The Fuchsia Breeders Initiative

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Issue 13, July 2019

Testing new seedlings in the polytunnel

Contents of this issue:

Contributions for the next issue, which is scheduled for the end of December 2019, should be in the editor's possession ultimately on 15 December 2019.

Please send your contribution in Word, with the photographs attached separately. Large contributions can be transferred by uploading the file by e.g. WeTransfer.

Any new Fuchsia cultivars being released? Please provide a photograph and some descriptive information, and it will be seen and get attention all over the world!

Photograph on front page:
***Fuchsia* 'Roger Desiré'**
(De Cooker, 1992)

Weather conditions go up and down. Nothing strange with that of course, but for sure something to watch and to take into account if you grow fuchsias. This year I have left, for the first time, my polytunnel in the 'nursery area' during the summer season. It's not designed for providing full protection against frost in the winter season, because originally it was meant for growing tomatoes and other vegetables. But these are grown in my glasshouse during summer. In the winter season the polytunnel is used now mainly for storing my spring bulbs like tulips and daffodils, planted in pots. It's not really a frost free place, but it slows down frost a bit and protects the bulbs from snow and heavy rainfall. I'm very happy with it. In the summer season it can be used for growing some fuchsias. It provides protection against the most severe sunshine and, of course also against rain and heavy winds. It's therefore well fit for growing my new fuchsias which have to be tested for several years for making choices as which to release or dispose off.

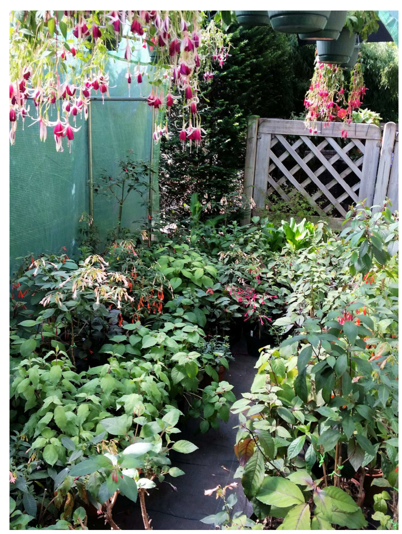
In July it gets very crowded in the polytunnel, which is of course a good sign because then all plants are growing well. Fortunately, outside the polytunnel then additional space becomes available because I also grow many vegetables in pots like potatoes, rucola and sugar snaps, and these are harvested between April and July. Never a dull moment.

Focus this year is on testing last year's new purple triphylla seedlings. Decisions have to be made based on parameters such as

Editor of The Fuchsia Breeders Initiative

Mario de Cooker

growth properties, size of the foliage, length of internodes, quality of the root system, quality of the blooms, fertility and time of producing first blooms, to name a few. So decisions on what to release have always to be made on a rather arbitrary combination of such factors.



It gets crowded in the polytunnel

I hope your fuchsias are thriving excellently, despite the more and more extreme weather conditions as we have experienced already twice this year.

Mario de Cooker

Little Known Treasures

By Edwin Goulding

Photographs by Edwin Goulding

Introduction

In previous articles we have considered some unusual aspects of Fuchsia growing. Niches, like the environment affecting F. lycioides and its pollinator have received special attention. In each instance we considered things from the hybridist's perspective. Our aim has been to offer different ideas that might help in the development of future desirable characteristics and hybrids. In this article we will examine further niche plants from Section Hemsleyella. This time, however, the uplifting of the Andean mountain range has created multiple niches and massive difficulties in accessing plants, hopefully still growing in their native habitats.

F. apetala

Part one

The consequences of global warming have been mentioned in past publications. Our hotter summers have come with rising winter temperatures. The match has not been exact or predictable but the impact has come at an opportune moment for us. Greenhouse heating through the darkest months can be very expensive. It has become easier to protect plants so that they can be enjoyed throughout the whole year. Frost protection rather than the provision of full winter heating has become the name of the game.

In The Fuchsia Breeders Initiative, Issue 6, December 2015, pp.14-17 a system designed to help care for overwintered plants was described. In the case of plants from *Section Hemsleyella* this is of special relevance as they flower in spring, usually on bare branches. Although the species described here are capable of withstanding reasonably cold, damp and dull conditions they do not experience frosts in their native habitats. Our aim here is to see whether different genetic material can be introduced with advantage into a wider range of marketable plants. The future for our genus is certain to be totally different from its past; exciting and full of promise.

Part two

Section Hemsleyella[1] in cultivation

Plants from this section are rarely seen or grown. Efforts at conserving and distributing those already in existence have been minimal. Competitions have inhibited interest in exploration for new species. Many treasures are in danger of disappearing both from cultivation and from their native habitat with the subsequent potential loss of an enormous genetic reservoir both in the natural environment and to hybridists. Their winter or spring flowering propensities have yet to be explored in any great depth.

Each of the ones grown and photographed over past years has long thin growth combined with tuberous roots capable of reaching large proportions. These are likely to protect the plants against periods of water shortage by providing reserves of this and other nutrients. The majority of people growing such beauties will try to train them or pinch them to shape; not a good idea. They flower best when they are allowed to wander freely and close to the horizontal.

F. apetala[1]

This species (photograph on p. 2) was found as long ago as 1802 by Ruis and Pavón in Peru. It is one of the easiest of this section to grow and is still reasonably common in cultivation. As its name suggests, and like all the others in *Section Hemsleyella*, petals are usually absent. Flower lengths vary enormously from 4 cm to 16cm. Blooms are warm amber in colour. Flowering is around March to May in the United Kingdom when grown with greenhouse protection. Leaves are held alternately on branchlets and are covered with fine hairs.

F. cestroides[1]

This shrubby species is one of the easiest in this section to grow but is still relatively uncommon in cultivation. Again, the plant was found in Peru but this time by Schulze and Menz; the year was 1940. The tubes are somewhat shorter than most within the section, being about 2 cm in length and thinly tapered. Flowers are held in dense clusters on plants that can reach 3 metres in height. In cultivation the blooms are a much paler colour than that described in its native habitat; ripe wheat golden. Leaves are less hairy than on *F. apetala* and are opposite or ternate on young stems.

F. inflata[1]

This is another of those species collected by Schulze and Menz in Peru in 1940. Like all the species in this section *F. inflata* is not frost resistant. In fact, the extremes of heat and cold alike are problematic for it. Growth arising from the tubers is sparse, long and thin. The pale orange apetalous blooms are long and pencil shaped, about 12 cm by 0.5 cm. Their size and shape make photographic illustrations very difficult to produce that do justice to their proportion and beauty. This is perhaps the most unlike a typical *Fuchsia* that anyone will ever see.

F. cestroides

F. inflata

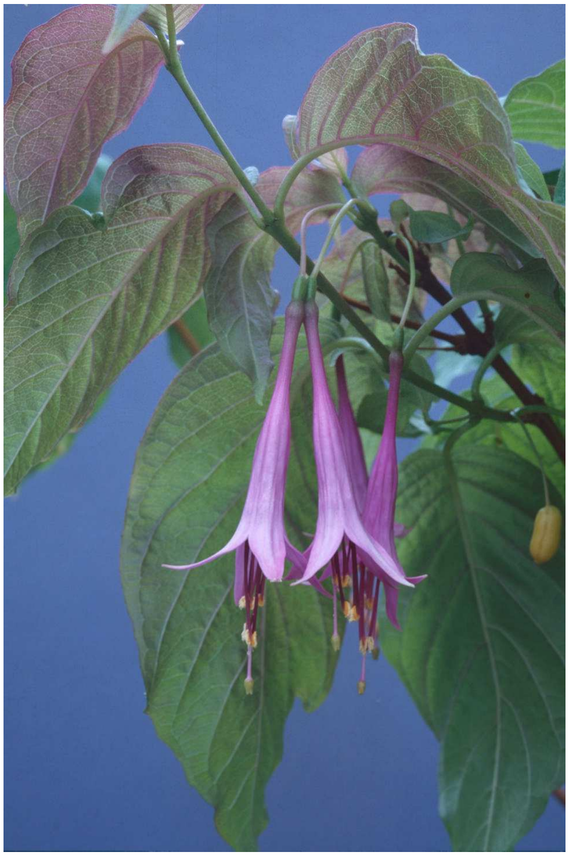
F. insignis[1]

This species has been known for much longer, having been found by Hemsley in 1867 growing in Equador. Like many others in the section it is to be found growing sometimes epiphytically and sometimes terrestrially. Growth is similarly scandent or semi-scandent. Flowers are shorter at 6 cm and more widely tapered than many others in this apetalous section. They are also usually produced when leaves are absent. The brilliant waxy orange of the flowers is enhanced by the widely recurving sepals. Horizontal or pendant growth encourages spring blooms.

F. insignis

F. juntasensis[1]

F. juntasensis was found in Bolivia during 1898 by Kuntz. It is perhaps the strongest and most unusual of the section. It can be found growing terrestrially or epiphytically and has the usual tuberous root system found in this section. Leaves are carried alternately and often appear at the same time as the aubergine hued flowers that are carried in clusters on the ends of the branches. The latter have tubes that are about 5 cm long and about 1 cm wide. This species is perhaps the most common in cultivation and used in hybridising from within the section.



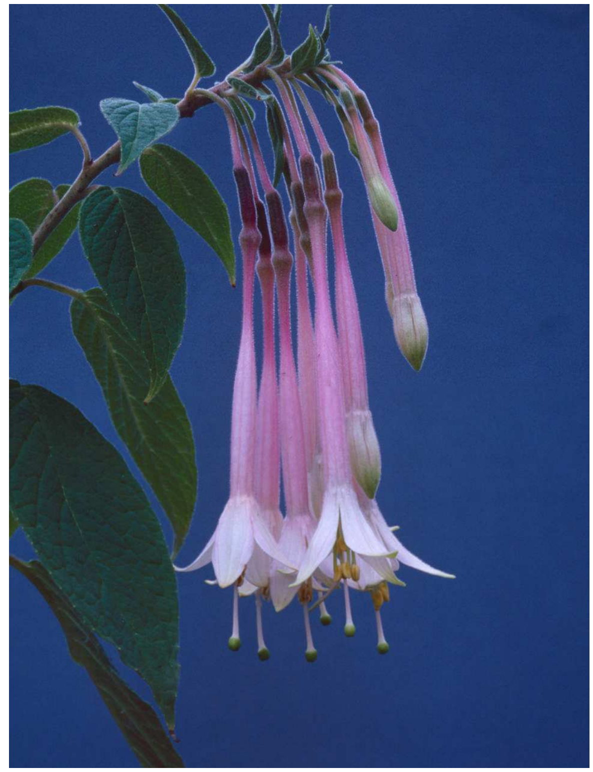
F. juntasensis

F. pilaloensis[1]

Berry located this exquisite beauty (photograph on p.5) during 1985 in Equador. Like others in the section it may be found growing epiphytically or terrestrially in its native habitat. Shrubby plants about 1 meter high are the norm although longer semi- or scandent branches may be formed. In cultivation taller growth is likely. Tubes are about 5 cm long and 0.5 cm in diameter. Flowers are rarely produced in large numbers but are stunningly beautiful in their colours; pale pink or almost white with darker veining.

F. tilletiana[1]

F. tilletiana was found in 1972 by Munz in Venezuela. Certainly, in cultivation, the tubers produced are the smallest seen within species of this section. Terrestrial growth is usually shrubby but much taller stems are possible with adequate support; again, semi-scandent or scandent in type. Blooms are produced in clusters when leaves are absent. Floral tubes are short by comparison with those previously described; 3.5 cm and thinly funnelform. Its sepals recurve. In colour the blooms are pink or cherry red.



F. pilaloensis

Part three

Section Hemsleyella not in circulation

A substantial list of species from within this section is not in circulation; several have never been. They are as follows:

F. chloroloba[1]

F. garleppiana[1]

F. huanucoensis[1]

F. membranacea[1]

F. mezae[2]

F. nana[1]

F. salicifolia[1]

F. tunariensis[1]

F. cestroides

Part four

Experiments to date

We can see that just under half of the species in *Section Hemsleyella* are in cultivation. Aside from this point but of importance to hybridists is the work undertaken so far using available plants as a starting point. Pictures of some of these will already have been seen in previous publications of The Fuchsia Breeders Initiative. These can be sourced using the index at the end of TFBI, issue 10, December 2017. Observant readers will notice that petals almost invariably re-appear in the first generation of outcrossed seedlings and are usually retained thereafter.

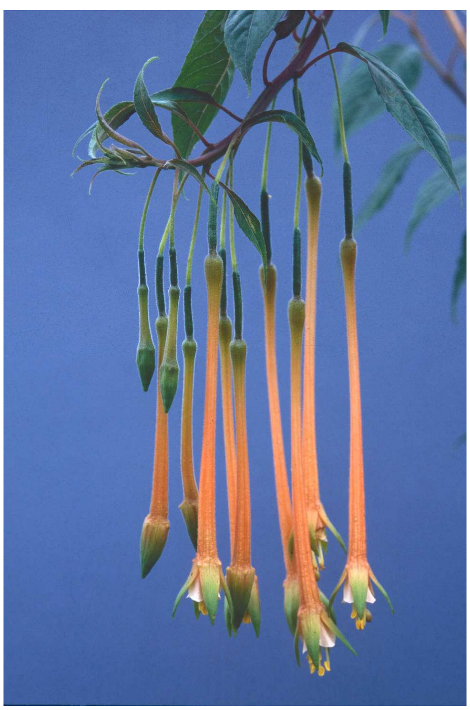
Koralle[3] x (Koralle x *F. apetala*)
[Gouldings Fuchsias, 1999]

Brian Kimberley

(*F. bacillaris* x *F. bacillaris)* x {(*F. cylindracea* x *F. encliandra* ssp. *encliandra*) x (Obcylin x *F. cestroides*)}
[Goulding, 2016 not released]

OAZ.617

F. magdalenae x *F. inflata*
[Van der Post, 1990]



Treslong[4]

(*F. splendens* x *F. decidua*) x *F. insignis*
Goulding, 2015 not released]

NAAJ.562

Conclusion

In this article we have considered a few of the little known treasures existing in the genus *Fuchsia*, *Section Hemsleyella*. Barely half those identified by Paul Berry are in cultivation and these, so far, have been used rarely in hybridising. Of course, early flowering apetalous blooms might not spring to mind as the perfect place to start. Nevertheless they offer an enormous untapped opportunity to those adventurous enough to use them. In a previous article we have already seen how *Sections Encliandra*, *Schuffia* and even *Fuchsia*, in the shape of *F. triphylla*, can be utilised in the future[5].

How valuable it would be if more resources could be devoted to locating and conserving the remainder of the Hemsleyellas. It seems likely more species are still to be found among the isolated regions in which plants from this section are found. Global warming and habitat loss might soon destroy such possibilities completely. In the meantime, we as hybridists, have a brief window of opportunity to use some of these gems. In this way we can seek to broaden the available genetic pool among hybrids and appeal to a wider public in future years. Excitement is to be found by hybridists in the unknown; the thrill of the chase; the stimulation of exploration.

1 BERRY,P.E., 'The Systematics of the Apetalous Fuchsias of South America, *Fuchsia* Sect. *Hemsleyella* (Onagracea)', in *Annals of the Missouri Botanical Garden*, Vol.72, 1985, pp 213-51, ISSN 0026-6493.

2 BERRY,P.E., & HERMSEN,E., 'New Taxa of *Fuchsia* (Onagracea) from Northern and Central Peru', in *Novon*, Vol.9, Number 4, 1999, pp 479-482. *Fuchsia mezae* is now said to be in the possession of the NKvF Botanical Group. I have neither seen nor grown it.

3 Note the plant formerly nominated as Thalia is here correctly named as Koralle. Flowcytometry tests carried out for Mario de Cooker have helped to differentiate this plant from others like Göttingen. It is likely to have 55 chromosomes.

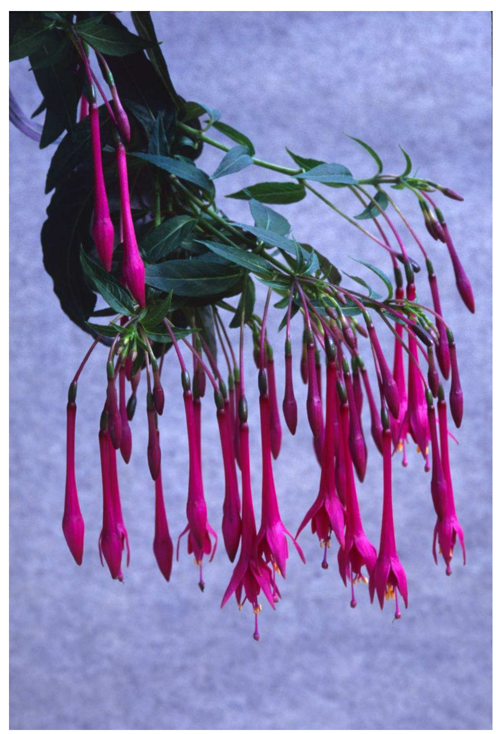
4 A play upon words. It sounds as if very long is meant but this would require a change in spelling. In fact Treslong was a large property built around 1560 by Count Bloys van Treslong. It was demolished in 1950 and a large television studio complex replaced it which no longer exists

5 The Fuchsia Breeders Initiative, issue 5, July 2015.

F. fulgens x *F. pilaloensis*
[Beije, 1998]

Fulpila

Koralle x *F. juntasensis*
[Gouldings Fuchsias, 2000]



Daryn John Woods

Capitalizing on the phenotypic plasticity of Fuchsia N 11-02

By Mario de Cooker

Photographs by Mario de Cooker

***Fuchsia* seedling N 11-02 is a 'Sparkling Whisper' sport showing seasonal phenotypic plasticity as regards colour, length and shape of its blooms. Could we capitalize on this for developing new fuchsias?**

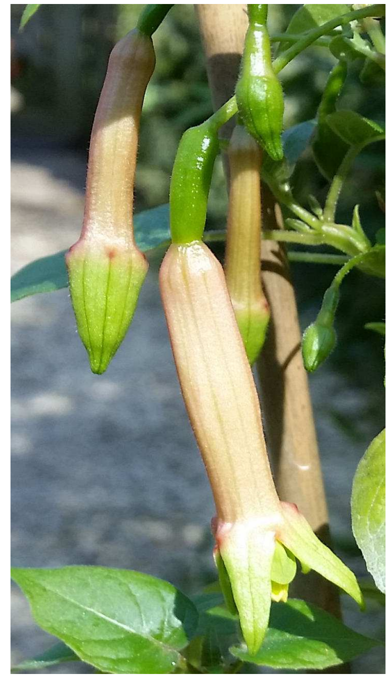
In a previous article in The Fuchsia Breeders Initiative (Issue 8, December 2016) it has been speculated that, if N 11-02 's phenotypic plasticity could be transferred to its progeny, it might bring advantage in creating new fuchsia cultivars. Especially, in developing a yellow fuchsia such genetic trait might be of advantage.

The assumption as regards heritability does indeed seem to hold, but should we be really happy with it?

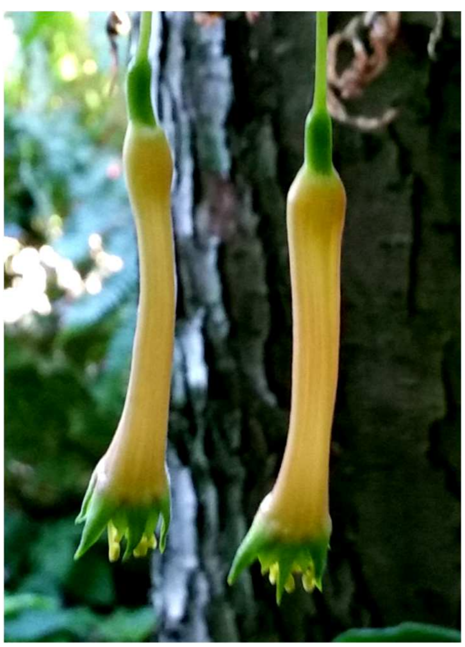
For exploring the assumption's validity, crossings have been carried out N 16-01 x N 11-02.

Seedling N 16-01 = ('Sparkling Whisper' x *F. decidua*) x 'Sparkling Whisper' has been chosen as the female parent because of its attractive yellowish/greenish corolla. Moreover, N 16-01 exhibits at high temperatures similar phenotypic plasticity as N 11-02, presumably because of its 'Sparkling Whisper' genetic traits (see the photographs on p.9).

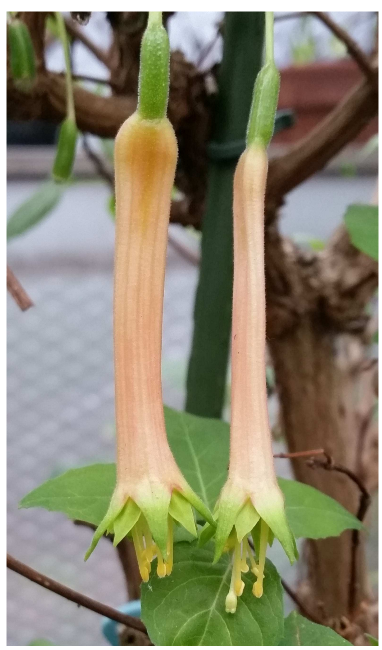
Results of these crossings were not unambiguously encouraging. An example of the outcome is seedling N 18-04, which has indeed inherited a pale tube, together with a greenish corolla. Flowering period is however in March/April, which is not really attractive for further use in making crossings.



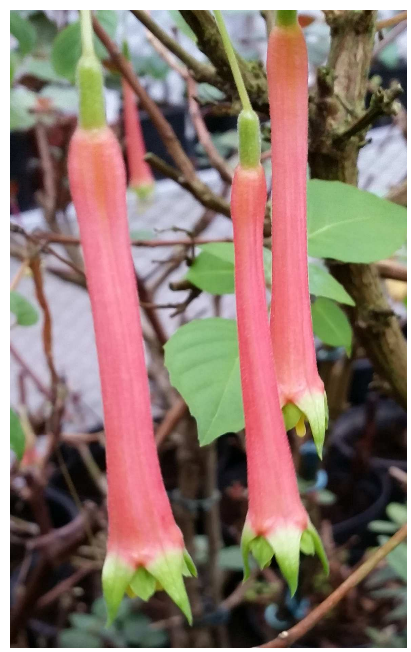
N 18-04 (19 March)



27 September



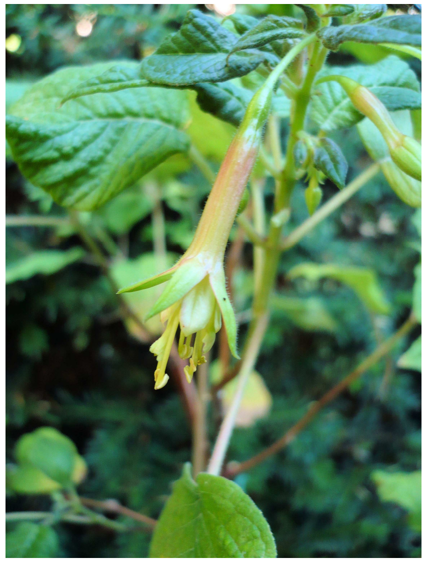
29 October



6 January

Seasonal phenotypic plasticity of 'Sparkling Whisper' sport N 11-02.

N 16-01 (9 March)

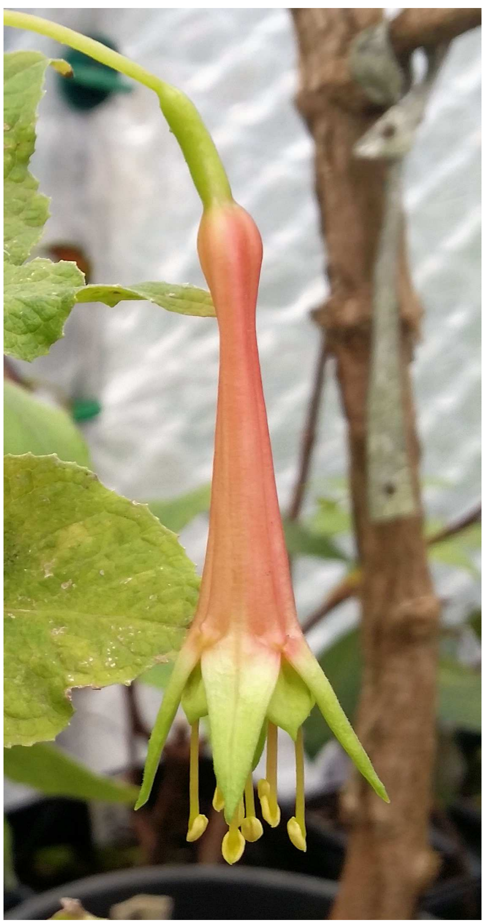


N 16-01 (6 August, after heat wave)

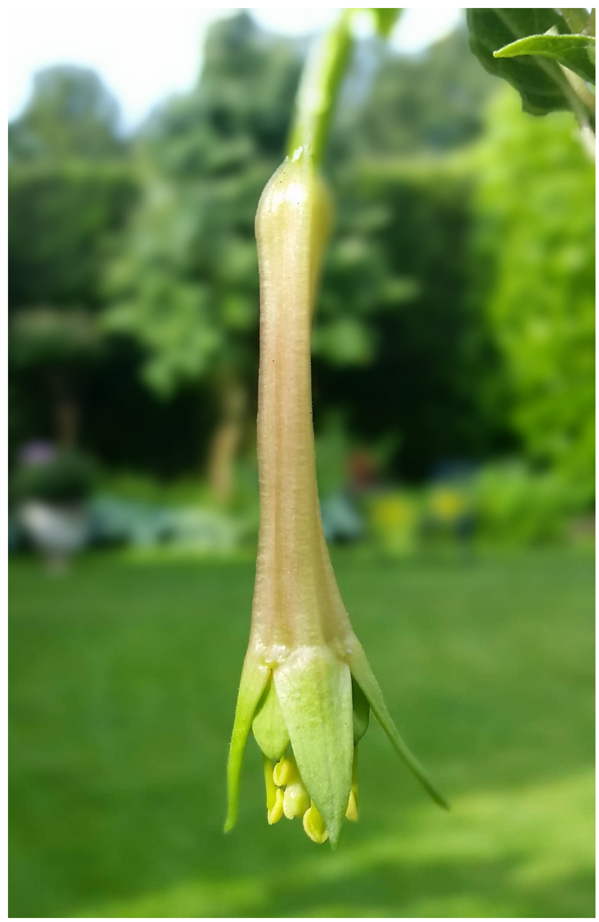
Which preliminary conclusions can be drawn from these crossings?

Positive is, that the presupposition that the phenotypic plasticity trait could be inherited seems to be correct. Moreover, it seems to be part not only of N11-02 's genetic pool, but also of that of 'Sparkling Whisper' (and thus of *F. splendens* ?). Negative is, that flowering, and formation of viable pollen by seedlings such as N 18-04, occurs early in the year. Some hope for future developments could, however, be drawn from a seedling like N 18-35, which produces occasionally some viable pollen also later in the season.

Summarizing: still a long way to go for producing a yellow fuchsia via this route!



N 18-35 (1 November)



N 18-35 (9 June)

Seasonal phenotypic plasticity of N 18-35 = N 16-01 x N 11-02

In search for new purple triphyllas

By Mario de Cooker

Part 2: Exploring the genome of seedling N16-20 and its progeny

Introduction

Purple triphylla seedling N 16-20, which appears to be a breakthrough in creating purple triphyllas, has originated from the crossing 'Daryn John Woods' x 'Purcellian Elegancy'. From initial crossings it has become clear that it has excellent fertility. In this article it will be described how fertility of seedling N 16-20 relates to the N 16-20 genome and how we could capitalize on this for transferring the reddish and lilac purple colours to the tubes, sepals and corollas of all kinds of different progeny, both triphyllas and also other *Fuchsia* forms.

The N 16-20 phenotype

Seedling N 16-20 was created by crossing 'Daryn John Woods' as the female parent with *F. triphylla* 'Purcellian Elegancy' as the male. Blooms, berries and seeds have clear resemblance to the female parent 'Daryn John Woods', but are distinctively larger (photographs on p. 10 and p. 11). Berries are also bigger than *F. triphylla* berries.

The purple, triphylla shaped blooms, are carried in racemes at sturdy stems. Flowering starts around mid July and carries forward (be it less floriferous in the last four months) until about April of the next year.

The Fuchsia Breeders Initiative uses the following definitions for characterizing the type of triphylla seedlings and cultivars.

F. triphylla

Seedlings characterised by a 100% *F. triphylla* genome. Examples are the species itself and, e.g., the pink and orange/pink bi-colour *F. triphyllas*.

Triphylla hybrid

Seedlings characterised by having, according to the hybridisation scheme, at least a 50% *F. triphylla* genome are indicated as triphylla hybrids, but can be indicated as triphyllas as well. Cultivars originating directly from *F. triphylla* as the male or female parent are by definition triphylla hybrids. Also, cultivars originating from, as an example, a crossing 'Göttingen' x 'Göttingen' are considered triphylla hybrids because the 'Göttingen' genome includes (according to the hybridisation scheme) 50% of *F. triphylla* genes.

Triphylla

Seedlings characterised by having, according to the hybridisation scheme, at least a 25-50% *F. triphylla* genome. An example is a seedling originating from the crossing 'Göttingen' x *F. magellanica*, having an arithmetic 25% of *F. triphylla* genes.

Triphylla seedling N 16-20

Berries of N 16-20 (left) and 'Daryn John Woods'

Triphylla seedling N 16-20

Triphylla cultivar ‘Daryn John Woods’

Berries of pink *F. triphylla, F. triphylla* PB#7 and seedling N 16-20, respectively.

Orange/yellowish inside of berries[15] of ‘Daryn John Woods’ and N 16-20

Seeds of N 16-20 and ‘Daryn John Woods’ (same scale)

Number of seeds per N 16-20 berry can be very large

The 'Daryn John Woods' genome

Flow cytometry measurements have been carried out for the crossing parents involved in creating 'Daryn John Woods'.

'Daryn John Woods'= 'Koralle' x *F. juntasensis.*

2C DNA 'Koralle'[5]= 5.66 pg [1,2]

2C DNA *F. juntasensis* (tetraploid) = 5.04 pg[3]

2C DNA 'Daryn John Woods' = 4.46 pg[1]

From these measurements it appears that the 'Daryn John Woods' genome can best be described as TTJJ, which has an expected 2C DNA = 4.52 pg vs 4.46 pg measured.

Such genome then presupposes, that in the creation of 'Daryn John Woods' a TT gamete has been delivered by 'Koralle' (which presumably is a pentaploid cultivar having a TTTTF genome) thereby loosing the *F. fulgens* set of chromosomes. Such event is not unlikely and quite similar to what is to be expected to happen occasionally also with 'Göttingen', which has a corresponding pentaploid TTTTF genome[6].

The *F. triphylla* 'Purcellian Elegancy' genome

2C DNA 'Purcellian Elegancy' = 4.00 pg[3]

The *F. triphylla* 'Purcellian Elegancy' genome is a tetraploid TTTT.

The seedling N 16-20 genome

On basis of the crossing performed for creating seedling N 16-20 = 'Daryn John Woods' x *F. triphylla* 'Purcellian Elegancy', for seedling N 16-20 a tetraploid genome TTTJ and a corresponding 2C DNA value of 4.26 pg would be expected. This is however far from the measured value 2C DNA = 6.28 pg[3], which suggests a hexaploid rather than a tetraploid genome.

For obtaining a hexaploid N 16-20 genome, either 'Daryn John Woods' or 'Purcellian Elegancy' must then have contributed an unreduced gamete in this crossing.

Corresponding genomes can be described as

- N 16-20 = TTTTTJ with 2C = 6.26 pg (in case an unreduced 'Purcellian Elegancy' gamete has been involved).

F. triphylla **'Purcellian Elegancy' has been used as the female parent in making seedling N 16-20.**

- N 16-20 = TTTTJJ with 2C DNA = 6.52 pg (in case an unreduced 'Daryn John Woods' gamete has been involved).

The measured 2C DNA value of N 16-20 amounts to 6.28 pg. First conclusion would then obviously be that the N 16-20 genome could best be described as TTTTTJ.

However, with such genome an almost unsurmountable problem arises. From crossing experiments it has become clear that seedling N16-20 has excellent fertility, both as the male and the female. This could best be explained by the TTTTJJ genome as such genome would deliver balanced gametes TTJ rather than an unbalanced mix of presumably TT and TTJ gametes as produced by a TTTTTJ genome. Therewithal, difference of calculated vs measured value of a TTTTJJ genome is rather small[4].

The genome has been further investigated by making crossings. Later in this article the TTTTJJ genome will eventually be confirmed from the results of these crossing experiments.

As a working model it is assumed that the N 16-20 genome can be described as a hexaploid TTTTJJ[7].

N 16-20 crossing experiments

Starting from the assumption that the N 16-20 genome can be described as TTTTJJ, gametes formed will be exclusively TTJ. For such gametes, the *F. juntasensis* (the J) contribution to the colour of the blooms will be dominant[8]. As regards colour of the blooms of the progeny, it could then be expected that exclusively seedlings having blooms with purple hues will be created in crossings with N 16-20 being used both as the male and the female[9].

Crossings have been carried out between N 16-20 and a number of *Fuchsia* species and cultivars, predominantly in first instance using several different *F. triphylla* and *F. fulgens* specimens. In these crossings, seedling N 16-20 has been used both as the male and the female parent.

In this article, focus is on crossings of N 16-20 with species specimens of *F. triphylla* and *F. fulgens* as these lend themselves best for the genome elucidation of the seedlings by flow cytometry. In a later article N 16-20 crossings with cultivars will be addressed.

N 16-20 pollen formation is best from September onwards. If used as the female, successful crossings can be carried out all year round.

Seedling N 16-20 has proven having excellent fertility. Seeds are produced in large quantities, up to some 50 seeds per berry. Not all crossings, however, have been equally successful. As an example, a number of crossings N 16-20 x *F. boliviana* have delivered not any viable seeds. Large quantities of shriveled unviable seeds were produced, and none of these has germinated [10].

Germination of N 16-20 seeds normally occurs within 3-5 days.

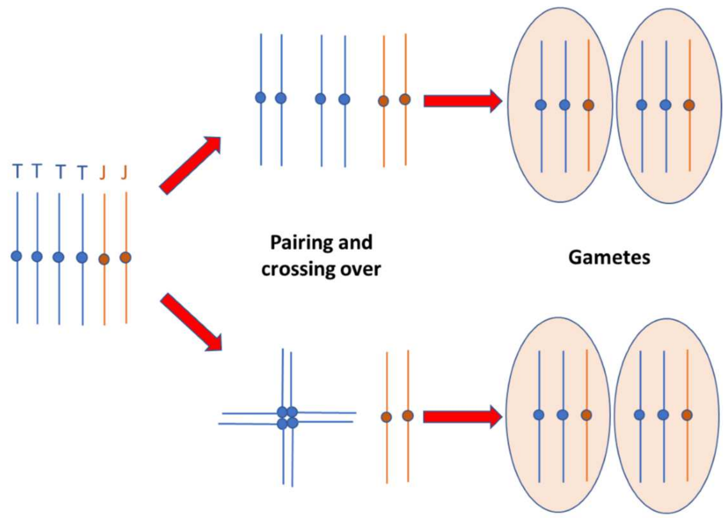


Figure 1. Gametes formation by seedling N 16-20 in meiosis

Germination of viable seeds normally occurs within a very short time, usually 3-5 days.

Crossings N 16-20 x F. triphylla

Crossings have been carried out with *F. triphylla* 'Purcellian Elegancy', *F. triphylla* PB7760 #6 and *F. triphylla* PB7760 #7.

As expected, all seedlings produced from these crossings have purple hues. Flowers are produced in racemes and show large phenotypic variation as regards tube length and shape of the blooms. This could indeed be expected, as the tetraploid species *F. triphylla* itself has large phenotypic variability[11]. This variability is contained in the *F. triphylla* genes, but moreover, in meiosis not only bivalent but also tetravalent pairing of *F. triphylla* chromosomes of *F. triphylla,* as well as the *F. triphylla* chromosomes contained in N 16-20 could occur, which could deliver extra variability by double reduction (see Fig. 1).

In general, seedlings produced from crossings N 16-20 x *F. triphylla* 'Purcellian Elegancy' are somewhat less vigorous than seedlings originating from the PB 7760 species and the *F. fulgens* crossings. Furthermore, most of these seedlings have a clear thickening at the top of the tube, which is typical also for *F. triphylla* species crossings[11].

Crossings N 16-20 x F. fulgens

Crossings have been carried out with a series of different *F. fulgens* species and *F. fulgens* seedlings having the

Triphylla seedling P19-E6 is an example of an N 16-20 x *F. triphylla* crossing.

species genome, viz *F. fulgens* 'Grandiflora', *F. fulgens* 'Gesneriana' and a couple of seedlings originating from selfings of *F. fulgens* 'Gesneriana' [12].

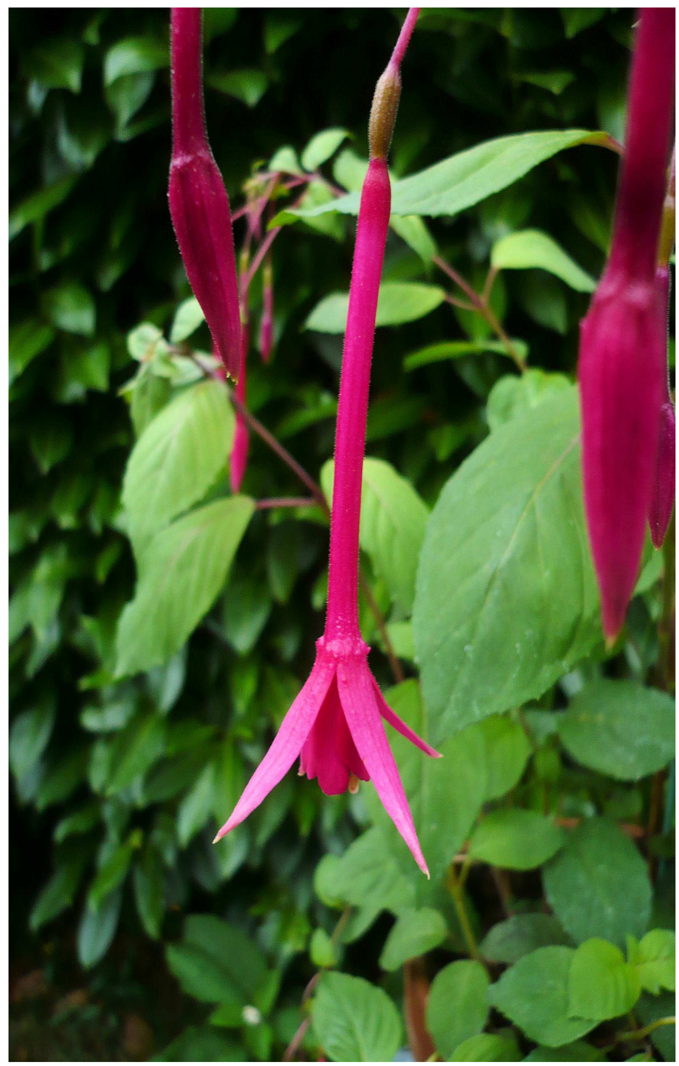
Seedlings originating from crossings N 16-20 x *F. fulgens* are, in general, vigorous growers, having often larger leaves than seedlings originating from the *F. triphylla* crossings. A large phenotypic variation as regards tube length and shape of the blooms is found.

Triphylla seedling P18-H2 is an example of an N 16-20 x *F. fulgens* crossing.

Colour of the blooms is in general less vibrant than N 16-20 x *F. triphylla* crossings. Co-pigments of the crossing parent play an important role in this respect.

Crossings N 16-20 x cultivar

Various cultivars have been used for making N 16-20 x cultivar crossings, amongst these B 83-5[13]. The cultivars used have all their own characteristics and their own specific genetic potential for creating phenotypic variation. All blooms of seedlings produced have purple colour hues. Results of such crossings will be addressed in a next article.



Triphylla seedling P18-A1 (no racemose flowering) is an example of an N 16-20 x cultivar crossing having a very long tube.

The genome of N 16-20 seedlings

Flow cytometry measurements have been carried out on a series of N 16-20 seedlings:

N 16-20 x *F. triphylla* PB#7

N 16-20 x *F. triphylla* 'Purcellian Elegancy'

N 16-20 x *F. fulgens* 'Grandiflora'

Flow cytometry measurements on seedlings originating from N 16-20 x F. triphylla PB#7 crossings.

2C DNA seedling N 16-20 =	6.28 pg
2C DNA *F. triphylla* PB 7760#7 =	4.04 pg
2C DNA P18-B1[14] =	4.93 pg
2C DNA P18-B2 =	5.02 pg
2C DNA P18-B3 =	5.14 pg

Expected genome of the crossing is TTTTJ.

Expected 2C DNA value for this crossing = 5.30 pg vs an average 2C DNA value of 5.03 pg.

Conclusion is, that an acceptable, be it not perfect, agreement exists between expected and measured average value for this crossing.

Flow cytometry measurements on seedlings originating from N 16-20 x F. triphylla 'Purcellian Elegancy' crossings.

2C DNA seedling N 16-20 =	6.28 pg
2C DNA 'Purcellian Elegancy' =	4.00 pg
2C DNA P18-F1 =	5.06 pg
2C DNA P18-F4 =	5.27 pg
2C DNA P18-F6 =	5.22 pg
2C DNA P18-F7 =	4.94 pg
2C DNA P18-F8 =	5.16 pg

Expected genome of the crossing is TTTTJ.

Expected 2C DNA value for this crossing = 5.30 pg vs an average measured 2C DNA value of 5.13 pg .

Conclusion is, that a fair agreement exists between expected and measured average value for this crossing.

Flow cytometry measurements on seedlings originating from N 16-20 x F. fulgens 'Grandiflora' *crossings.*

2C DNA seedling N 16-20 =	6.28 pg
2C DNA *F. fulgens* 'Grandiflora' =	3.03 pg
2C DNA P18-D2 =	4.99 pg
2C DNA P18-D4 =	4.40 pg
2C DNA P18-D5=	4.26 pg

Expected genome of the crossing is TTJF.

Expected 2C DNA value for this crossing = 4.79 pg vs an average measured 2C DNA value of 4.55 pg.

Conclusion is, that an acceptable, be it not perfect, agreement exists between expected and measured average value for this crossing. The spread of the measurements, however, is rather broad, which needs further investigation [15].

Conclusion on the genome of crossing products of N 16-20

Overall conclusion on flow cytometry measurements on N 16-20 crossings is, that on basis of an assumptive TTTTJJ genome for seedling N 16-20, a fair agreement exists between measured and expected 2C DNA values for a series of crossing products as described above.

Fertility of N 16-20 seedlings

Fertility of N 16-20 progeny has thus far not extensively been investigated. Seedlings, originating from the crossing N 16-20 x *F. fulgens* seem to have none or at best only very poor fertility. However, a couple of seedlings, obtained from crossings N 16-20 x *F. triphylla* PB 7760 #6 have produced some seeds.

Accepting the genome TTTTJ for such seedlings, it would be quite understandable that these would have some fertility. Gametes formation then presumably proceeds in line with gametes formation of *F.*'Göttingen', having a comparable pentaploid genome TTTTF. In such case, the colour of the progeny would most probably not have exclusively purple hues, as also TT gametes may be formed. This could be checked by performing additional crossing experiments.

It's not clear if such fertile N 16-20 seedlings could have value for creating new triphyllas. Gametes having the TT genome may be obtained rom *F. triphylla* as well, and gametes having the TTJ genome may be obtained also from seedling N 16-20. Distinctive feature could be a different mitochondrial environment, depending on the way the crossing parents have been made, but this could be elucidated only by trial-and-error.

Seedling P18-G1

References and notes

(1) Single measurement flow cytometry 2C DNA value.

(2) Flow cytometry measurements have been carried out by Mrs. Dr. ir Leen Leus from ILVO, the Belgian Institute for Agricultural and Fisheries Research, Caritasstraat 21, 9090 Melle (Belgium), www.ilvo.vlaanderen.be. The 2C DNA value is the absolute amount of DNA in a non-dividing cell nucleus. This means the size of the full undivided genome in picograms (pg). For a diploid plant the 2C DNA value corresponds to two sets of chromosomes; for a triploid plant the 2C DNA value corresponds to 3 sets of chromosomes etc.

(3) Average 2C DNA figure of two flow cytometry measurements.

(4) Moreover, 2C DNA value of polyploids frequently decreases as compared to expected value with increasing polyploidy. J. Ramsey, D.W. Schemke, 2002; Neopolyploidy in Flowering Plants; Annu. Rev. Ecol. Syst. 33: 589-639).

(5) The genome of 'Koralle' as used by Mr. Edwin Goulding in several crossings (as an example for creating *F.* 'Our Ted') is presumably TTTTF (T = *F. triphylla* set of chromosomes, F = *F. fulgens* set of chromosomes). This corresponds with the outcome of flowcytometry measurements, indicating that 2C 'Koralle' = 5.66 pg and 2C 'Thalia' = 5.64 pg. Furthermore, as an additional conclusion, 'Koralle' and 'Thalia' could therefore be well one and the same cultivar. Note that this 'Koralle' differs from the triploid 'Koralle' as mentioned in The Fuchsia Breeders Initiative, issue 8, December 2016, p. 16. Evidently, several different 'Koralle' specimens are in circulation.

(6) Mario de Cooker, The Fuchsia Breeders Initiative, Issue 8, December 2016, p. 14-18.

(7) The *F. triphylla* chromosomes of the TTTTJJ genome contain at least one T_W set of chromosomes, that is, containing chromosomes having the defect for producing anthocyanins. As 'Our Ted' (the first near white triphylla) has originated from 'Koralle' x 'Koralle' we could assume with some confidence that 'Koralle' could have contributed a T_W set of chromosomes. 'Purcellian Elegancy' will have contributed without any doubt at least one T_W as it has delivered a gamete with the genome T_WT_W or T_WT in the crossing.

(8) Henk Waldenmaier, The Fuchsia breeders Initiative, issue 9, July 2017, p. 12-17.

(9) It is not known if in meiosis pairing and crossing over could occur between *F. triphylla* and *F. juntasensis* chromosomes. Such pairing occurs in a number of diploid *Fuchsia* species crossings, *F. splendens* x *F. fulgens* ('Speciosa') being an example. This could influence and change the outcome of N 16-20 crossings.

(10) In the series of N 16-20 crossings, as yet no relation has been found between germination power and the Endosperm Balance Number. This is point of attention in further investigations.

(11) Mario de Cooker, The Fuchsia Breeders Initiative, issue 4, December 2014, 11-15.

(12) *Fuchsia Fulgens* seedlings are described in The Fuchsia Breeders Initiative, issue 6, December 2015, p. 5.

(13) *Fuchsia* B 83-5 is one of hybridist Henk Waldenmaier's seedlings, having the pentaploid genome MMMMF (M = set of chromosomes of *F. magdalenae*; F = set of chromosomes of *F. fulgens*). It has excellent fertility and has been used for creating many new fuchsia cultivars.

(14) Purple triphylla seedlings from 2018 are encoded as P18-… P =purple, 18 = 2018, followed by a capital indicating the crossing and a figure indicating the seedling.

(15) A similar spread of flow cytometry measurements has been found also for N 02-16 x *F. fulgens* crossings for making mini-triphyllas (De Cooker, unpublished results). Backgrounds of such spread are as yet unclear.

(16) The orange/yellowish colour of the inside of the berries has been inherited from *F. juntasensis*, which has yellowish berries.

New Fuchsia 'Icy Tears'

By Mario de Cooker

Fuchsia 'Icy Tears' (De Cooker, 2019) has originated as a sport from *Fuchsia* 'Frozen Tears'. It's origination is a nice example of a very rare, and highly unlikely coincidence.

I have introduced 'Frozen Tears' in 1993 (AFS registered in 2011). It's a floriferous cultivar with single to semi-double reddish/purple blooms. It makes long (up to 1 meter) trailing branches. 'Icy Tears' has similar growth properties as 'Frozen Tears'.

In March 2016, I have visited the Zeelenberg Nursery at their new location in Dongen (The Netherlands) for providing cuttings of new Fuchsia introductions. When I told Mrs. Yvonne Zeelenberg that I had lost my own 'Frozen Tears', she kindly offered me a one year old plant (one out of several) in a basket as a replacement.

A couple of months later I perceived an aberrant flower in the plant, apparently a sport. The plant had indeed one branch carrying differently looking flowers. Tube and sepals had changed into a white colour, the sepals still showing a red stripe.

Well, quite a remarkable coincidence. I could have been there on another day, not mentioning 'Frozen Tears'. Or Mrs. Zeelenberg could have given me another basket.

Predestination?

***Fuchsia* 'Icy Tears'**

***Fuchsia* 'Icy Tears'**

Photograph by Alan Richards

***Fuchsia* 'FrozenTears'**

I have tested the sport since 2016 as regards growth and sporting back to the original plant. The latter has indeed happened once, out of about 20 cuttings.

This year about 80 cuttings will be grown by members of our local Fuchsia Society. Sporting is one of the items to be monitored

Many new pale-pink/near-white triphyllas are flowering now. Since a couple of weeks, however, several of these have been severely damaged by bumblebees.

Last week I indeed caught one with my camera in the polytunnel. Billy Humblebee, happily jumping from bloom to bloom, was steeling the nectar by making holes in the tubes. At the moment, the orange and purple triphyllas don't seem to suffer from this problem. I love fuchsias, but I love bumblebees as well. So I'm afraid I will have to live with it.

Contents of the next issue

The next issue is scheduled for the end of December 2019.

Let's Face It (by Edwin Goulding).
In December's issue of TFBI our article will be called Let's Face It. What we call "the market" is in reality a whole collection of niche markets. Wise hybridists know what has already been created, what suppliers will produce and what buyers will purchase. Then, their progeny stand a chance of living long and happy lives. In fact, all successful plants fulfil a defined purpose and a distinct need.

In search for new purple triphyllas.
Part 3: Creating new purple triphyllas by making N 16-20 x cultivar crossings (by Mario de Cooker).
New purple triphyllas, having all kinds of different shapes and growth properties, can be created by making crossings of seedling N 16-20 with fuchsia cultivars. First results will be described and future steps will be explored.

Want to learn more about all this? Then stay connected!

Your contribution to the The Fuchsia Breeders Initiative is highly appreciated. Contributions for the next issue should be made available at the latest on 15 December 2019.

The Fuchsia Breeders Initiative

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