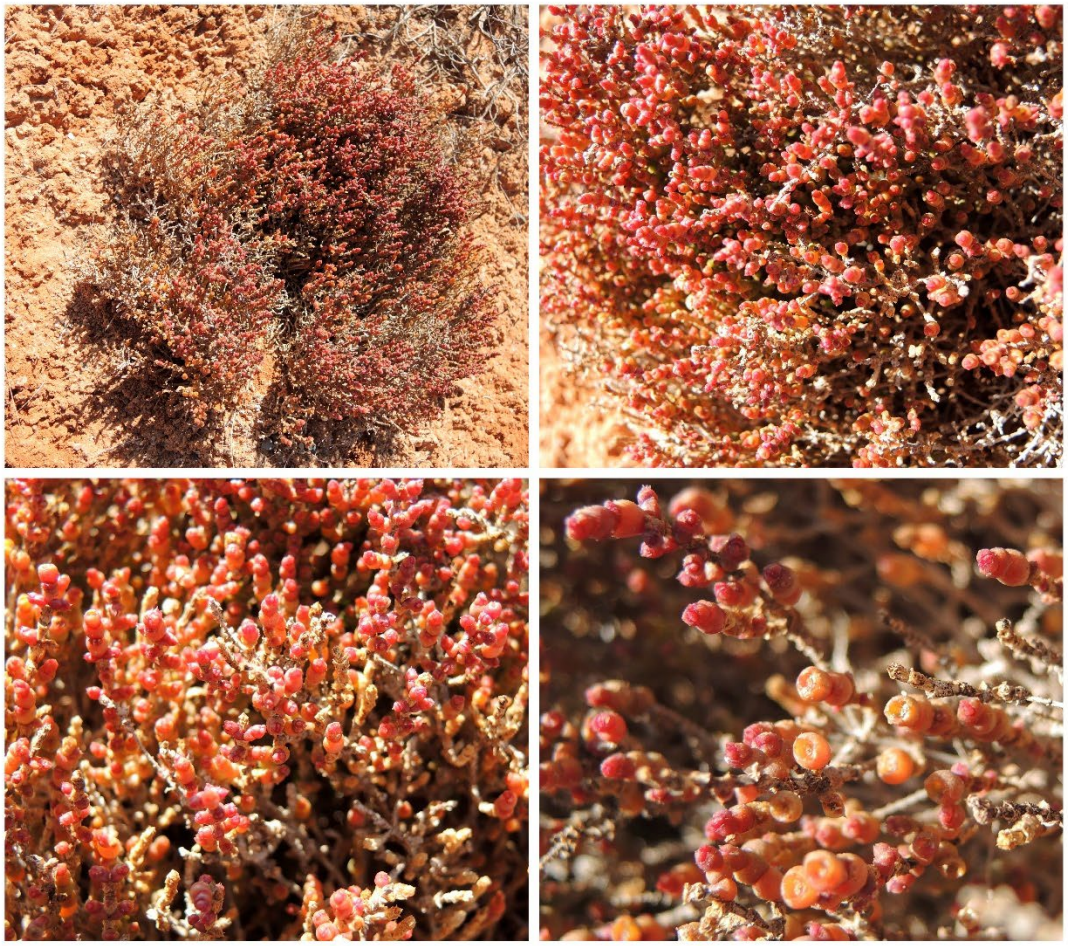


LH 039

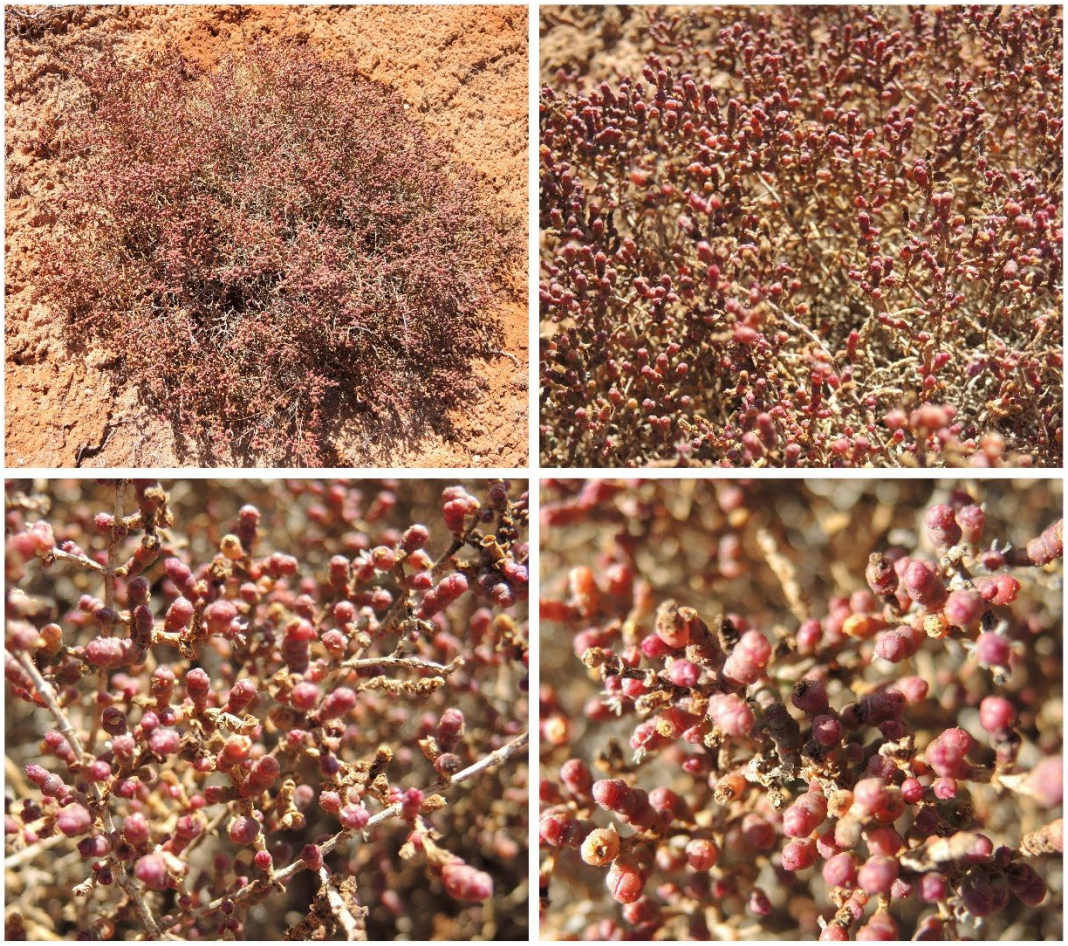


LH 040

LH 041



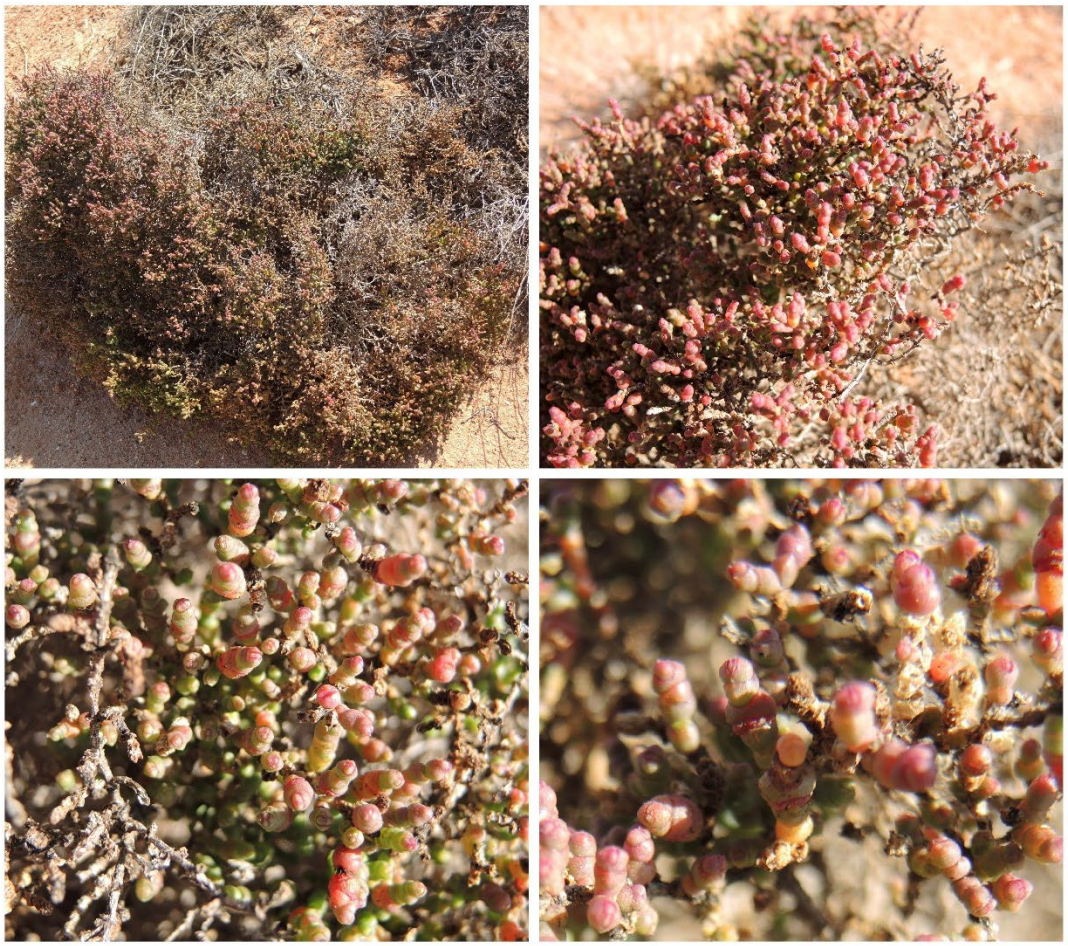
LH 042



LH 043

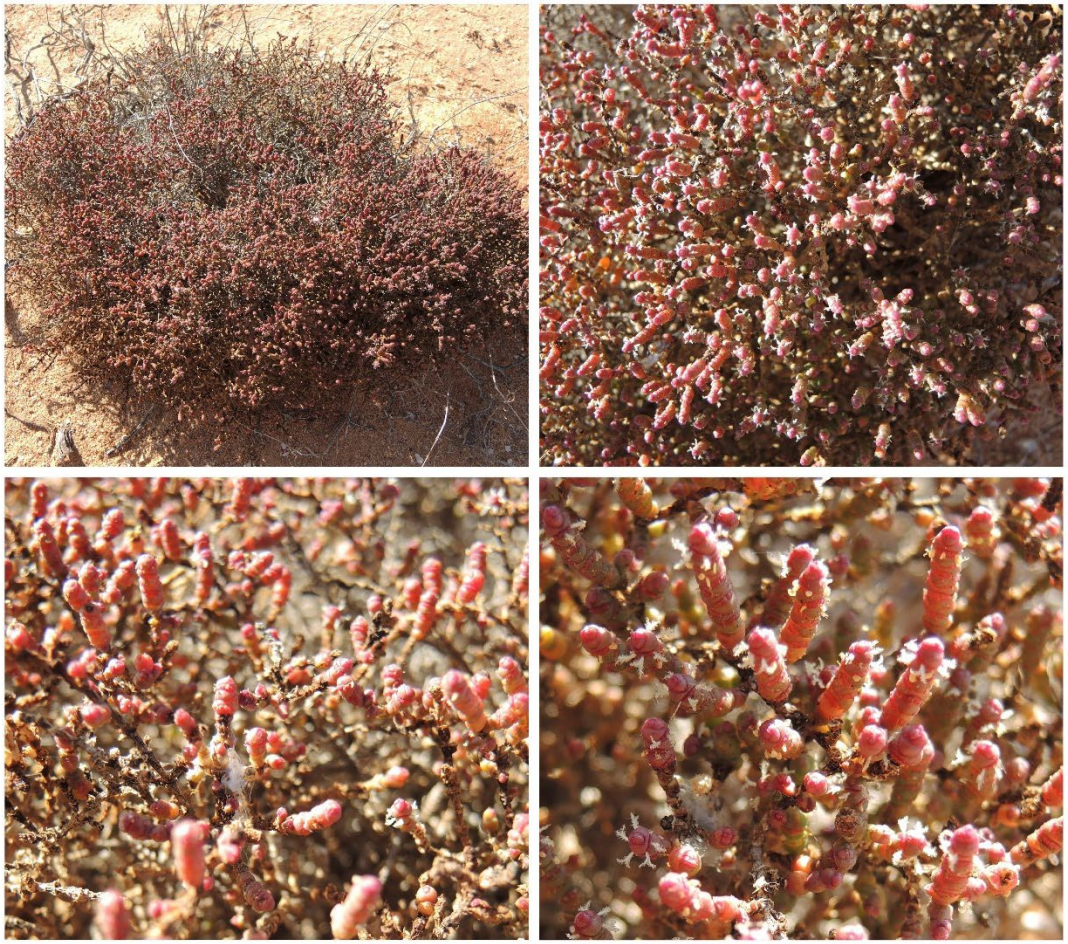
LH 044

LH 045



LH 046

LH 047



LH 048

LH 049

LH 050

LH 051

LH 052

LH 053

LH 054




LH 055

LH 056

LH 057

LH 062

LH 065

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LH 085

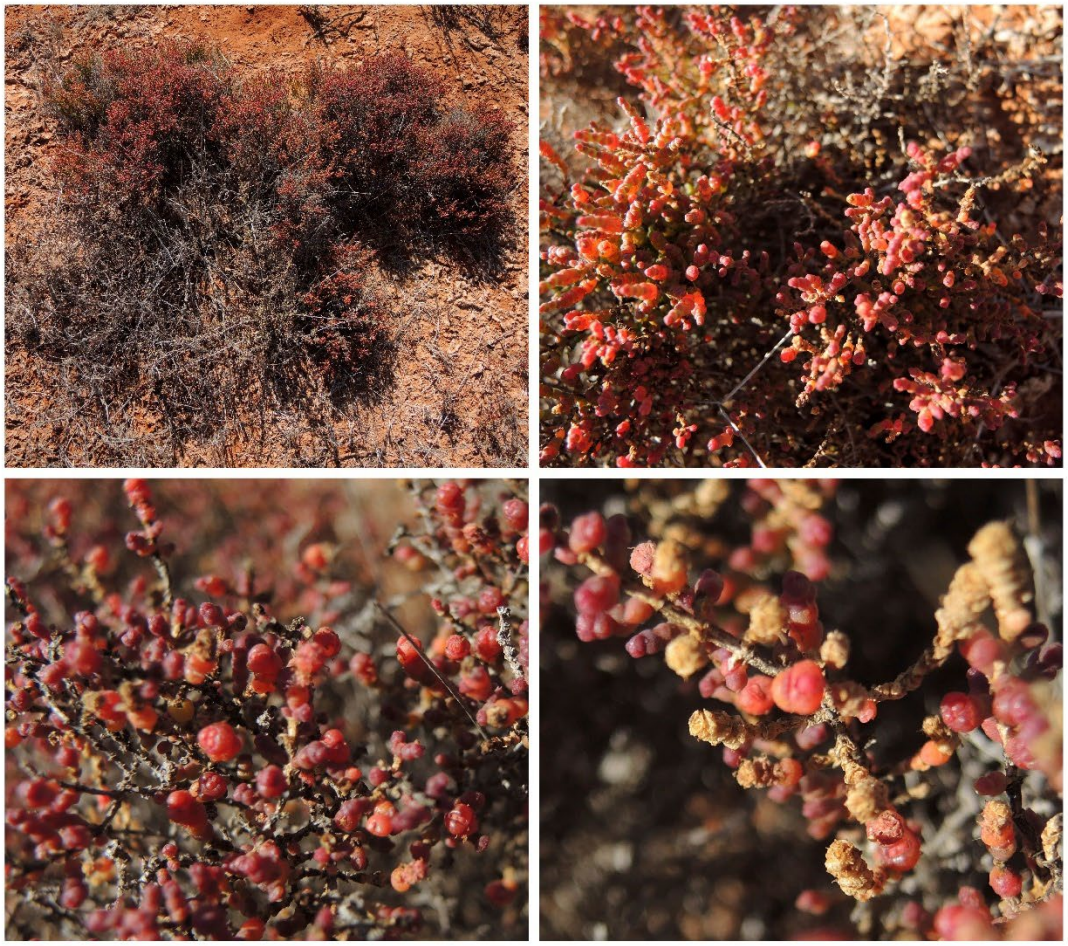
LH 086

LH 087

LH 088

LH 089

LH 090



LH 091

LH 092

LH 093

LH 094

LH 095

LH 099

LH 110

LH 111

LH 112

LH 113

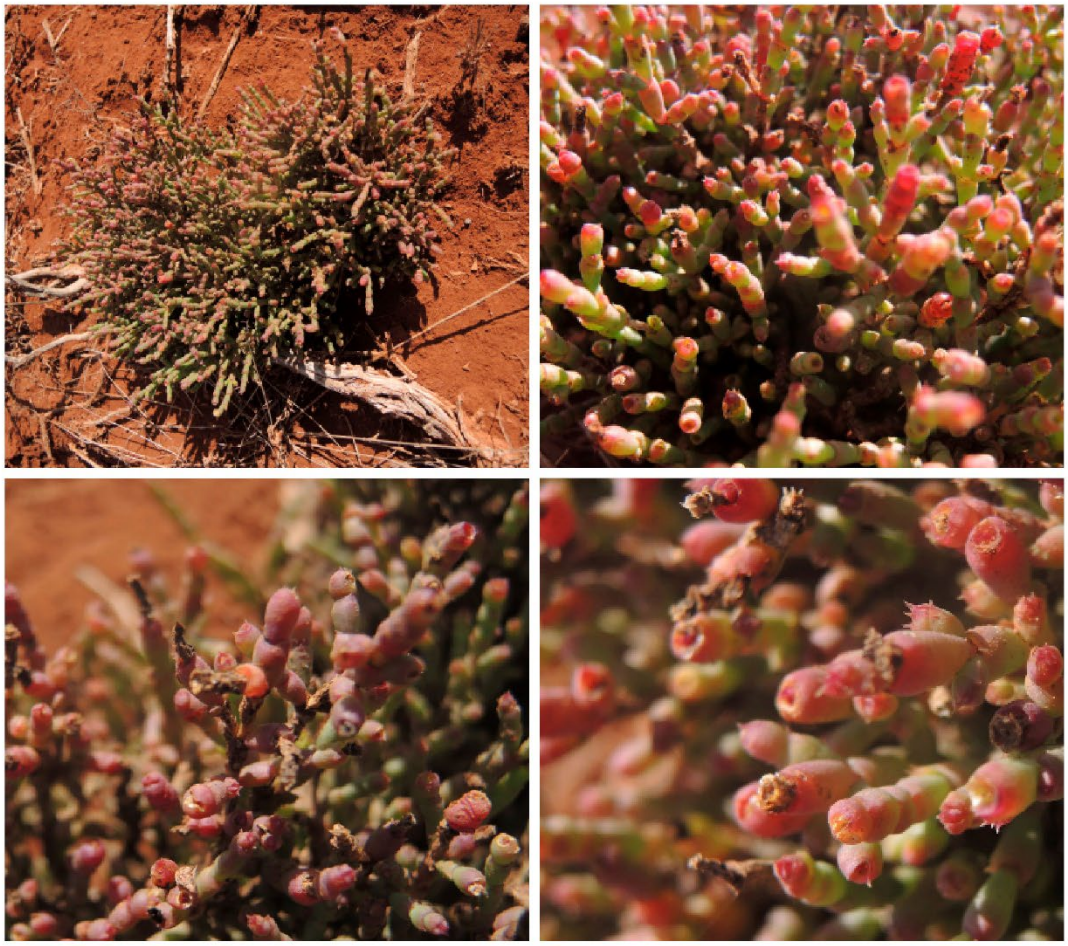
LH 114

LH 115

LH 116

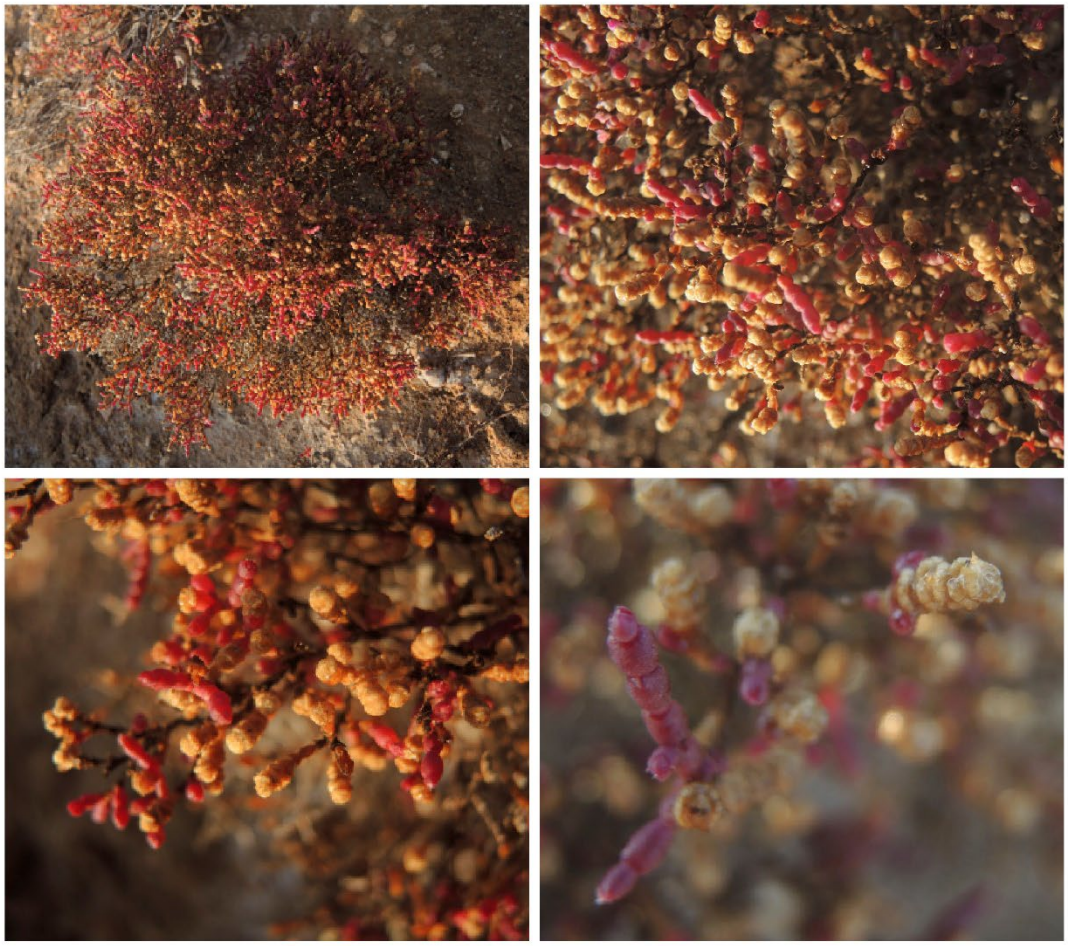
LH 117

LH 118



LH 119

LH 120



LH 121

LH 122

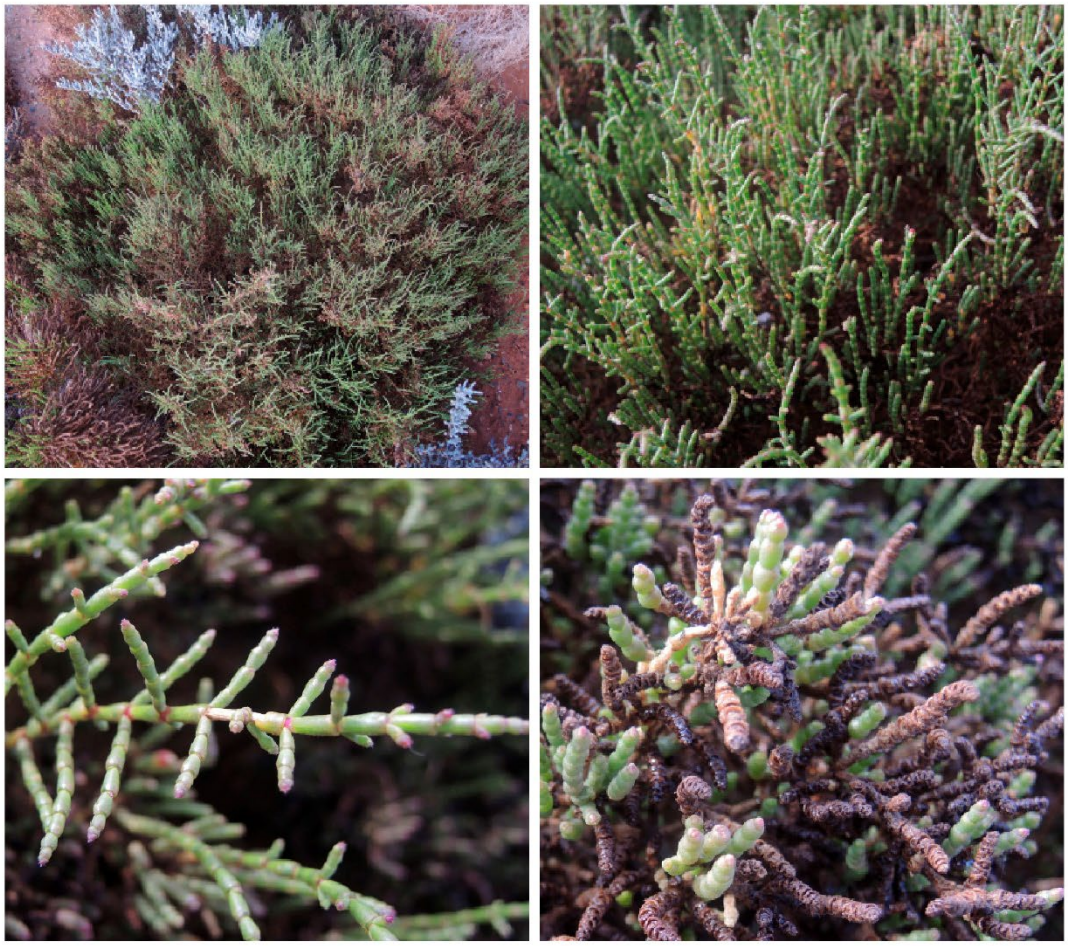
LH 124

LH 125

LH 126

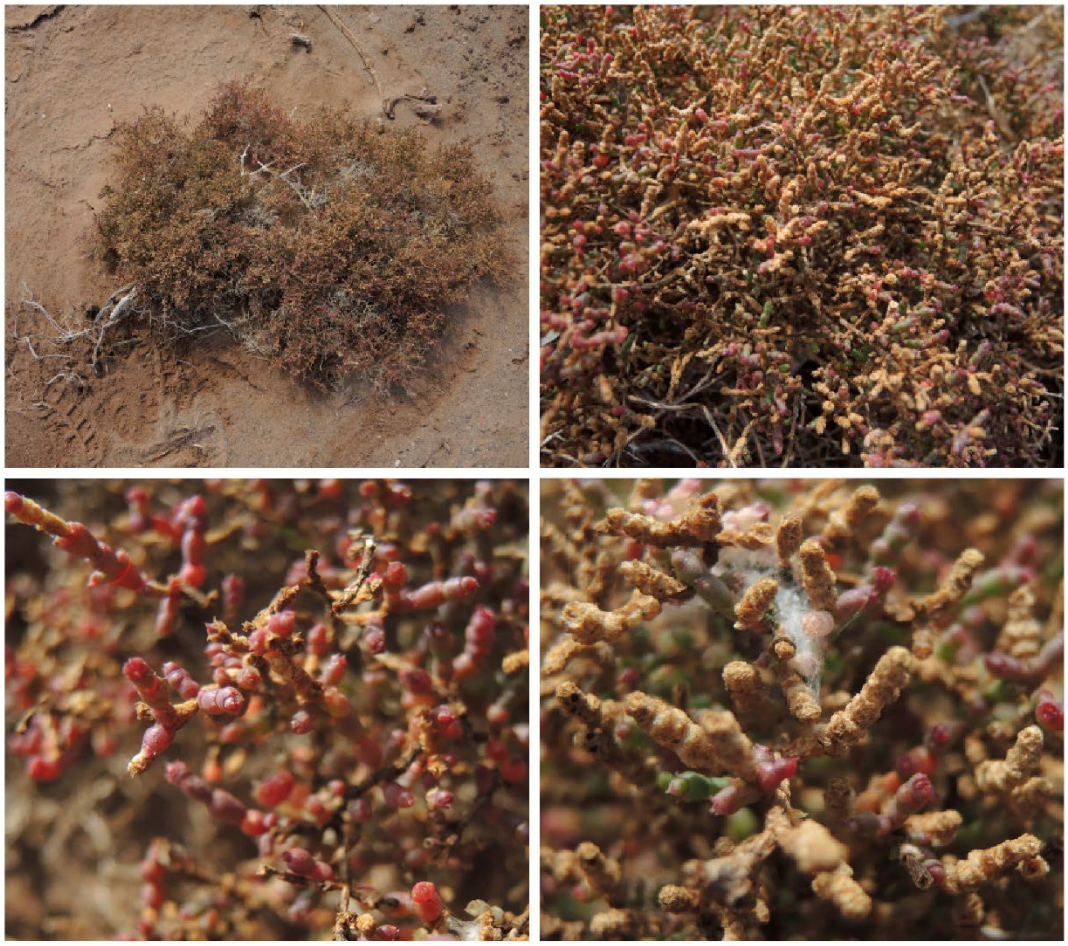
LH 127

LH 128



LH 130

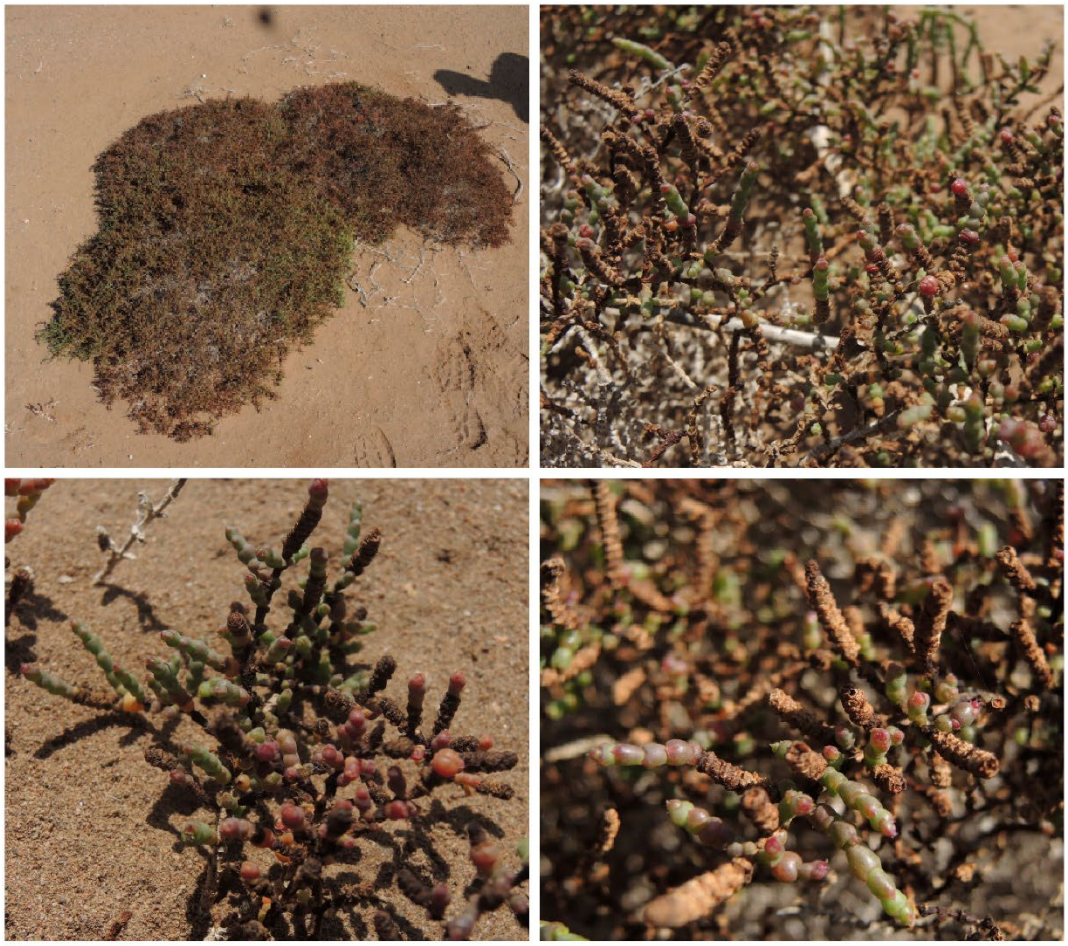
LH 131



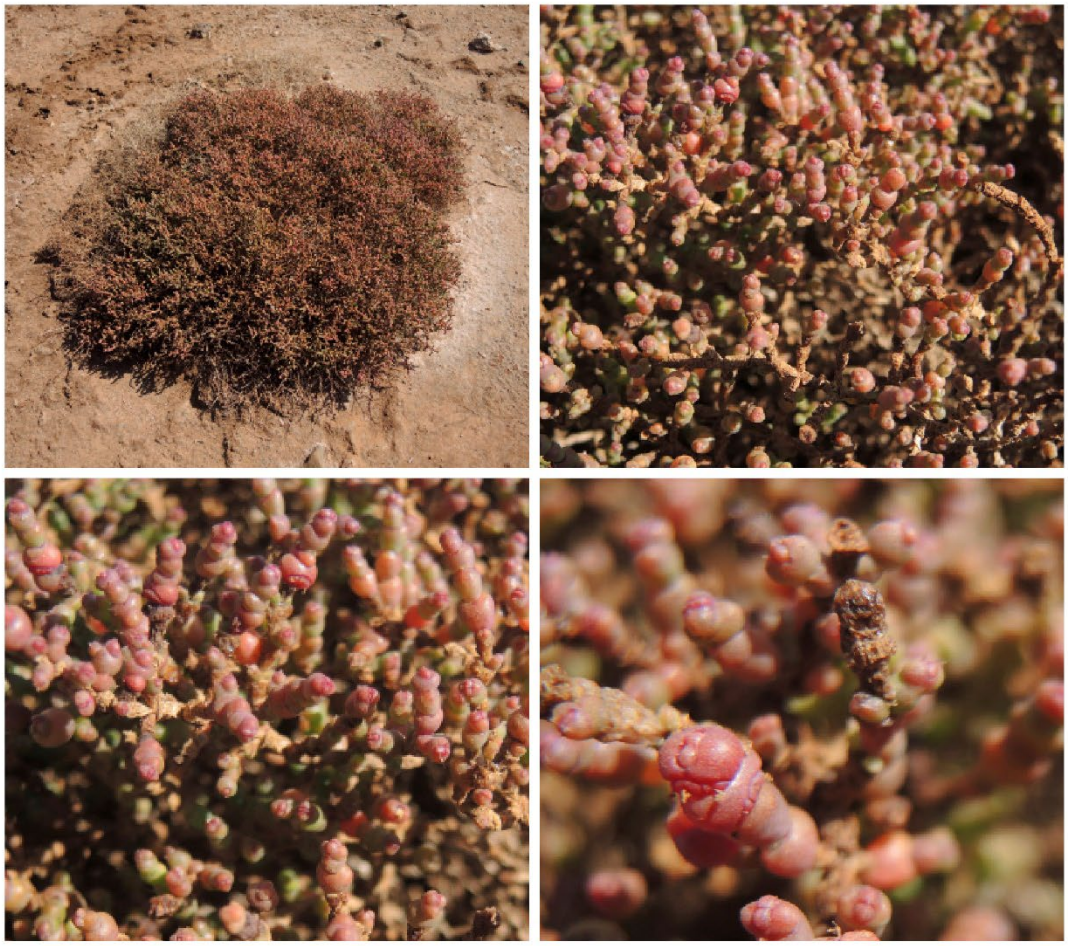
LH 132

LH 133

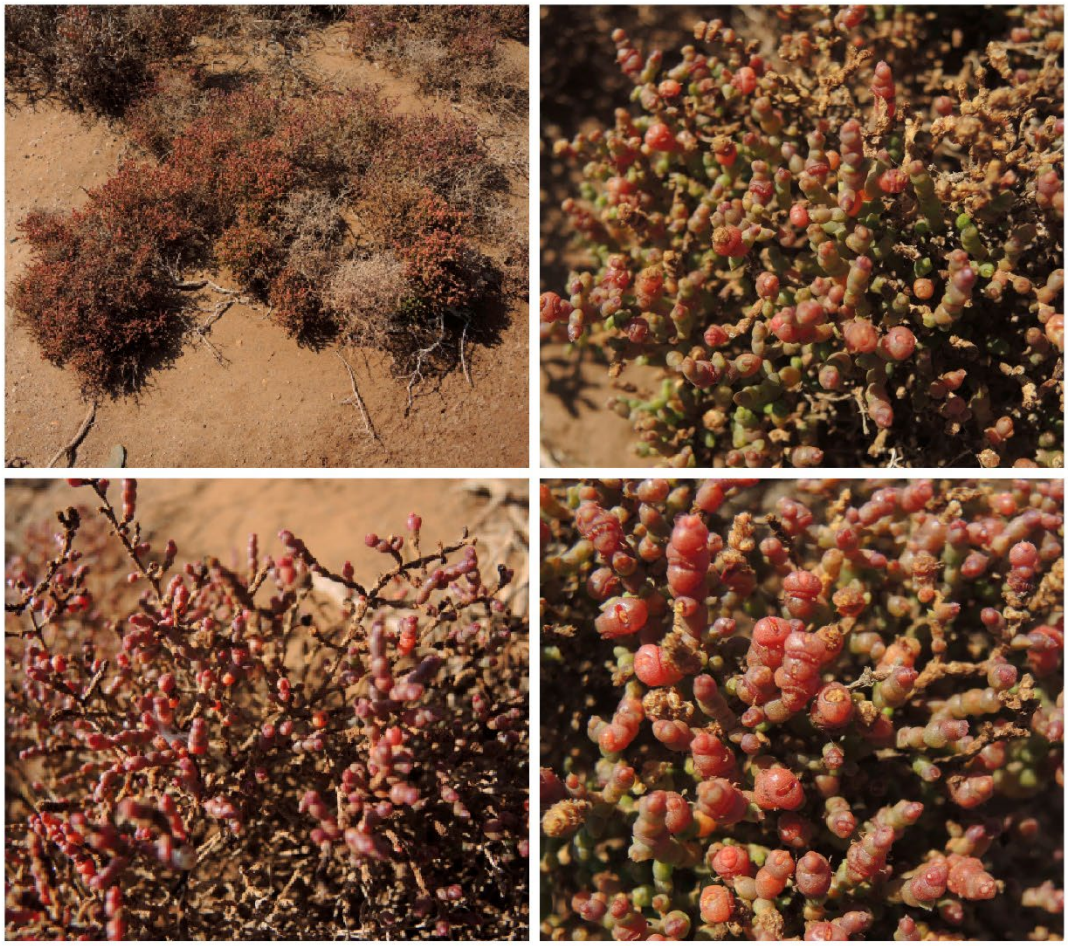
LH 134



LH 135



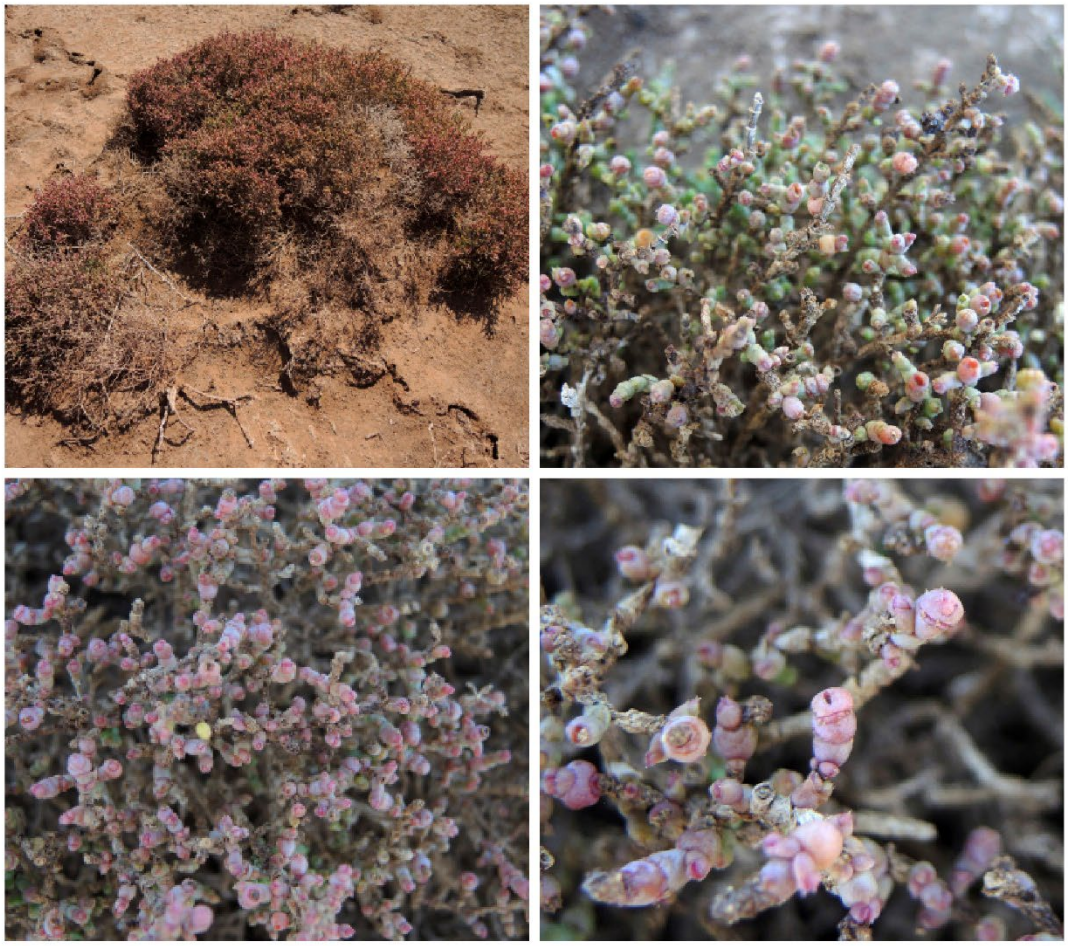
LH 136



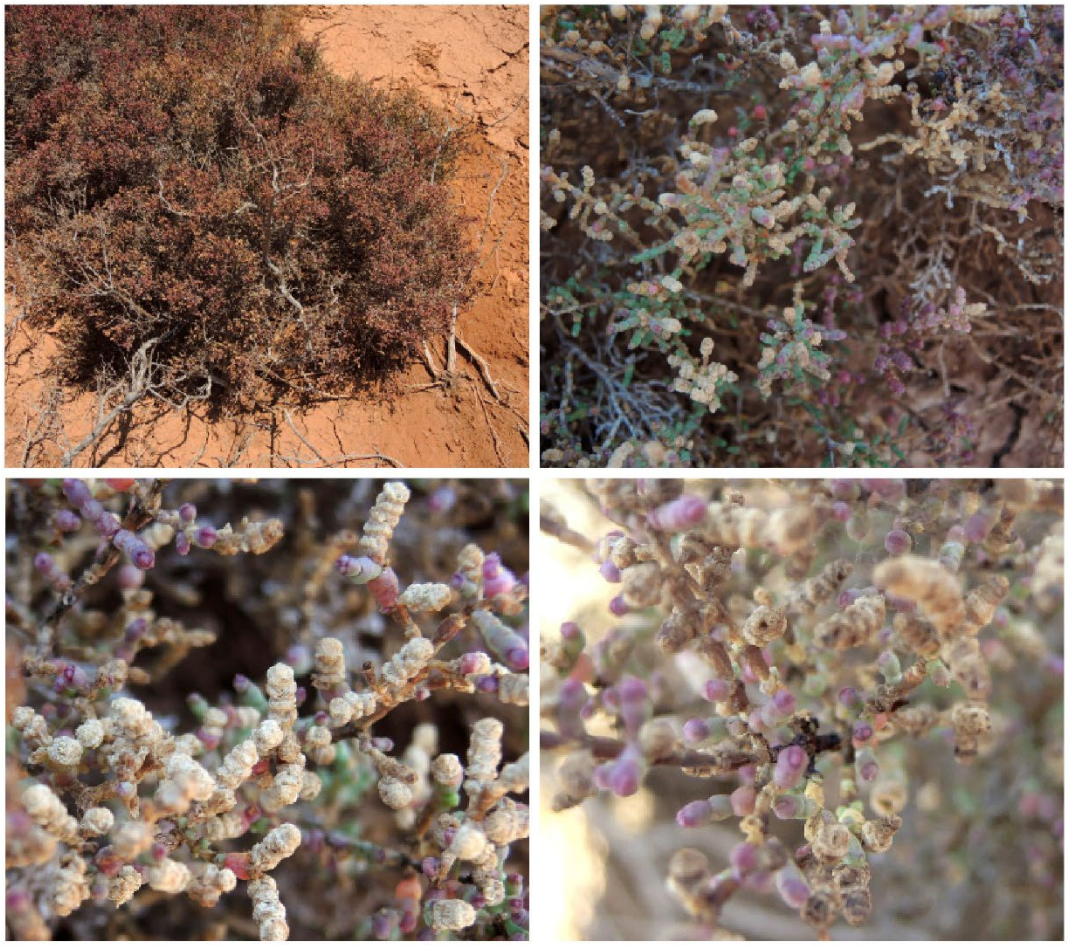
LH 137

LH 138

LH 139



LH 140



LH 141

LH 142

LH 156

KS1328

KS1330

KS1345

KS1348

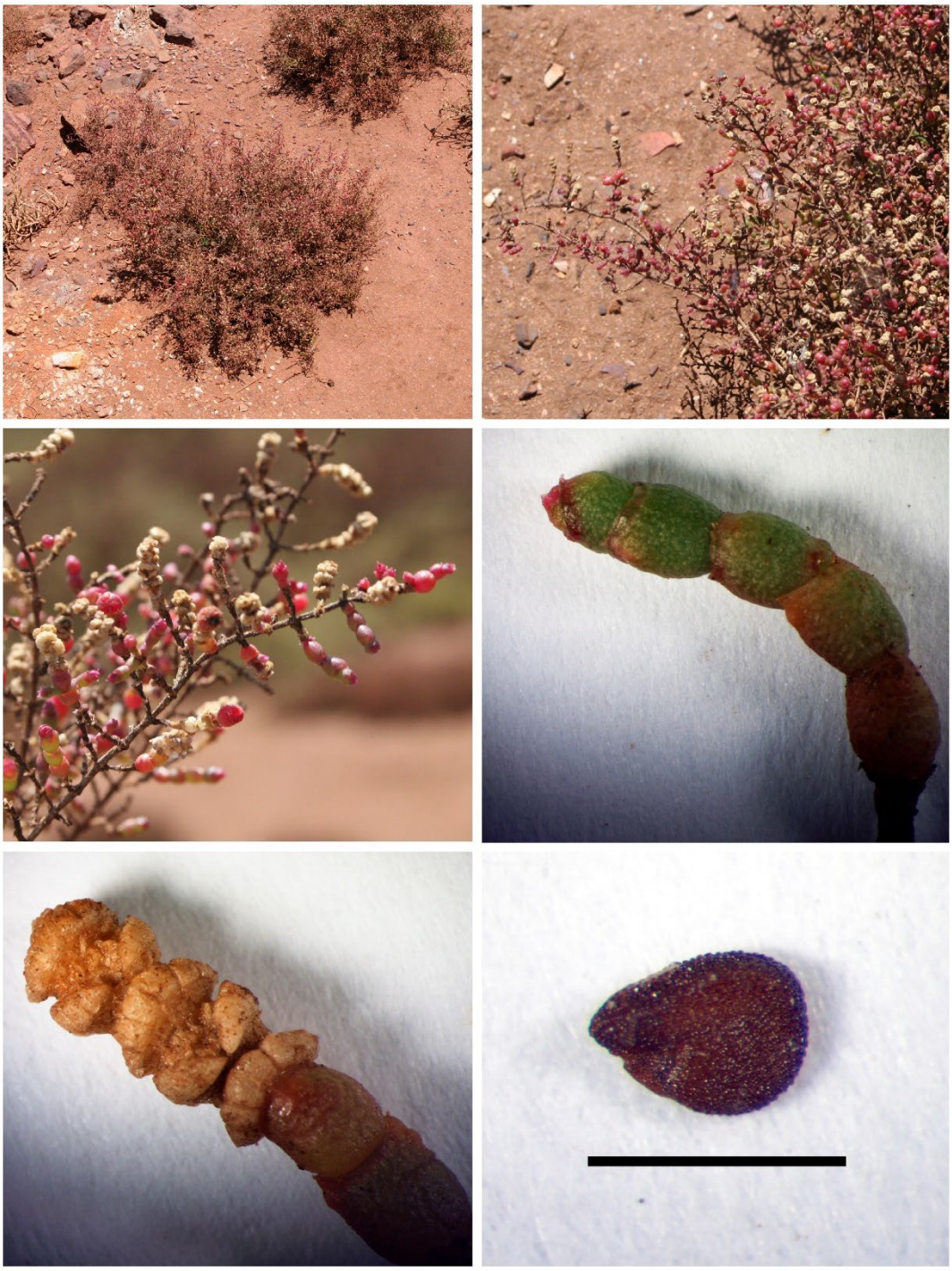
KS1350

KS1354

KS1355

KS1357

KS1367

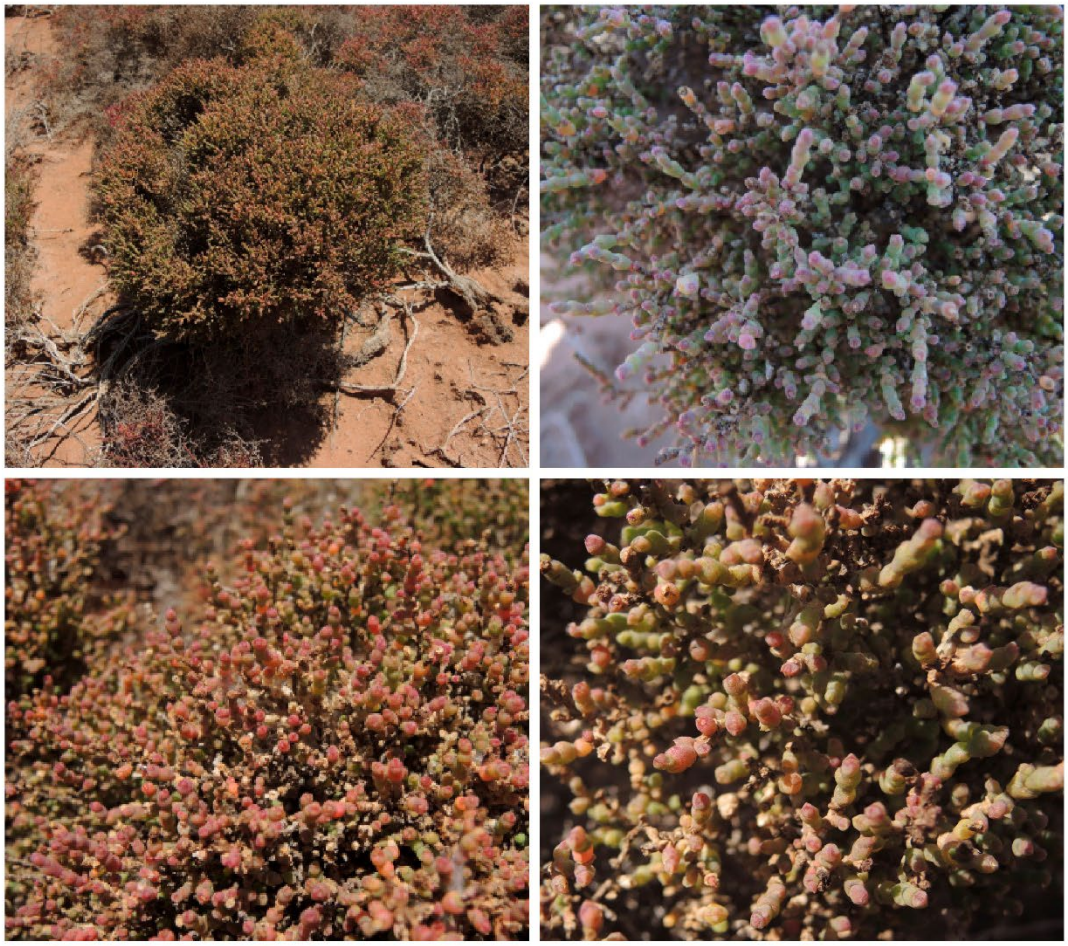


KS1370

KS1371

KS1374

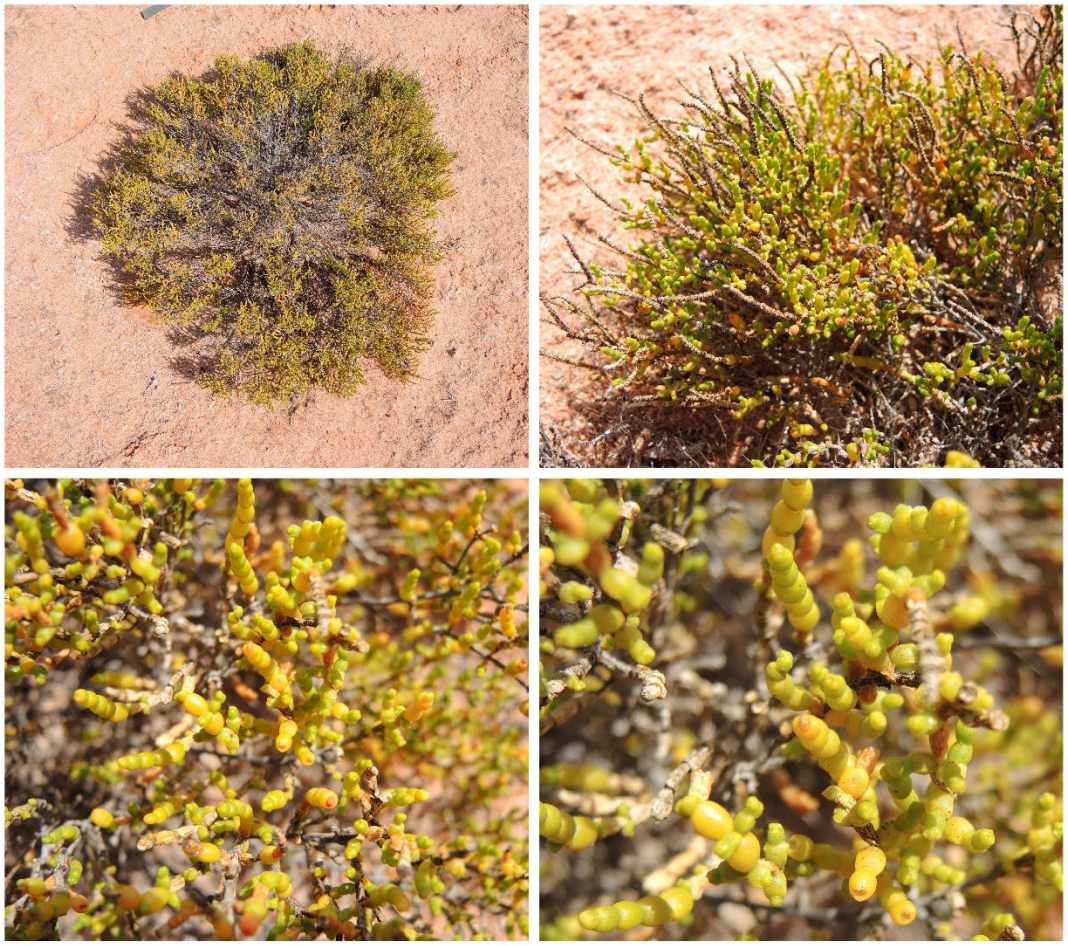
Appendix 4. Field photographs of less well resolved accessions at the base of Clade 2 *Tecticornia* aff. *halocnemoides* subsp. *tenuis* group sampled from north of the ESSP site on the Pilbara coast in December 2023 (LH prefix). Images by: A.Z. Čalasan.



LH 143

LH 158

Appendix 5. Field photographs of the Clade 7 *Tecticornia halocnemoides* subsp. *longispicata* sampled from the ESSP area and Pilbara coast in December 2023 (LH prefix) and in Port Hedland 2009 (KS prefix). Voucher information for sample numbers provided in Appendix 1. Scale bar 1 mm. Images by: A.Z. Čalasan (LH), K.A. Shepherd (KS).



LH 008

LH 015

LH 029

LH 013

LH 129





KS1343

KS1365

Appendix 6. Field photographs of the Clade 9 *Tecticornia pergranulata* sampled from the ESSP area and Pilbara coast in December 2023 (LH prefix). Voucher information for sample numbers provided in Appendix 1. Images by: A.Z. Čalasan.

LH 145

Appendix 7. Field photographs of the Clade 10 *Tecticornia pterygosperma* subsp. *denticulata* sampled from the ESSP area and Pilbara coast in December 2023 (LH prefix). Voucher information for sample numbers provided in Appendix 1. Images by: A.Z. Čalasan.

LH 068

LH 101

LH 103