ALSTERWORTHIA INTERNATIONAL

Aloe (Aloidendron, Kumara, Aloiampelos, Aristaloe, Gonialoe), Gasteria, Haworthia (Haworthiopis, Tulista), Astroloba, Chortolirion & cultivars.

***Aloe* showing *Duplachionaspis exalbida* (*Aloe* Scale)**

Contents.

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Gasteria 'Just One'

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Parentage. *Gasteria armstrongii* ♀ x unknown ♂.

Comments. From the seedpod produced by *Gasteria armstrongii* in 2004 only one plant was produced. This caught the eye of my friend Jozef Verhoeven, a hybrid collector, which resulted in me giving him a cutting. This cultivar has now become very popular, so it is formerly named here. I am grateful to Jozef for his interest in this cultivar and for his efforts in helping to make it popular.

Description. In shape it is reminiscent of *Gasteria armstrongii*, but there are significant differences. Leaves, though distichous, are shallowly S-shaped as they are curved up in the end half in the opposite direction to that of the lower half; the colour is dark green with no tubercles but many tiny, faintly-white dots in longitudinal groupings of varying densities, giving the leaf surfaces a distinctly foggy appearance, leaving only small, elongated areas of unclouded dark green. As with *Gasteria armstrongii*, the leaf ends are truncate each ending in a stout mucro.

Name. 'Just One' refers to this cultivar being the only plant produced by the seed collected from the cross.

Propagation. Offsets and leaf cuttings if you

The above photograph shows the nature and form of *Gasteria* 'Just One'.

The truncate, S-shaped, dark green leaves covered in tiny, faintly white spots of varying densities, giving the cultivar a foggy appearance, are clearly shown in more detail in the enlarged photograph below.

Longitudinal groupings of minute, faintly white spots of varying densities provide a foggy appearance of varying intensity on a dark green background. The S-shape of the leaf is also shown.

Some New Gasteria Cultivars
Hybridist, Descriptions, Photographs
D.M. Cumming

Gasteria **is a small genus with plants ranging in size from *Gasteria glomerata* up to the huge, at least for growing in a pot, *G. excelsa.* There are rosette and distichous plants, for the most part stemless, *G. rawlinsonii* being the only stemmed *Gasteria.* Throw in two 'types' of variegation, Silver/Green which appears to be mendellian in nature and yellow, red, white type variegation which gives the impression that it has never heard of Mendel. Into this mix one must throw in a few dedicated Japanese cultivators and one ends up with many desirable plants.**

It should be noted that many of the Silver/Green variegation hybrids can 'change' dependant on propagation methods. With leaf propagation one can end up with a complete Silver/Green plant where the original had darker green markings or vice versa. Even with offsets, some 'pure' Silver/Green plants can produce offsets with markings as in 'Lime Squeak' whereas in 'Babylon' all offsets are 'pure' Silver/Green.

All measurements are from flowering size plants, however, for example, the hybrid 'Cloe' with age or planting in the garden may become a lot larger, though it must be said that *excelsa* 'Cala' is a lot smaller than *excelsa*.

1. *Gasteria* 'Silver Flounce'.

Parentage: *Gasteria* 'Perfectus' ♀ *Gasteria* 'Little Warty' ♂.

Description: Rosette, to 120 mm diameter, 70 mm high, 8-10 leaves. Chunky leaf with marked silver edge, 90 mm long, 35 mm wide, partially channelled, overall appearance silver/ green. The magnified section of the leaf shows the fine detail. The leaf is essentially dark green but covered with longitudinal lines of rounded tubercles of different densities; dense at the leaf edges giving the silver flounce, less dense in the longitudinal lines between the edges with tiny densely scattered, whitish spots clouding the dark green to produce the silver/green effect. The red colour seen on some older (lower) leaves is the result of strong sunlight. Slow to offset.

Etymology: refers to the silver edge of the leaf.

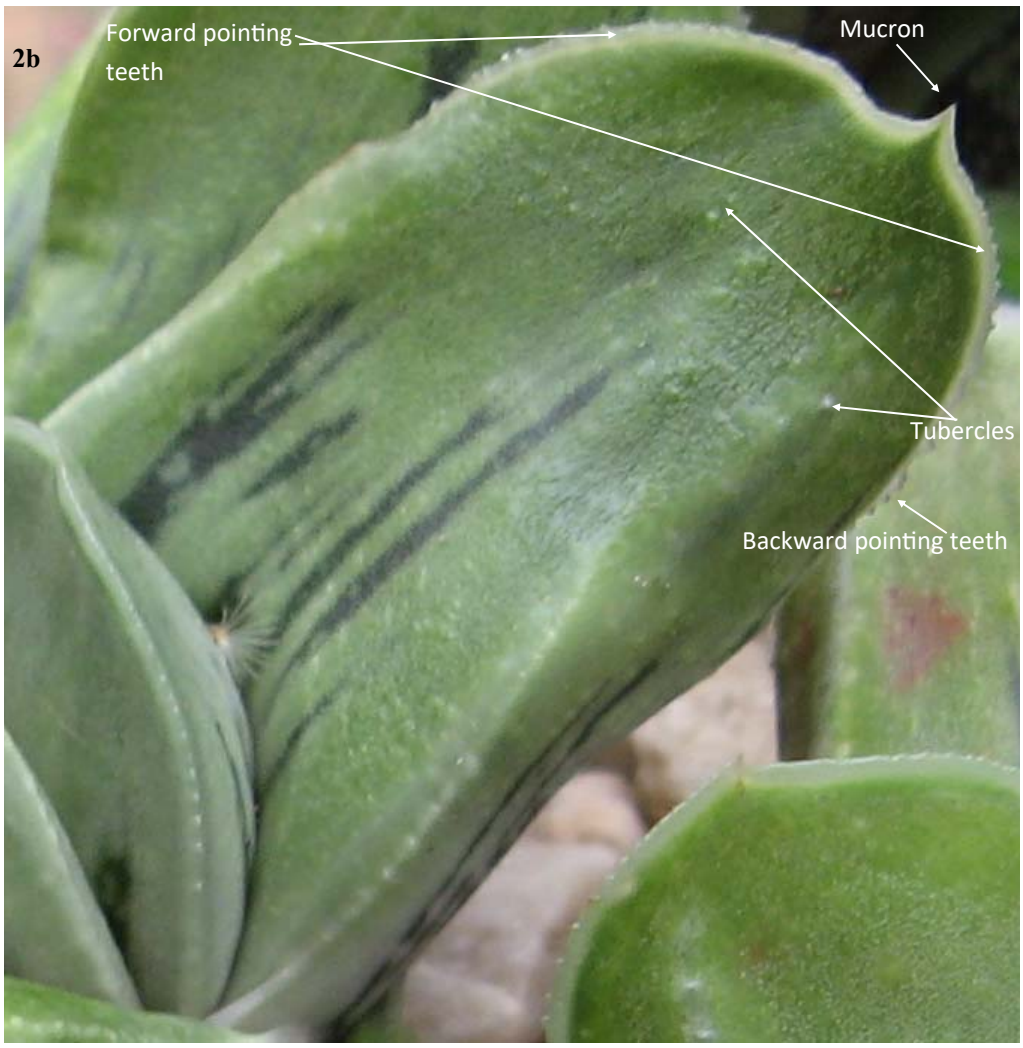

1a


1b

2. *Gasteria* 'Lime Delight'.

Parentage: *Gasteria bicolor* x *Gasteria* 'Little Warty'.

Description: Leaves distichous at first. rosette forming with age, to 70 mm in diameter, 60 mm high, 10 -12 leaves. Leaf 40 mm long, 15-20 mm wide, a predominantly 'lime' green colour. The magnified leaf reveals that the basic colour of the leaf is dark green, but most is obscured by longitudinal areas of lime green, leaving only a few longitudinal dark green areas visible. A few, small, scattered, white tubercles and many small whitish dots are found in the lime coloured parts of the leaf. In the dark green areas there are only a few small, low scattered tubercles, a few white dots and a few islands of lime green. The leaf edges are thinly outlined whitish becoming much bolder in the upper third of the leaf (cartilaginous) with minute, scattered white tubercles, end mucronate. Forms many offsets.



Etymology: refers to the 'lime' green colour of the leaves.

Propagation: Offsets.

The magnified leaf shows the nature of the small, sparsely distributed tubercles and small, numerous whitish dots and groupings on a dark green leaf, the combined effect of which is to produce a lime colour to the human eye at normal size.

The cartilaginous leaf edge, mucro and concolorus, minute forward-pointing teeth on the truncate end and the backward pointing teeth on the sides can be discerned.

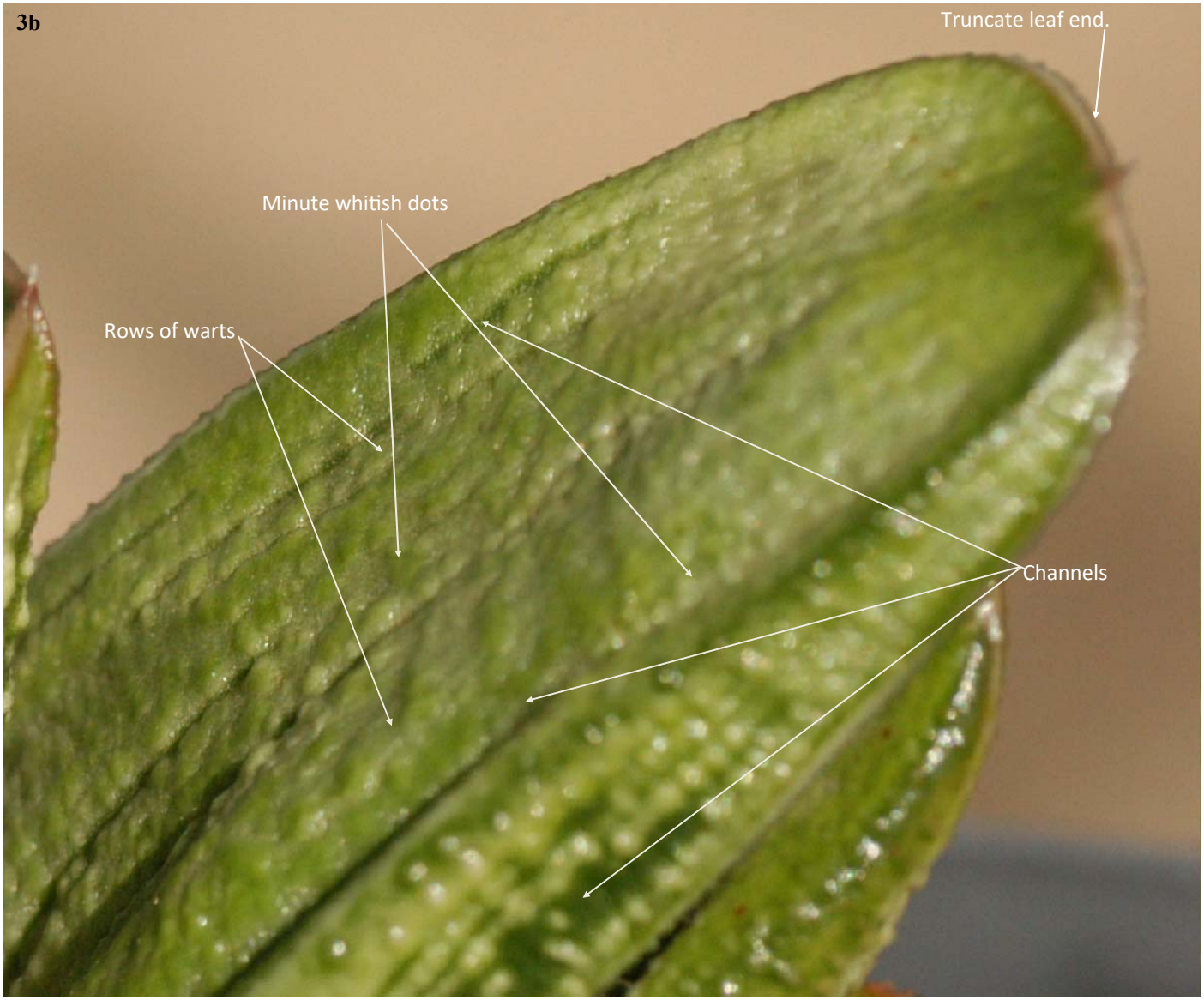
3. *Gasteria* 'Big Brother'.

Parentage: *Gasteria* 'Old Man Silver' x *Gasteria batesiana*

Description: Distichous, 8-10 leaves, 100mm long 35mm wide, upper surface slightly channelled, back slightly rounded. Leaves are truncate, dark green but covered in longitudinal rows of whitish warts and minute dots on both sides, producing a silver/green effect with only a few longitudinal dark green stripes of varying length and width. None offsetting,

Etymology: Refers to it being a sibling of "Little Warty"

Propagation: leaf cuttings or by beheading.



4. *Gasteria* 'Rip Rap'.

Parentage: *Gasteria perfectus* ♀ x a small green/silver hybrid called 'Star Gate' but never published ♂.

Description: Mostly distichous forming a rosette with age. 80mm high, 90 mm in diameter. 8-10 leaves, 70mm long, 20mm wide. Leaves are dark green covered with numerous minute, whitish dots and scattered warts giving the cultivar a silver/green appearance with only the edges of the leaves dark green for the terminal half and an outer light brownish cartilaginous edge. Leaves lack other markings. Young leaves are approximately vertical, older are slightly recurved, almost retuse. Clump forming.

Etymology: Refers to its possible use as 'building material' to create new and interesting cultivars.

Propagation: Offsets and leaf cuttings.


4a


4b

Correctly Naming Cultivars.

To be correctly named, cultivars must be named in accordance with the provisions of the International Code of Nomenclature for Cultivated Plants. This ensures that, for those genera for which there are International Cultivar Registration Authorities, the correct cultivar names are centrally listed for the entire world, which prohibits the names being used for other cultivars and for alternative names being used in place of the correct name. These are advantages for breeders, sellers and purchasers. The Japanese Haworthia Society is the ICRA for Haworthia (including Haworthiopsis and Tulista), Astroloba and Chortolirion

The ICNCP may be purchased from the International Society for Horticultural Science or it may be down loaded free of charge from < http//www.actahort.org/chronica/pdf/sh_10.pdf >. It is worthwhile getting this free copy. If you wish to publish your cultivars in English, the journal Alsterworthia International will gladly publish them for you and ensure that they comply with the ICNCP. Please contact Harry Mays at

hmays@freenetname.co.uk

5. *Gasteria* 'Silver Pipsqueak'.

Parentage: *Gasteria* 'Silver Toad' x *Gasteria baylissiana*.

Description: predominantly distichous, 40 mm high, 8-10 leaves, forms clumps. Leaves, 40 mm long, 20 mm wide, dark green, but substantially covered with many minute, whitish spots and less numerous larger, whitish spots, leaving only small areas of green visible in interrupted, longitudinal lines. The overall impression is a silver-green cultivar. For the upper third, the leaves have a whitish, cartilaginous edge and a variable number of small, whitish, rounded teeth on the sides.

Leaf undersides are similarly marked to the upper.

Etymology: Refers to the colour and size of the plant.

Propagation: Offsets.


5a

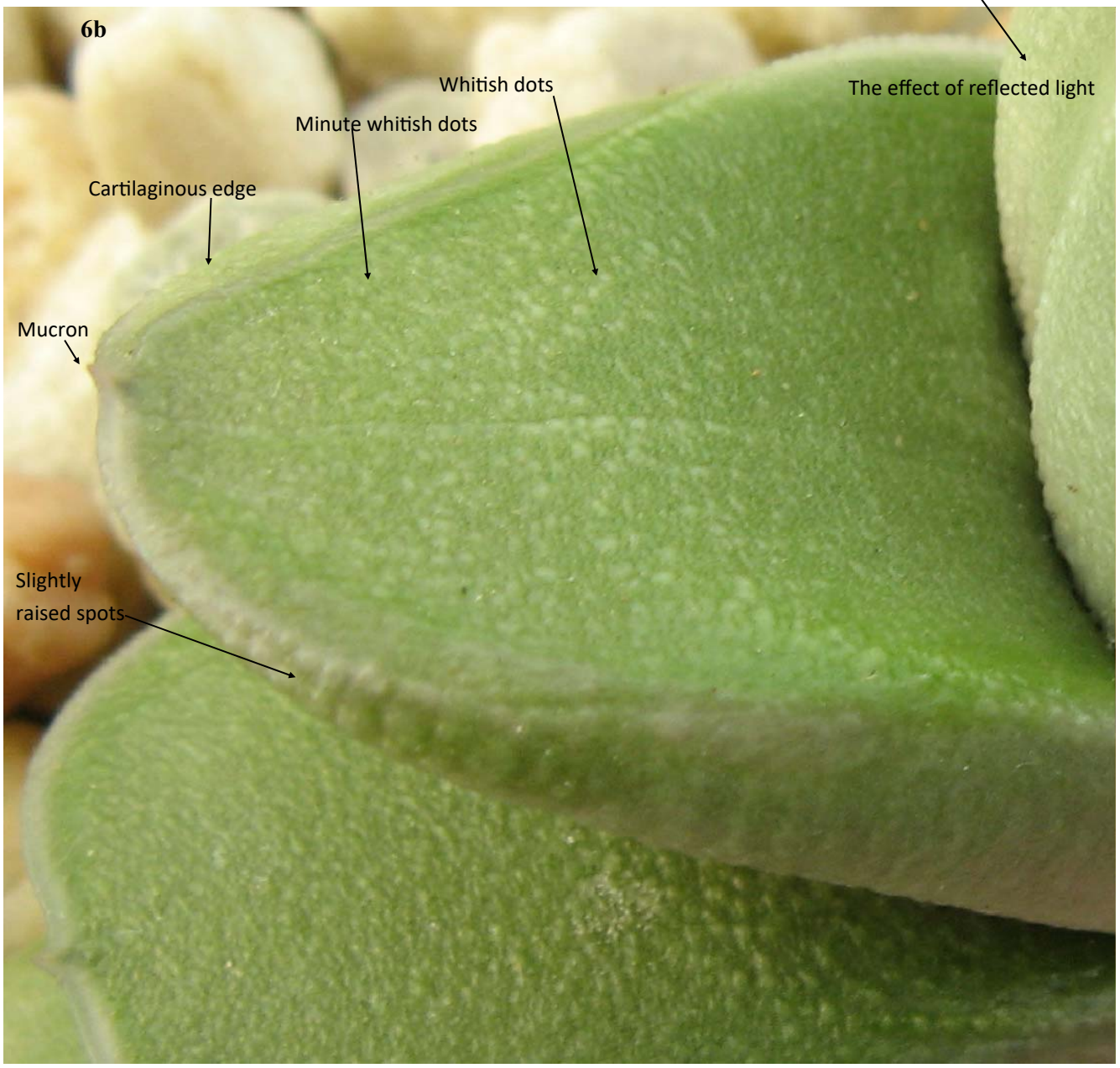
6. *Gasteria* 'Lime Squeak'.

Parentage: *Gasteria* 'Lime Delight' x *Gasteria* 'Silver Pipsqueak'

Description: Distichous, leaves 11-12, 60mm-65mm long, 35mm-40mm wide; dark green with many random, tiny whitish dots and larger whitish, rounded spots, the overall effect being a lime coloured leaf, which is enhanced by reflected light. The edge of the end third of the leaf is cartilaginous and rounded with slightly raised spots, the side edges are more of less parallel - a lorate leaf. Offsets profusely. This clone was select for the absence of other makings.

Etymology: From part of each parents name.

Propagation: Leaf cuttings.



7. *Gasteria* 'Babylon'.

Parentage: *Gasteria glomerata* x *Gasteria* 'Big Brother'.

Description: Plants distichous: leaves boat shaped with a high prow and small mucron, 80mm-90mm long, 35-40mm wide, dark green, covered with dense, small white spots. The spots are less dense on the underside. Overall effect is a silver-green leaf with no other markings.

Quite stable i.e. no markings on offsets.


7a

Etymology: No relationship to plant. Just a name.

Propagation: Offsets.


7b

8. *Gasteria* 'Glofils'.

Parentage: *Gasteria glomerata* x *Gasteria* 'Silver Flounce'.

Description: small plant, distichous, 40mm-45mm long, 30mm-35mm wide; leaves 6-8 slightly recurved, dark–green but whitish clouds cover substantial areas, remaining areas have scattered groups of whitish circles with dark green randomly exposed; a small mucron tips the leaf end; under side is similarly marked to the upper. Tiny whitish dots are scattered over the entire leaf surface. Offsets readily.

Etymology: an anagram of glo from glomerata, si from Silver and fl from Flounce.

Propagation: Offsets.

9. *Gasteria* 'Galasqueak'.
Parentage: *Gasteria* 'Galatica' x *Gasteria* 'Silver Pipsqueak"

Description: Distichous, 60 mm high. Leaf, 80 mm long, 30 mm wide, dark green with yellow striations of various widths. Whitish spots and minute dots randomly cover the whole leaf surface. Markings are the same on both leaf surfaces. Leaves edges are parallel, ends retuse.

Etymology: from parts of

10. *Gasteria* 'Cloe'.

Parentage: *Gasteria excelsa* 'Cala' x [*Gasteria* 'Old Man Silver' x *Gasteria bicolor* v. *liliputana*].

Description: Rosette 300mm diameter, 10-15 leaves, 130mm-150mm long, 50mm-55mm wide; dark green with margins defined by a prominent whitish wrap–round. The leaf margin itself is lined with small, rounded rudimentary spines. Whitish ornamentation is made up of circles, ovals and short, thin lines on both leaf surfaces plus a scattering of minute dots. Leaf tip acute with a very small mucron. Markings on the upper and lower sides are similar.

Etymology: An anagram of C from Cala, L from liliputana, O from Old, and E from excels.

Propagation: leaf cuttings.

11. *Gasteria* 'Little Sun'.


11a

Hybridist: Nectarina afra*

Parentage: *Gasteria* 'Little Warty' X ?

Description: Distichous to weak rosette; 10-12 leaves 80mm-90mm long, 35mm-40mm wide. Very dark green with glossy, whitish-green warts (bullate) in more or less longitudinal rows. Upper surface concave, lower convex. Leaf ends generally obtuse, rarely acute.

Etymology: "Little" from the parent, "Sun" from the hybridist a Greater Double collared Sunbird * see page 26, Animals.

Unfortunately I was unable to obtain his permission when naming his hybrid.

Propagation: offsets.


11a

The contrast of the dark-green leaves and the prominent bullate surfaces make an impressive picture and provide opportunities for future crosses.

12. *Gasteria* 'Glombay'.

Parentage: *Gasteria glomerata* x *Gasteria baylissiana.*

Description: Distichous; 8-10 leaves 55mm-60mm long, 40mm-45mm wide 25-26mm thick, dark-green but substantially covered with prominent (greenish) white spots presenting a sculptured silvery-green picture. Leaf end retuse with a thin cartilaginous rim. Slowly forms offsets.

The flowers are equally impressive; flower stalk, deep red; gasteriform portion, bright red; tubular throat and mouth, white with curved back white tips and green stripes. The flowers are denser than in most cultivars.

Etymology: In part from parentage.

Propagation: Leaf cuttings and occasional offsets.


12a

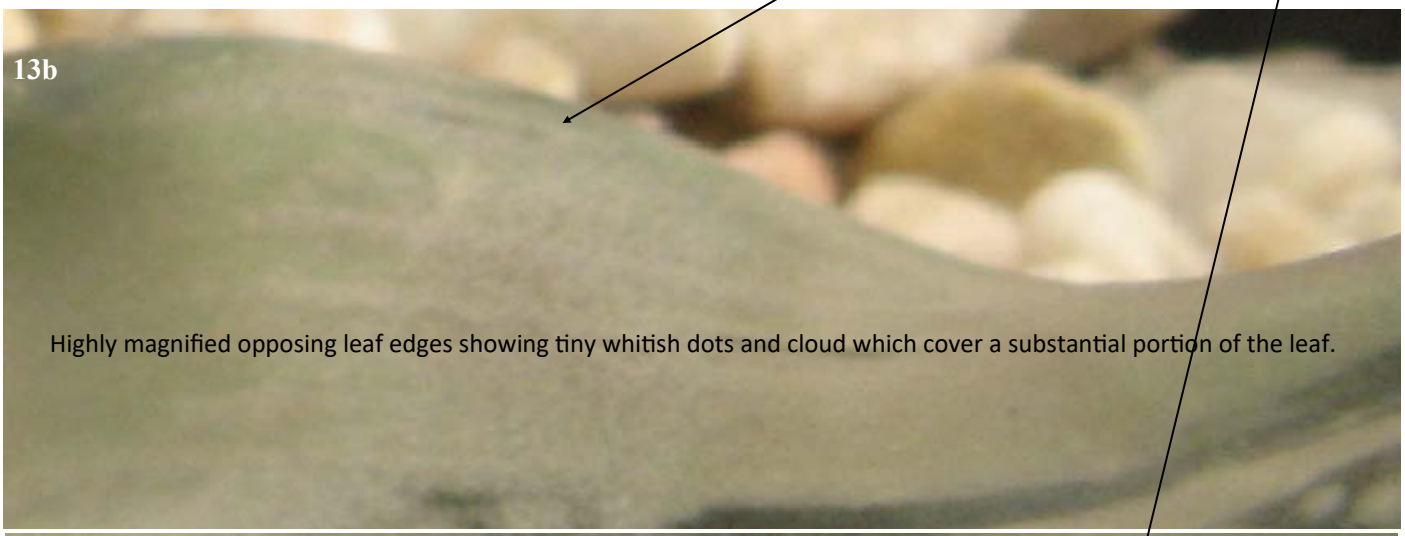
13. *Gasteria* 'Silver Lady'.

Parentage: *Gasteria brachyphylla* ssp. *bayeri* x *Gasteria* 'Little Warty'.

Description: Distichous, possibly forming a rosette with age; 8-10 thin, lunate leaves 80mm-90mm long, 50mm-55mm wide; dark green with longitudinal stripes made up of minute dots and clouds of silver-white. Similar dots and dashes decorate the exposed green. Both surfaces similarly marked. Leaf edges parallel, tapering to a short sharp spine (acerose). The cultivar appears silver green with dark green markings.

Etymology: Silver from the leaf colour.

Propagation: Leaf cuttings.



Highly magnified opposing leaf edges showing tiny whitish dots and cloud which cover a substantial portion of the leaf.

14. *Gasteria* 'Exactor'.

Parentage: *Gasteria* 'Galatica' X *Gasteria batesiana variegate.*

Description: Rosette forming with age, 80 mm in diameter, 40mm high, 6-8 leaves. Leaf 40 mm long, 18 mm wide, dark green, some with prominent, yellow stripes; minute whitish dots and more prominent spots are scattered on both leaf surfaces. Leaf edges are more or less parallel, closing at the end to a short mucron.

Etymology. 14-16 have the same parents and names end in "tor".

Propagation. Offsets and leaf cuttings.


14a


14b

15. *Gasteria* 'Inflictor'.

Parentage. *Gasteria* 'Galatica' x *Gasteria batesiana* variegate.

Description: Distichous, 60 mm high, 5-7 leaves, 60mm long, 25 mm wide, medium green with white striations of various widths. Scattered white spots and dots cover the entire leaf surface. Finely rugose. Both surfaces are similarly marked. Leaf sides are parallel, ends are truncate.

Etymology:14-16 have the same parents and names end in "tor".

Propagation: Offsets and leaf cuttings.


15a


15b

16. *Gasteria* 'Predictor'.

Parentage: *Gasteria* 'Galatica' X *Gasteria batesiana* variegate.

Description: Distichous, 60 mm high, 10-12 leaves. Leaf 55-60 mm long, 30 mm wide, parallel edges, retuse end; dark green, with yellow stripes of varying widths on both sides of the leaves with random, scattered, low, white warts covering both leaf surfaces. Offsets freely.

16a

16b

Etymology: 14-16 have the same parents and cultivar names end in "tor".

Propagation: Offsets and leaf cuttings.

17. *Gasteria* 'Tam'.

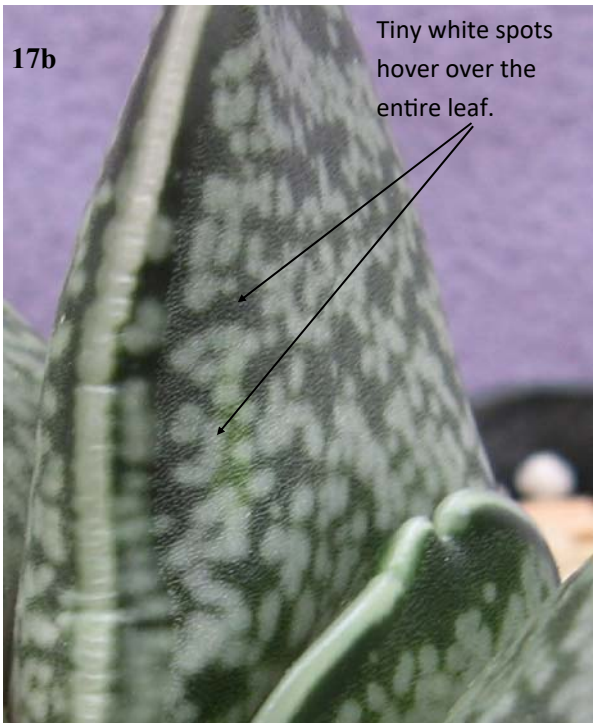
Parentage: *Gasteria* 'Galatica' x *Gasteria* 'Old Man Silver'.

Description: Distichous, twisting with age, 130 mm in diameter, 70 mm high, 8-10 leaves. Leaf 60mm long, 30 mm wide, 20mm thick, dark green with scattered white/silver spots and cigar shaped marks, smooth. In magnification, tiny, white spot hover over the entire leaf.

Etymology: name of the male German Shepherds I had in Australia.

Propagation: Leaf cuttings.

17b



17a

18. *Gasteria* 'Exaltation'.

Parentage: *Gasteria* 'Galatica' x *Gasteria carinata* variegate.

Description: Rosette forming, 140 mm in diameter, 50 mm high. Leaf 70 mm long, 30 mm wide, dark green with yellow streaks, raised yellowish spots, minute scattered white spots seem to hover above with variable, diffused, red markings randomly hovering above all else. Leaf margins are lined with sharp, small teeth.

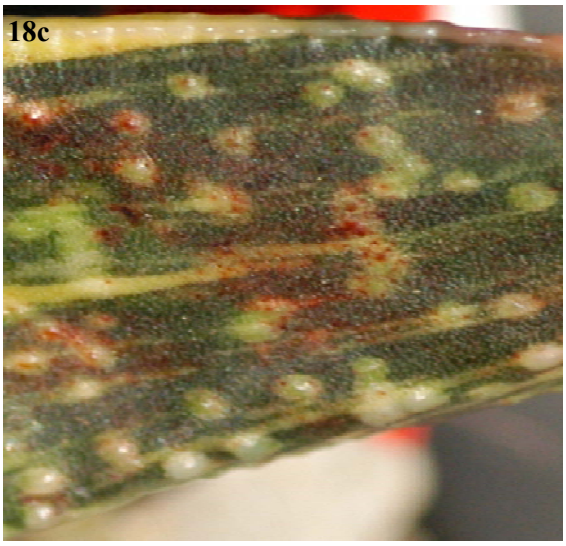
Etymology: The name reflects the influence of the cultivar.

Propagation: Leaf cuttings.


18a


18b

The magnification makes the individual, scattered, minute spots and the diffused red clouds clearly visible. Look carefully and you will see that the minute spots seem to hover above the green and yellow and the red clouds above everything.


18c

Addendum to Haworthia Study No. 14, 2005

M. Hayashi

All the type specimens of the new species described in Haworthia Study No. 15: 11~14 & 16 (2005) were stored in The Research Institute of Evolutionary Biology, Tokyo. They are subsequently moving to The University Museum, The University of Tokyo, Tokyo,

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Editor's note.

Bruce Bayer defines species in broad terms, resulting in fewer species, whereas Dr. Hayashi defines them in narrower terms, resulting in many more species. In Haworthia Study No. 14, Dr Hayashi discusses his Haworthia Lapis Group with the variability of plants which Bayer refers to as *Haworthia aristata,* with photographs of habitat plants, in his 2002 Haworthia Update. Other Groups are mentioned and Groups may be divided into Series.

The new species described in Haworthia Study No. 14 are: *Haworthia dura, Haworthia rava, Haworth ciliata, Haworthia erii, Haworthia ernstii, Haworthia lazulis, Haworthia luri, Haworthia pellucida, Haworthia incrassa, Haworthia ianthina, Haworthia royalis, Haworthia cangoensis, Haworthia angiras, Haworthia odyssei, Haworthia kogmanensis, Haworthia laxa, Haworthia montana, Haworthia vitris, Haworthia joubertii, Haworthia limbata*
+ *Haworthia doldii & davidii* stat. nov, and Eminens, Aranea & Setata series.

THE HOUSE of PESTILENCE

David Morton Cumming

A look at some of the pests and diseases that have proliferated under my care or lack thereof and their apparent impossible control.

MITES (Acari: Prustigmata).

Mites, the scourge of many, these range from finger nail size to the microscopic (Eriophyid Mite). They are everywhere, on land, from Alpine regions to tropical lowlands, in water, fresh, in thermal springs to temperatures of 50 C and salt to depths of 5000 metres, in the air up to 3,000 metres above sea level, in our beds and on our skin. They can constitute up to 7% of the invertebrate biomass in soil and have been around for 300+ million years. The earliest fossils of a *Protoacarus crani* are from the early Devonian Period. There are around 45,000 described mites but this is estimated to constitute only 5% of those in existence. They eat plants, other mites, pollen, dogs, people, well all most! They actually feed on body fluids for the most part. The most common way of 'getting around' is Phoresy, hitchhiking, be it on animals or invertebrates. As many as 500 mites have been counted on one Dor Beetle, *Geotrupes stercorarius,* consisting of six Genera.

Mites start life as an egg, then pass through some or all of the following life stages (stases), a prelarva with no legs or mouth, a larva which is hexapod, three nymphal stages, protonymph, deueronymph and tritonymph before becoming an adult; only the larval stage is hexapod all others are octopod, however there are some exceptions, Eriophyid mites, which have only four and even as few as two legs

Every one who grows plants, particularly succulents, has come across the Two Spotted Spider Mite (TSSM), *Tetranychus urticae*. In my collection these infest *Brachystellma*, some *Ceropegia* and *Pterodiscus*. I have tried a number of solutions, but as soon as summer comes around they are back on the same plants. They over winter as adults, whereas other species may over winter as eggs. Adults can produce up to 12 eggs per day which can soon become a problem. They seem to be immune to organophosphates, systemic imidacloprid treatments do not control spider mites nor mites in general. It has been shown that treatment with an imidacloprid increases, significantly, the egg production in TSSM. Thus one has to resort to predatory mites which are available in USA and Europe or to a miticide. So far these have not bothered me to the extent that I feel I have to take action, however I do now have a

A case of Stapelia Blackspot Mite.

Pyrrole, Chlorfenapyr, sold as Hunter, (Pylon in US) this is an uncoupler of oxidative phosphorylation (disrupts H proton gradient formation), and a Glycocide, Milbemectin, a Chlorine Channel Activator (interferes with the GABA nerve receptor). The Chlorfenapyr I sourced to use for the following pest, the Milbemectin as a part of an eradication program of the Stapeliad Black Spot Mite. More of a nuisance, are pollen feeding mites. These can be found feeding on aloes and gasterias. It is said that when predatory mites have predatorated all the mites, that they will turn to pollen feeding? They have been mentioned as possible pollinators of Poellnitzia but this would seem to be a chance happening rather than an evolutionary event.

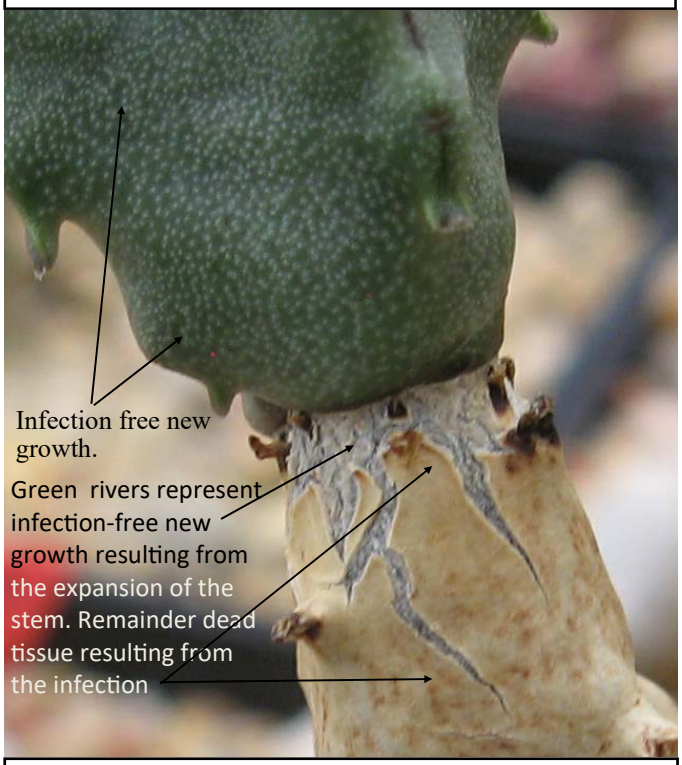
Eriophyid Mites (Eriophyidae).

Now to the real problem ones, Eriophyid Mites. These are microscopic mites which are closely associated with the host plant on which they reside and often take their common and scientific name from the host plant, e.g. an Orchid mite of Oncidium, *Brevipacpus oncidii*. They are translucent, cigar shaped, that feed on many different plants, there are over 2,000 recognized species of Eriophyid mites. Many are host specific, others feed on a wide range of plants. Females over winter as fertilized adults, they can lay as many as 80 eggs in a month, taking 7 days to reach adulthood, living for up to a month. As soon as new growth starts, mites emerge to feed on the softer new stems, leaves, shoots. They are often called Gall Mites as they can cause the formation of galls but are also responsible for leaf curling, blisters, rusts, russeting and deformed buds. I have two such mites, one that has a name, the Aloe Mite, *Aceria aloinis*, the other I shall call the 'Stapeliad Black Spot' Mite. The Aloe Mite is the cause of Aloe 'Cancer', the secretions of this sub-laminar mite act as growth stimulants resulting in a fast growth of poorly differentiated cells. Some aloes are more susceptible than others, *Aloe longistylla* is particularly sensitive, so much so that I have given up growing this species. Some plants exhibit only small malformation in the flowers. Other genera affected are *Tulista*, in the strict sense, i.e. *Robustipedunculares*, *Haworthiopsis* especially *Haworthiopsis sordida. Haworthia*, the soft leaved ones, and *Gasteria* appear to be unaffected or do nor appeal to the mite. Now to treatment, there a number of miticides that have recorded successes, Chlorfenapyr as previously mentioned, in conjunction with Spirotetramat (Kontos). This is a Tetramic Acid, an inhibitors of Acetyl CoA carboxylase. The problem with mites is that there are normally one or two which have resistance to one or other of the miticides. It is not, as usually assumed, that the mites treated develop resistance. When treated, all the sensitive ones die but the resistant ones are left to breed and produce offspring that are also resistant. It is necessary to follow up the treatment with a second miticide that has a different mode of action (MOA). There are other methods of treatment on the local scene, one with the use of formaldehyde. Painting all the galls and deformities with 'neat' formaldehyde will kill any mites with which it comes into contact, however, often the Mites are long gone. Removal of the deformed parts is recommended. Beheading infected plants will induce new growth and offsets, these may all show deformities or they may all be normal or somewhere in between, common sense should prevail.

Stapeliad Black Spot Mite

These are not sub-laminar and can be seen at x100 magnification. I first saw them on a *Caralluma burchardii* that had developed a grey appearance. I looked under a dissecting microscope and saw hundreds if not thousands of translucent cigar shapes all sticking out at right angles to the plant stem. Initially I thought of fungal fruiting bodies until one wriggle its behind, a female? So it moves, therefore it must be mobile therefore it must be? What the hell is it? It was not for another week that I eventually saw one crawling along parallel to the leaf surface but could not see much in the way of legs.

Caralluma burchardii showing new growth after 'Stapeliad Black Spot Mite' infection



Magnification showing detail.

Now I have to go back a few months to a year. I exchange plants with a friend who had sent me some plants saying that he had had them treated as they had had an infection, where he had seen a mite. He had failed to say anything about the size etc. of this mite and since the plants he had sent had these black spots/ blotches that looked like what had previously been put down to a fungal infection, the treatment of which was Potassium hydroxquinoline sulphate, 'Chinosol', I had dismissed the Mite possibility. Fortunately, I found that the mites were susceptible to Mercaptothion, which is none other than Malathion, so I appear at this point to have eradicated it, maybe too presumptively of me, one mighty pest. Oh! that they were all so easily controlled. The *Orbea* were the most susceptible to damage and suffered quiet a number of losses, with *Piaranthus* showing the least damage.

INSECTS, Moths & Butterflies (Lepidoptera)

What exotic is next in line; a Pyraloid Moth of a very large family of moths containing around 16,000 described species, this makes it somewhat difficult to identify the particular culprit. The majority of these feed on living plants either externally or internally, as leaf miners etc. So far the moth in question has not been identified but may be related to *Eldana saccharina* or Sugar Cane Borer. The larva of this particular moth has a liking for *Gasteria* which appear to be its top priority, followed by Ledebouria bulbs, *Haworthia* and *Aloe*. The adult moth lays its eggs in the centre of the rosette where the larva then burrow and devour the roots, then the leaves, all done internally with no indication of what is happening until the leaves collapse. By this time it is almost too late to save even a leaf. Occasionally some frass can be seen. At one point I thought that I had this particular pest under control with monthly spraying of systemic imidacloprid. However, due to time constraints and the introduction of part of a large *Gasteria* collection, the problem reared its head once again with a vengeance. This is only now starting to come under control or maybe it is that winter is just around the corner, especially as I now see that imidacloprid tends to be of limited efficacy against caterpillars. Thus my initial 'successes' could just be coincidence. Without a control (some untreated plants) with which to compare results the efficacy of any treatment must be questioned.

Beatles (Coleoptera).

A pest which does occasionally raise its head is the Lily Weevil, *Brachycerus tauriculus*. The larva burrow into the stem of aloes and haworthias and eat the stem from the bottom up, often resulting in the death of the plant, especially if it is a small plant. I have seen a small population of *Haworthia* aff. *decipiens* in habitat

Pyraloid moths.

wiped out by an infestation of this beetle, only rosettes of unattached leaves were left in twenty odd plants.

Grasshoppers (Orthoptera).

An occasional biblical visitor to the planthouse are Grasshoppers/Locusts, the most common being *Acanthacis ruficornis*. These are looking for food and a place to lay eggs. They lay eggs in dry sandy soil. The adults do not appear to be a problem but when one has a hundred or so hungry little hatchlings, especially among seedlings, physical removal followed up by a spraying with a household insecticide usually solves the problem.

Leafminers.

Leafminers are insects that have a habit of feeding within leaves, producing tunnelling injuries. Several kinds of insects have developed this habit, including larvae of moths (Lepidoptera), beetles (Coleoptera), sawflies (Hymenoptera) and flies (Diptera). Most of these insects feed for their entire larval period within the leaf. Some will also pupate within the leaf mine, while others have larvae that cut their way out when full grown to pupate in the soil. Although leafminer injuries are conspicuous, most leafminers produce injuries that

have little, if any, effect on plant health. Most have many natural controls that will normally provide good control of them. Insecticides applied when leafminers lay eggs are useful for the control of many. I have not had any persistent problems with them, though the *Haworthia* population in the Hankey area are at times heavily infested with leafminers, probably with the flies of Liriomyza, which infest Citrus. Hankey is a Citrus growing area. Sprays of systemic neonicotinoid insecticides (imidacloprid, dinotefuran) can provide some control at these stages among leafminers that are beetles (Coleoptera) or sawflies (Hymenoptera). Neonicotinoids tend to be poor in control of caterpillars, the larval stage of moths (Lepidoptera).

Hemiptera.

Aphis (Aphididae) Aphis is a problem that I have so far been able to control in the house of pestilence; in all probability the attacks launched on other pests help to keep them at bay. Only one that is an occasional problem is *Aloephagus myersi*, the one that attacks the centre of aloes and gasterias. This is easily controlled by Malathion. It is of some interest that this Aphid was described from insects that had become 'naturalised' in California, as it is native to Southern Africa. It is now widespread even managing to bypass the strict quarantining of Australia.

Mealybugs (Pseudococcidae).

Another that suffers the same fate is Pseudococcus, Mealybugs are sexually dimorphic, females appear as nymphs, exhibiting reduced morphology, and lack wings, although unlike many female scale insects, they often retain legs and can move. Males are smaller, gnat-like and have wings. Since mealybugs (as well as all other Hemiptera) are hemimetabolous insects, they do not undergo complete metamorphosis in the true sense of the word. However, male mealybugs do exhibit a radical change during their life cycle, changing from wingless, ovoid nymphs to Wasp like flying adults. Mealybug females feed on plant sap, normally in roots or other crevices, and in a few cases the bottoms of stored fruit. They attach themselves to the plant and secrete a powdery wax layer (hence the name mealybug) used for protection while they suck the plant juices. The males on the other hand are short-lived as they do not feed at all as adults and only live to fertilize the females. Some mealybugs lay their eggs in quantities of 50–100 in the same waxy layer used for protection; other species are born directly from the female. Though this was a persistent pest in Australia it appears to now be easily controlled by a regular spraying of an imidacloprid such as Confidor, again without running a control the results are hearsay. If one wishes to let nature have its way and rely on natural predators such as Ladybirds to control the problem, be sure that ants are not present as these will guard the mealy bugs from any such predator.

Scale Insects (Diaspididae & Coccidae).

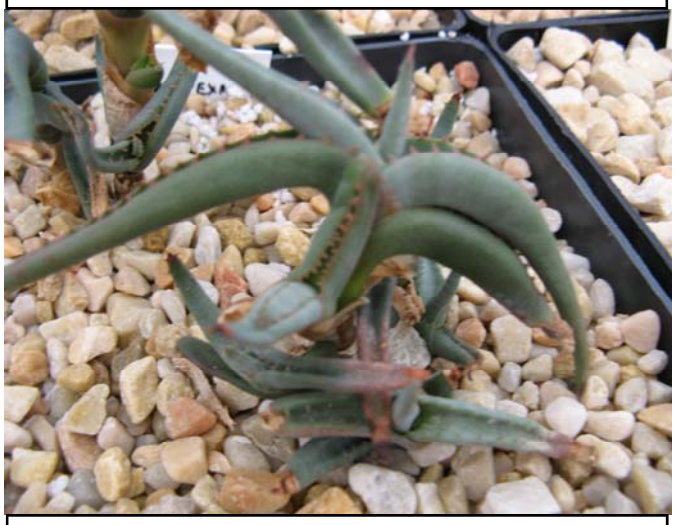
In the garden environment and in habitat aloes can be seen covered in a White Scale, Duplachionaspis exalbida. Fortunately I have not had this pest in my aloes but have had it on small *Crassula* cuttings, which I had collected and since destroyed. In Australia, pre the House of Pestilence, I grew cacti which had occasional outbreaks of Scale. I used a soft toothbrush to physically remove these.

Plants have no circulatory cells to defend them against attack, however, as sessile organisms, they have evolved a highly sophisticated and elaborate signalling network to respond and adapt to various biotic and abiotic stresses. The two well documented responses are the production of Salicylic acid (SA) and Jasmonic acid (JA). They are essential compounds produced in the plant by reaction to the pathogen attack. When plants are attacked by insects they respond by releasing Jasmonic Acid which activates the expression of protease inhibitors. These prevent proteolytic activity of the insect's digestive proteases thereby stopping them from acquiring the needed nitrogen in the protein for their own growth. (JA is also involved in regulating plant growth and developmental processes.) Salicylic acid (SA) also plays an important role in the induction of plant defence, mostly to pathogens, through morphological, physiological and biochemical mechanisms. Long before salicylates were identified, plants (Salix) containing these compounds were used

Aloe showing *Duplachionaspis exalbida* (Aloe Scale)

Aloe castilloniae with Xanthomonas.

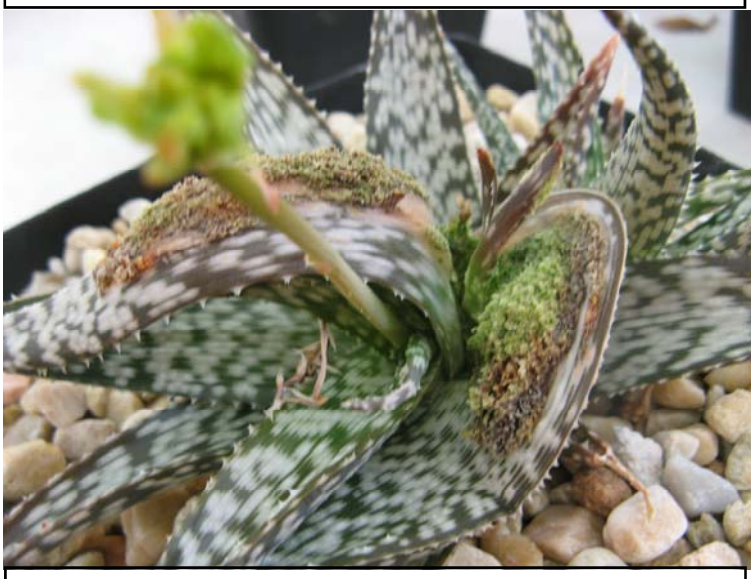
Aloe castilloniae after teatment with copper ammonium acetate.



Aloe inexpectatus (before treatment)

Aloe inexpectatus a year after treatment with Xanthomonas

Aloe recovering from Xanthomonas after treatment with copper ammonium acetate



Aloe infected with *Aceria alonis.*

Aloe striata infected with *Aloe* cancer in habitat.

Aloe flower infested with *Aceria aloinis*

Aloe IMG 8648 infected with ?????

Right above.

Gasteria carinata lost roots to Pyraloid Moth larva.

Right.

Aloe flower damage by *Aceria aloinis*

extensively medicinally. Chewing of Salix leaves to ease pain in childbirth (400 BC) to Compresses of willow bark on wounds. It was not until 1979 when aspirin was injected into Tobacco leaves where it enhanced resistance to a subsequent infection of a tobacco mosaic virus that it was realized the importance of SA in plant defences.

There are many other plant responses to specific stimulants, both herbivorous and pathogenic, that involve many diverse pathways. Plants are anything but simple. The same can be said of bacteria; some produce a Jasmonic Acid mimic to fool the plant into not producing JA in its defence. Plants can also use indirect mechanism to protect themselves against predation by arthropods such as the emission of volatiles, the production of which is initiated by the production of JA and/or SA in response to attacks by the arthropods. One such volatile, that can attract parasitoid wasps, such as *Cotesia rubecula*, thus reduces the herbivore's pressure on the plant. The wasps destroy the herbivores. *Cotesia rubecula* is not common, it is established in only a few areas of the world. They die down during winter months with a population explosion in late summer related to the growth of its host species. *Cotesia rubecula* reproduces parasitically through the wide spread Small Cabbage White Butterfly, the female wasp stinging then laying between 20 and 50 eggs within the host. The defence mechanism of the caterpillars are sometimes able to kill the eggs. If they do not, the caterpillar does not die until the larvae of the wasp emerge. The impact on the host population can vary greatly, from a small percentage up to 75% of the caterpillars in a given habitat. *Cotesia rubecula* consumes plant juices created by the flowers and leaves of cabbage. It is a solitary species. The Small Cabbage White (*Pieris rapae*) is a small to medium sized butterfly of the family Pieridae. In general it is best to rotate treatment when using Insecticides/Miticides, to try and avoid applying the same MOA to more than one generation of the pest. For this reason it is helpful to identify the pest and know its life cycle, for example some substances kill only adults and leave eggs unaffected.

Nematoda.

Nematodes are roundworms, one of the most ancient and diverse groups of animals. Most nematodes are microscopic, free-living and feed on bacteria, fungi, protozoans, other nematodes and plants. Plant parasitic nematodes are simple animals, often with less than 1,000 cells. They possess a stylet mouthpart, used to pierce plant tissues, extract juices and secrete material that helps parasitize the plant. Nematodes occur in a variety of shapes and sizes. Typically, they are long and slender, but when mature, can appear swollen and not very worm -like. Nematodes all moult, similar to insects. Even though these organisms are very small, they have a sophisticated nervous system and sensory organs, allowing them to find their host plants, locate the specific plant cells they need, mate and reproduce.

Some plant parasitic nematodes spend most of their lives inside plant tissues. These nematodes are "endoparasites" and have the advantage of protection from predatory organisms living in surrounding soil that would gladly make a meal of them. Others live mostly in the soil without the benefit of protective plant tissues. These Ectoparasites have a reduced risk of dying when the host plant dies, but are more likely to be attacked by a predator or pathogen.

Nematodes are also susceptible to death from harsh environmental changes, such as temperature and lack of water. Some, not all, can enter into a state of metabolic inactivity (sort of a suspended animation) during these times of environmental stress. If they can do this, they can often survive for years waiting for more favourable conditions to trigger their revival.

Some nematodes move similar to snakes. However, most can move no farther than a meter or so within their lifetimes. They form up to 90% of all life forms on the ocean floor.

Various nematodes feed on all plant parts: roots, stems, leaves, flowers and seeds. They specialize in the use of their stylet, depending on their style of feeding. Most plant parasitic nematodes are root feeders and live in the soil. The damage caused to the above-ground plant is general in nature and related to root damage, nutrient deficiency, wilt, stunting, yield depression and sometimes plant death can result. The main diagnostic signs and symptoms of nematode infestations are root cysts or galls.

I did have some problems with these in Australia and resorted to using Nemacur, Fenamiphos, Ethyl 3 methyl4-(methyl thin) phenyl (1-methylethyl) phosphoramidate, an organophosphate, which appeared to work, this is and can be used as an insecticide, stated to be effective against Aphids, Mites, Thrips and Mealybugs. Cutting all the roots off and repotting is also a way to go and the use of 'soil-less' potting mixtures. Since I am now in that category, using Perlite only, I have eliminated the problem, I hope?

THE LITTLE FELLAHS (Bacteria, Fungi, Viruses).

Now to the more problematic Bacterial, Fungal and Viral infections, first in identifying the problem and secondly in effecting a cure or at least some control.

Bacteria.

I am not all that conversant with plant pathogens, only Erwinia coming to mind, a few species of which cause soft rot in potatoes, Xanthomonas campestris which is one of the main plant pathogens, Pseudomonas syringae and then Agrobacterium. Ps. aeruginosa is a human pathogen involved in Cystic Fibrosis. The ability of Agrobacterium to transfer genes to plants and fungi is used in biotechnology, in particular, genetic engineering for plant improvement. I am sure that there are many more, especially with DNA studies indicating a number of 'new' genera within Agrobacterium.

I will only mention the Xanthomonas campestris as this appears to be the most common culprit causing widespread 'blights', 'cankers', 'spots' and the like among ornamentals and commercial crops. Also, this last year or so, I have had a 'dry rot' which, in correspondence with Jean-Andre Audissou, he reports on having contracted it from plants from a nursery in Madagascar some years back. I now think that if this is the same thing that I have, it is most likely a Xanthomonas infection. I lost a number of haworthias and many hybrid seedlings to this last year. I can find no fungal elements on the plants concerned and systemic fungicides appear to have no effect. I also have a 'spot' on some gasterias which I am now putting down to the Pseudomonas syringae, these are further identified as pv. standing for 'pathovariety'. I originally thought it to be fungal in nature but again could find no trace of fruiting bodies or other fungal elements. Now, our problem is that there are very few tools with which to eradicate (impossible?) or control this disease. The old stand by is about the best one can do, some Copper compounds. Copper Oxychloride comes to mind. It is mainly used as a fungicide, Phyton 27 is a commercial brand containing a copper compound. “Flowers of Sulphur” could also be tried. Some of the 'old things' work, not too sure about myself. The only antibiotic that is available for commercial use is Streptomycin sulphate though I have heard that oxytetracycline is available also. The only other thing is a bacteria, Rahnella aquatilis, which sort of acts like Streptococcus viridens in ones mouth, where it is part of 'normal flora' and inhibits things like Candida albicans (a Yeast), anyway Rahnella competes with the Xanthomonas and wins.

Fungi.

Here, I am now not sure if I have any. Those I thought I might have, have not responded to a systemic fungicide, Tebuconzole, and I now regarded the diseases in question to be bacterial in nature and thus even more difficult to control. Aspergillus niger, a Black Sooty Mould, wants to grow on the Asbestos fibre bench tops I use. I am not sure if this is the cause of the loss of some seedlings. I have been scrubbing the bench tops with a strong industrial strength disinfectant, time may tell. Then there is Powdery Mildew. It has not bothered me since I built the plant house, however, when the plants were previously only under shade cloth and received winter rain occasionally, some euphorbias became infected. Dusting the plant with Sulphur was usually sufficient to clear this up. That said, if there was a large infection, the plant often became badly marked. There are a multitude of fungal treatments available, mostly contact ones that interrupt with various pathways.

Viruses.

Tobacco Mosaic Virus is probably the best known plant virus. I have not really had any problems with it. I grow Drimiopsis and a number of plants contracted a virus. I removed the plants far away from the collection in the hope that the plant’s defences might overcome the virus but after five to six years out in the cold they are still infected. I have just noticed that an Euphorbia ecklonis coming into leaf has what appears to be a virus. Actually it is quiet nice but I think I had better remove it. Viruses are spread by herbivorous insects. Other than the previous mentioned injection of Aspirin into a Tobacco plant and it displaying a reduced infection there would appear to be no easy treatments. Heating the plant is said to work. Of course if one heats it too much one kills the plant as well, end of problem?

ANIMALS.

Now to two legged pests or at least nuisances, Sunbirds.; the Greater Double Collared Sunbird, Nectarinia afra, in particular, though I like these birds. They have a nest on an electric wire that was to be connected to an outside light just outside our kitchen window. To add to their nuisance value, I grow many aloes and gasterias which I use in attempts to create interesting hybrids. These sunbirds are persistent, I had to move all the plants which I want to hybridize to a small room attached to the main plant house. This was not enough, they just flew in the doorway, which had no door, so I hung some shade cloth as a curtain. Then they found a 100 mm space above another door to get in so that got blocked off, now they get around the shade cloth curtain so I will have to fit a door, I guess. As I said, more a nuisance, though they do break the flower stems at times and remove all the pollen one wants to use.

Now to some of our four legged friends which I am sure everyone has problems with at sometime or other and if one grows cacti it is always the Lophophora and Turbinicarpus that get eaten. With the haworthias it is the limifolia and nigra diversifolia that seem to be desired plants. I also brought a large collection of hoyas

when I moved from Australia to South Africa. These were in the form of rooted, one node cuttings, in 20mm tubes. Within a month, all these had been cut cleanly at ground level, BELOW the node, by Vlei Rats, Otomys irroratus. They also carried the cuttings off to some unknown place? Mus minutoides also is a nuisance at times, chewing chunks out of choice plants. Sometimes Haworthia tessellata are chewed down to ground level. Back in Australia I had a similar problem with an indigenous rat whose name I seem to have forgotten. There are 50 odd species of rats and mice there. I tried poison but found out that this took a long time as the anticoagulant used in the rat poison was countered by the Vitamin K that was to be found in the plants they were consuming. By the time the anticoagulant finally killed the rat it had devoured many more plants so I had to use live traps baited with aniseed-oil-soaked-bread.

Dragons, yep!

There be Dragons in them 'err Australian woods? - an Eastern Water Dragon, *Physignathus lesueurii* ssp *leseueurii*, to be precise. It was not that they ate plants, but they liked to lay eggs. It just so happens that a nice 6" pot full of sandy soil is just what wandering female Water Dragons are looking for - to hell with all these 'living stones' on top. I gave up growing Mesembs after that episode so I had a prelude to the present house of pestilence. So far no Dragons have made an appearance. Actually there are none in Africa to make an appearance apart from a Karen Zimmerman hybrid, Aloe 'Dragon'.

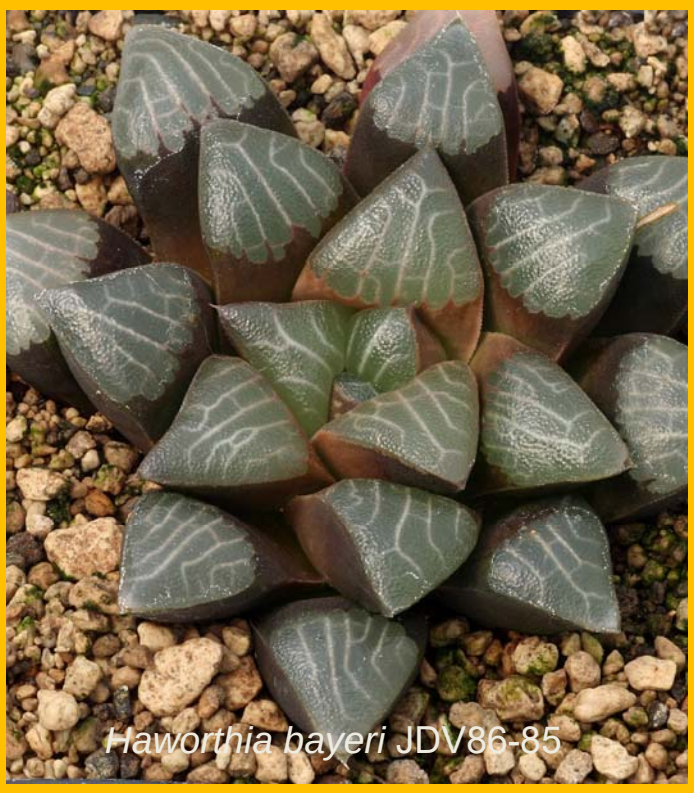
Some pests are universal, Red Spider Mite for example, others may be so only under certain set of circumstances. This leads me to a somewhat strange and damaging set of circumstances. My plant house is cut into banking thus making this part of one side to the height of the 'window', in this case shade cloth, serving as ventilation. This became ripped and pots below this showed foot prints or paw prints, what caused these? I have two dogs one a heavily built German Shepard male the other a lightly built female. I could see no reason why they would want to be in the planthouse so these were dismissed as possible intruders. Was it monkeys? We have Vervet Monkeys, Cercopithecus aethiops, around but the dogs keep them away from the buildings. We also have the occasional Large Spotted Genet, Genetta tigrina, but for what reason? They don't eat plants. So the plot deepens? The damage started to include over turned pots etc. so I placed a couple of brick pallets in place and that appeared to stop whatever it was. For some time all was well, then for some reason the pallets were moved and the next time it was a proper mess, over 100 six inch pots with collections of Haworthia blackbeardiana and H. decipiens were scattered everywhere, so it was the dogs, initially the lighter female, this last time the male.
It is 1,200 mm from the bench to the 'window' the reason ah! That was obscured by the fact that it was initially only the female and not the male. The male chases birds, though being on the heavy side he cannot jump high but has caught a couple of doves and some other slow take-off species, much to my annoyance. Earlier I mentioned the Sunbird visitations and that was the reason, he chased the Sunbirds.

Yet another slight detour, stretching the idea of pests to include wind. Back in Australia I lived just outside Brisbane. Though not subject to cyclonic weather, we occasionally received the 'tail end' of cyclones every three or four years. Thus I am well aware of the need to use Hurricane clips etc. and the fact that the flatter the roof the more uplift there is. It was always the blocks of flats with flat roofs, no pun intended, that lost them. In South Africa I am well South of any cyclonic weather, however I am situated on top of a hill 5kms from the sea and we are subjected to strong winds, sometimes very strong winds. I had been tempted to build the planthouse with a trussed roof spanning some 13 metres, however I had some fears of the roof lifting as the pitch was to be less than 15 degrees and one side was double storey in height (remember, it is cut into a banking on a slope) so I ended up with four steel posts supporting two beams and everything held down with hurricane clips on either side. However, there was one I missed nailing, as a Cabbage Tree, Cussonia spicata, was sort of in the way and I did not want to cut too much off it. We had a freak little 'tornado' earlier this year, blew out a couple of windows in the house as well as a downpipe and a few trees and broke the one rafter that was not attached, a 45×150mm, it was an upward lift so the brake was on the 150mm, I hope that I have now effected a cure. In conclusion, though living in a warmer climate removes the need for expensive heating, it appears that amassing a smorgasbord of delicacies in an enclosed space is just an invitation for all and sundry to a slap up feast, with the expensive problem of getting rid of unwelcome guests.

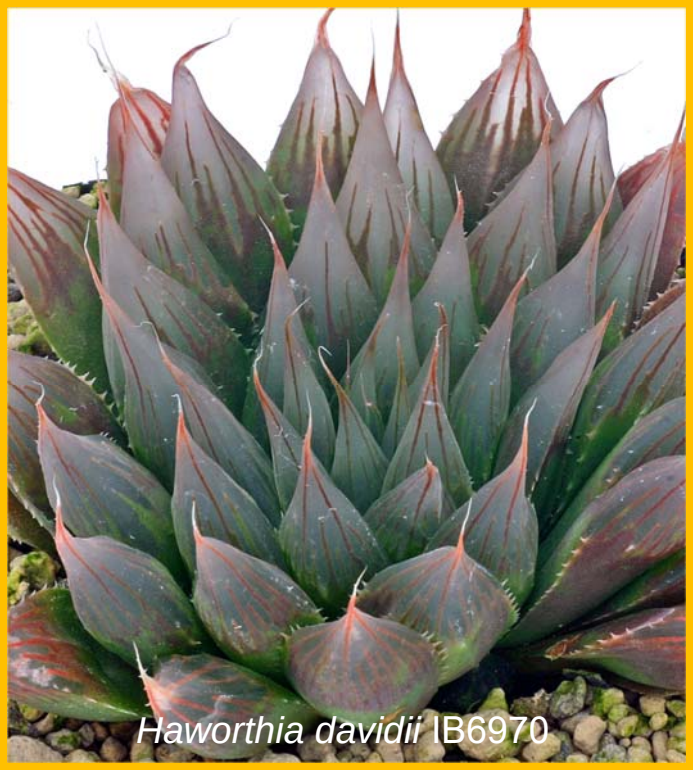
Wind Damage.

Forms of Selected Haworthia Species - Photographs by Ingo Breuer.


Haworthia nigra IB7044


Haworthia bayeri JDV86-85


Haworthia cummingii IB12447


Haworthia davidii IB6970


H. retusa IB8278


H. rodinii . IB7176


H. pallidifolia IB5164