The Fuchsia Breeders Initiative

ISSN: 2214-7551

Issue 17, July 2021

Contents of this issue:

Contributions for the next issue, which is scheduled for the end of December 2021, should be in the editor's possession ultimately on 10 December 2021.

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

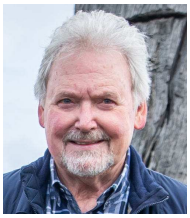
Any new Fuchsia cultivars being released? Please provide a photograph and some descriptive information, and it will be seen and get attention all over the world!

Photograph on front page:

***Fuchsia* 'White Twinkle'**

(De Cooker, 2020)

Some fuchsias are getting a bit desperate



Editor of The Fuchsia Breeders Initiative

Mario de Cooker

It's becoming more the rule than the exception: complaining about the weather and the extremes which seem to become the norm. Well, here we go again. Extreme heat in the USA and Canada this summer (with temperatures over 50 °C!) and forest fires at several places in the world have ravaged man, animal an plants. Over here, in The Netherlands, the new season has started with a couple of cold months: April and May, putting the fuchsias far behind their normal development. Then a local heat wave in June plagued the fuchsias, luckily followed by quite normal temperatures in July.

All together, difficult circumstances to prepare for a show (if any, in corona times) because several fuchsias show quite unusual development. In my own collection, the 'early birds' such as 'Checkerboard' started flowering at their usual time. Several other fuchsias are however far behind. Especially a number of triphyllas are still in their warming up phase. Even unpinched, they refuse making flower buds, which is quite unusual at the end of July, even for triphyllas.

As an example in my own garden, triphyllas producing not a single flower bud by mid July, are 'Insulinde' (De Graaff, 1991) and 'Wake The Harp' (De Cooker, 2014). Not a real problem, because we know that ultimately they will produce blooms. For new seedlings it's however more problematic, because for being interesting to be introduced they should produce flowers at the latest at the end of July. But under the present circumstances it's unclear whether late flowering is an undesired trait of the specific seedling, or just a coincidence that will not repeat itself next year. Some patience will be needed for another year of testing. Sigh!

'Wake The Harp' at the end of July in normal times.

Mario de Cooker

LONGEVITY

By Edwin Goulding

Photographs in this article courtesy Mr. Edwin Goulding

Introduction

Time is a complex subject as we have already seen.[1] In its many guises it is seldom considered when assessing new introductions that are brought to the market each year. And yet we can see it is vital to the sales of so many other genera that we are unwise to ignore its impact on *Fuchsia* as well. In this article I want to discuss the many facets of its effect on growing, flowering and selling Fuchsias. In truth we are not just considering shelf-life here as it affects pot plants but also its wider impact and relevance. The several aspects of longevity will be named and considered individually in greater detail.

Time to flowering

Growing plants in pots for competition taught me how important the interval between the final stage of nipping to enhance bushiness of growth and the appearance of flowers could be. In this scenario shows or competitions take place at a predefined date and venue. It is of little use producing outstanding plants that have no blooms when judging takes place. In *Fuchsias The Complete Guide*[2] useful estimates of stopping dates are given in weeks required before flowers are likely to be fully formed and in their prime.

This same truism applies to producing pot plants for the market. Buyers usually expect pot plants to be supplied in full bud rather than bursting into ample flower. Where cuttings sales are concerned the situation is somewhat different. Specialist nurseries take account of the vast differences in the time required to root and grow cuttings of the many different species, variants and hybrids available to their customers. Wholesale suppliers carry a narrow range of cultivars in order to simplify and standardize production throughout sometimes complex networks of individual growers.

One of the reasons why plants from Section *Hemsleyana* are seldom seen on sale is that they flower in low daylight and therefore require a greater expenditure on things like heat within greenhouses. Seasonality also adversely affects sales of plants from Section *Encliandra*. The public expect their plants to be ready for them to buy and grow-on from early spring into early summer. Most Fuchsias are then used for garden display, either in flower beds or in containers; the latter consisting of tub planters or of hanging baskets or wall pockets.

***F.* 'Dollar Princess'**

Alternative ideas have yet to be fully accepted for the Genus.
Two hybrids will serve to demonstrate the differences that can be found in the interval between the last stop and the onset of flowering. These are *F.* 'Dollar Princess' (Lemoine, 1912) and *F.* 'Peppermint Stick' (Walker & Jones, 1950). The former is a compact, almost mushroom-shaped, plant that produces blooms within six or seven weeks under optimal conditions. The latter is also of a neat habit but rather more upright in type that has been recommended for competitions. Unfortunately it takes around thirteen weeks to come into rather sparse summer flower; a major drawback.

***F.* 'Peppermint Stick'**

Time in flower

The average member of the public probably still considers a Fuchsia to be the little red and violet specimen like those seen growing in West Country, UK, hedgerows. A similar image persists where garden hardies are concerned. A significant part of their success lies in their ability to come into bloom just after the summer solstice and to remain in flower until the autumn frosts cut short their beauty. The earlier a hardy Fuchsia can come naturally into bloom the longer its flowering season can be. Here the impact is not focussed on a single day, or on a short spell, but on the accumulative total of flowering time and the sheer quantity of blooms.

Continuity of flowering is also a factor where the length of flowering time is concerned. Individual cultivars vary a great deal in the stamina required to maintain enough new growth in order to produce new buds and blooms in succession. More lethargic growers are likely to carry fewer flowers and to have longer intervals with no blooms on display. This remains true whatever the ultimate size of plants may be. Sometimes this is the result of unseen factors in the parents' genotypes but at others it can be the result of crosses between summer and winter flowering types.

Here again two examples have been chosen to illustrate the point. This is not to suggest that examples given are the only ones to be found or to imply that they have no other outstanding features. Such things as parentage and fertility ratios are significant factors in the choices hybridists need to make. *F.* 'Straat Final' (de Boer, 2017) remains in almost constant flower whereas *F.* 'Straat Futami' (de Boer, 2005) is very late in the summer to start. Perhaps this is evidence that the former is more closely associated to Section *Schufia* while the latter is closer to Section *Encliandra* and other winter flowering genotypes.

***F.* 'Straat Final'**

***F.* 'Straat Futami'**

Intermittant flowering

We can see already from the comments so far that seedlings should not be chosen for their immediate impression, made on a single day of judgement. Things are much more complex when it comes to growing plants for the second or third season in succession. Some features remain hidden in the genotype whilst others are on full view to anyone with keen powers of observation. It is also true that some of the factors that need to be taken into account are not immediately obvious, they occur spasmodically. Breaks in the continuity of flowering can be significant enough to ruin any pleasure in garden displays.

This trait was much more common in plants introduced during the early to the mid 1900's. It has been much reduced in recent years, whether by accident or design. A single example will suffice to illustrate the point. It came to my attention during the early 1970's. *Fuchsia* 'Lolita' (Tiret, 1967) had summer rest periods that were so long only two flushes of flower occurred in each summer season. For a basket display this is disastrous and is one of the main reasons this cultivar is now so difficult to locate and grow. Changes in feed regimes make no real impact on such happenings. There is not even the compensation of having ornamental foliage.

Individual flower lifespan

Another significant factor when considering longevity is the lifespan of each individual bloom. Some plants are very good at obscuring this by producing large numbers of flowers in quick succession. Dead blooms must be cleared up and wherever possible, in order to encourage new growth and the production of further flowers, the seed pods removed before they have a chance to sap the plant's energies. A number of factors feed into this aspect of a Fuchsia's life and the impact it makes on growers and observers.

***F.* 'Lolita'**

Some cultivars, like *F.* 'Peppermint Stick', for example, have blooms that last for relatively long times. This might be because their metabolism is slower than other 'fast track' plants. Curiously, some doubles seem to last longer on their plants than many singles but this is not

invariably the case; other factors come into play that we will examine shortly. Many of the triphylla hybrids also seem to carry each individual flower for a longer time and these may also be self-cleaning; drop their unfertilised ovaries and their dead blooms.

One example of very short lived flowers is to be found in *F.* 'Jennifer Haslam' (Gouldings Fuchsias, 1994). It compensates for this by producing large numbers of blooms on well-shaped bushes and carrying very large numbers of rapidly developing flowers. Regular cleaning of dead flowers then becomes essential in order to prevent the onset of *Botritis cinerea* as they can fall into the dense foliage and lodge there. An example of long lived flowers can be found in *F.* 'Daisy Bell' (Mieske, 1977). Both are illustrated here.

***F.* 'Jenifer Haslam'**

Bloom longevity and texture

One of the factors closely associated with bloom longevity is the texture of flowers. This feature seems to be most associated with Fuchsias whose origins can be traced back to species that are pollinated by birds. For this reason it seems to apply most commonly to hybrids with elongated tubes. In fact waxiness is usually clearly visible and evidenced by a glossy, almost reflective, surface appearance on both tubes and sepals. Smaller flowers descended from insect pollinated species are almost always shorter lived.

***F.* 'Daisy Bell'**

Of the two examples illustrated here the first is an older cultivar that came to my attention many years ago, *F.* 'Chang' (Hazard & Hazard, 1946). It has faded from popularity due to its leggy but reasonably strong growth having few side shoots. Additionally, it tends to lose its lower leaves quite rapidly so that the bare lower stems become too obvious. One hybridist that warrants a special mention here is Henke Waldenmaier. His WALZ series are notable for this waxiness. His choice of *F. magdalenae* as a starting point is shown in introductions like *F.* 'WALZ Bugel (Waldenmaier, 1990).

Bloom longevity and pollen

There is one aspect which affects bloom longevity that is not immediately obvious to novices.

Once pollination is complete there is no point in further energy being wasted by plants on keeping flowers for display. It is now directed to transforming the ovaries and in developing fertile seeds. The petals, sepals and tube, that together constitute each hypanthium, can be allowed to shrivel and fall away leaving the ovaries to mature on their pedicels. Birds are not required until seed dispersal becomes necessary.

Pollen is also lacking from some hybrids, or in very short supply. This reduces the possibility of flowers becoming self-fertilised. Far crosses are those most likely to produce offspring with this characteristic. Near relatives give a greater percentage of fertile offspring. Without energy being expended on the production of its own pollen any plant can afford to spend more resources on producing nectar and on prolonging the life of its blooms. Whether hybridists use stock as female or as male parents the same general rule is likely to remain true. Bacterial and fungal disorders are also less likely to develop when pollen is absent.

The two introductions illustrated here exhibit the usual characteristics of waxy tubes and sepals, relatively long tubes and little if any pollen. The first is *F.* 'Lechlade Potentate' (Wright, 1984). Its colours are as unusual now as the day they were first seen. *Fuchsia* 'Rina Felix' was produced at around the same time (Felix, 1984). Again, its colours are strikingly different from the norm. Its branches tend to be more woody and stiff by comparison with other triphylla types.

Foliage effect on cut branch/ flower longevity

Some of the greatest numbers of flowers sold to the public are cut flowers. This is evident to anyone who visits supermarkets, those famous one-stop shops that have become so much a feature of modern urban life. To some extent they reflect today's throwaway society. Beauty is not expected to last forever but is grasped when the opportunity presents itself to beautify smaller homes where there is a much reduced contact with nature; urbanisation. The fact that artificial colours are common also illustrates how little 'real' has to do with these purchases.

***F.* 'Chang'**

***F.* 'WALZ Bugel'**

***F.* 'Lechlade Potentate'**

***F.* 'Rina Felix'**

At the moment no Fuchsia lends itself to commercial cut flower production. Branches last at most about twenty four hours before they wilt. This is not to say that changes could not be made in order to improve this position. Hybridists would need to put in enormous and protracted efforts to make this possible and to expand the marketable

range of suitable plants. They would need to produce stock with longer and stronger internodal growth. Leaves and flowers would need to become waxier in texture too.

Two examples give a view of the characteristics required. First the habit of growth can be clearly demonstrated by *F.* 'Greenpeace' (de Graaff, 1985). The nearer the top of each branch that blooms are held the more easily they can be displayed and seen in a vase. Leaves on this cultivar are not waxy in texture. *Fuchsia* 'Hinnerike' (Bogemann, 1987) has a greater waxiness in its flowers but still substantially lacks this in its leaves. In truth, the more felt-like the foliage the more likely transpiration is to be too high to allow longevity to be achieved, particularly within dwelling houses' dry atmospheres. So far this remains an unfulfilled dream. Perhaps in the future?

***F.* 'Greenpeace'**

***F.* 'Hinnerike'**

Inhibitors of flowering and growth

Perhaps it is wise to point out that larger flowers when severed from their plants tend to have much shorter lives than waxy single flowers like those of the majority of James Lye's introductions. This can be clearly seen in U.K. competitions where six individual flowers are expected to be exhibited in little containers of water. Many blooms wilt badly even before judging takes place and for the visiting public must create a bad impression of Fuchsias as naturally very short lived.

Some years ago it was the trend for cuttings to be treated chemically with plant auxins in order to increase their bushy appearance. This also reduced the need for labour in nipping out leggy growth and for increasing the space between individual plants as they grew; a cost saver. This treatment had the effect of delaying the normal pattern of growth which was only resumed some three months later in the season. As a result those who bought the cuttings frequently complained that their plants had something wrong with them. Flowering in these plants was subsequently delayed and their total season shortened.

Foliage and cultural factors

At this point it is worth pointing out that cultural methods can make a huge difference to things like flowering times. I remember an occasion when one very keen club grower, a beginner, asked me why her plants weren't flowering like everyone else's. The plants were examined and proved to be of exceptional quality, large and very bushy. The compost and potting looked excellent and a discussion on watering and feeding impressed me with every attention to detail. Finding no sign of anything wrong with the plants, some twenty in number, I asked when the last stop had taken place; the show was about two weeks away. The answer stunned me. "No-one said anything about finishing nipping out the growing points." So much for poor teachers.

Longevity for a show Fuchsia may last for one show season or for several years depending on whether plants are protected over winter, pruned and started back into spring growth. With each succeeding year internodal growth shortens and very gradually the plant's vigour diminishes. The result can be a small umbrella of foliage above thick and gnarled stems; not a pretty sight. In the garden or hedgerow some hardies can last for very many years. Foremost among these in my experience are *F. magellanica* var. *molinae* (also known as *alba*) and *F.* 'Globosa' which so closely resembles our idea of the conventional hardy Fuchsia.

Texture

By now readers will have realised that the texture of foliage is as important as that of flowers. It particularly affects longevity. The thicker the leaf cuticles the more robust they are and the likelier leaves are to remain on the plant and looking healthy. Some species have very hairy foliage. The leaves in these cases tend to be much larger than in the majority of those we grow. This is probably to help in collecting and retaining atmospheric moisture in the wild and does not appear to have a great impact on the lives of individual leaves or their plants. Those hybrids that have soft matt-surfaced leaves are likely to suffer most, especially during hot and dry weather that becomes protracted.

Foliage colour changes

As days shorten and nights draw in leaves naturally start to change hue. Nutrients from them are reabsorbed into the main part of the plant and eventually the foliage falls. This process is well documented in all deciduous trees and shrubs. Fuchsias out of doors are no different.

Another change that can occur is redness showing on leaf surfaces. Sometimes this is a result of varietal tendencies when sudden temperature drops occur. These are not then reversed although new foliage is usually normal, whether green or yellow, or a mixture of each. A rusty redness is also quite often caused by red spider mite attacks. Careful examination of the undersides of the affected leaves is necessary, usually with a magnifying glass, in order to identify the tiny pest screened by a fine gossamer web. In cases where pests are found treatment is required but leaves never resume their normal life span or former colouration. Here are some illustrations of pathogens that can alter foliage radically.

Leaf drop

Leaves and plants have their natural life span in the same way that we have. There will of course be variations between individual plants but these are minimal when we compare, for example, Fuchsias with Oak trees. We have seen how longevity can be influenced by so many different factors, both in flowers and in leaves. Life for the dedicated enthusiast and hybridist will never be simple. If it were, we probably wouldn't be very interested in the first place. As it is, Longevity is one of those multi-faceted, diamond-like, subjects from which we can learn so much. Such knowledge will always be valuable.

References

[1] The Fuchsia Breeders Initiative, Issue 8, December 2016, pp.6-9.
[2] *Fuchsias The Complete Guide*, 1995 and 2002, Goulding, E., London: Batsford.

Red Spider, leaf top reddening

Red Spider, leaf underside

Botritis

Rust, leaf tops

How Flow Cytometry helps us solve genetic puzzles

By Mario de Cooker

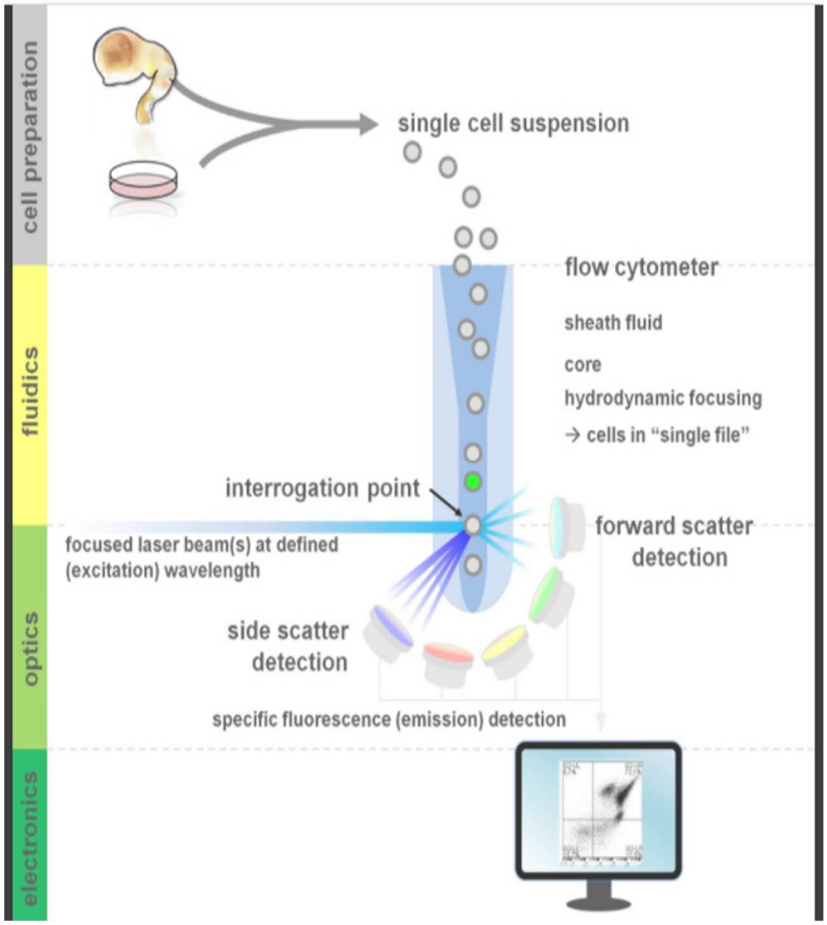
Introduction

Flow cytometry is an analytical technique with which we can determine the amount of DNA in cell nuclei in a relatively simple and inexpensive manner using a flow cytometer (a particle meter).

In short, the technique means that the DNA in the cell nucleus is stained with a fluorescent substance, which binds quantitatively to the DNA. The nuclei are then passed through the flow cytometer, where they are illuminated with light from a laser source. This allows the nuclei to fluoresce. The amount of fluorescence is recorded for each nucleus. As a result of the quantitative bond between the DNA and the dye, the strength of the fluorescence is used to measure the amount of DNA present in the nuclei. The number of cell nuclei is then measured with a computer as a function of the amount of fluorescence. In this manner a picture of the relative amount of DNA in the nuclei of the specimen (for example, a particular species or crossing) is obtained relative to an internal standard in the measurements used.

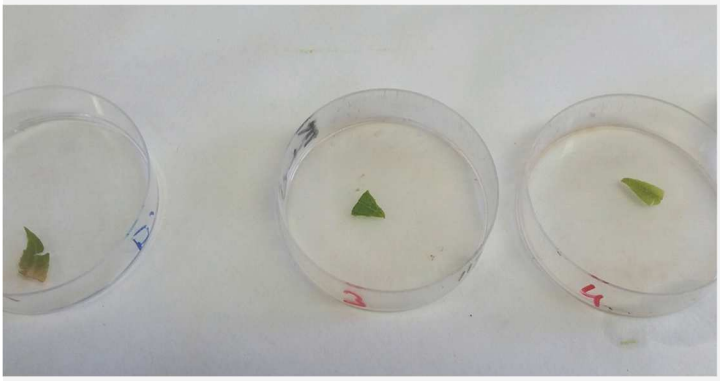
This DNA measurement is referred to as the 2C-value. For a diploid plant the 2C-value corresponds to two sets of chromosomes; for a triploid plant the 2C-value corresponds to 3 sets of chromosomes; for a tetraploid plant to 4 sets etc..

The measurement is relatively straightforward. A small quantity of fresh material from the plant (usually a small piece of a leaf or a flower) is chopped into pieces and the cell nuclei, in an appropriate buffer, are isolated and stained with a fluorescent substance. An internal standard is also added: i.e., material of another plant with a known amount of DNA. This internal standard does not always have to be the same, but is adjusted to the value of the DNA in the cell nucleus of the samples to be investigated. If the absolute amount of DNA of the internal standard is known, from measurements the absolute amount of DNA from the target plant can be calculated.



Some more information about the process and some background information can be found in the photos and slides on p. 10 and 11. The photos were taken in the ILVO Laboratory in Melle (Belgium). The text in this article was in part taken from slides show in a BFS SIG zoom meeting presentation by the author on 18 March, 2021.

Preparing for and performing Flow Cytometry measurements.



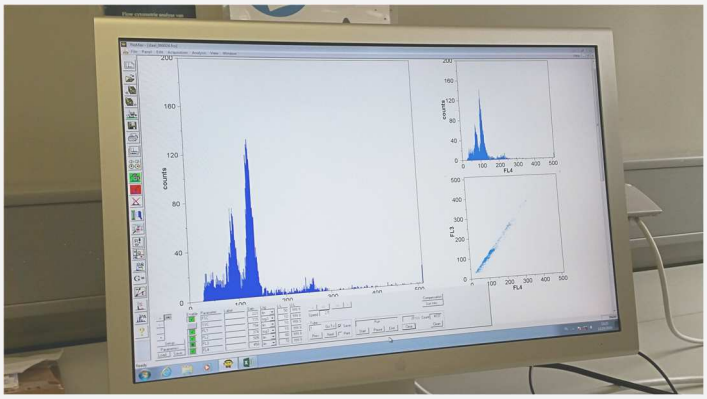
Only about 50 mg of a Fuchsia leaf is required.

About 50 mg of a leaf of a reference plant (with known DNA content) is added.

The leaves are chopped with a razor blade.

Chemicals are added.

After a couple of hours the measurements can be carried out.



Output of measurement.

What happens when we make a crossing?

For example: crossing species *Fuchsia* 1 x *Fuchsia 2*

Suppose both Fuchsias 1 and 2 are diploid species, so each has 2 sets of chromosomes, with the sets shown as A and B, respectively.

Diploid *Fuchsia* 1 has 2 sets of chromosomes: AA
Formation of gametes: AA → A + A

Diploid *Fuchsia* 2 has 2 sets of chromosomes: BB
Formation of gametes: BB → B + B

When making the crossing : *Fuchsia* 1 x *Fuchsia* 2
the gametes are combined, and produce a diploid seedling :
A + B → AB

The result of the crossing can be checked by measuring the 2C DNA values of the parents and the seedling.

As an example: crossing *Fuchsia* 1 x *Fuchsia* 2 = AA x BB:

Female parent
2C DNA value *Fuchsia* 1 = 4 pg
C DNA value of gametes *Fuchsia* 1 = 2 pg

Male parent
2C *Fuchsia* 2 = 2 pg
C DNA value of gametes *Fuchsia* 2 = 1 pg

2C *Fuchsia* seedling AB = A + B = 2 + 1 = 3 pg

Example of a measurement: histogram of

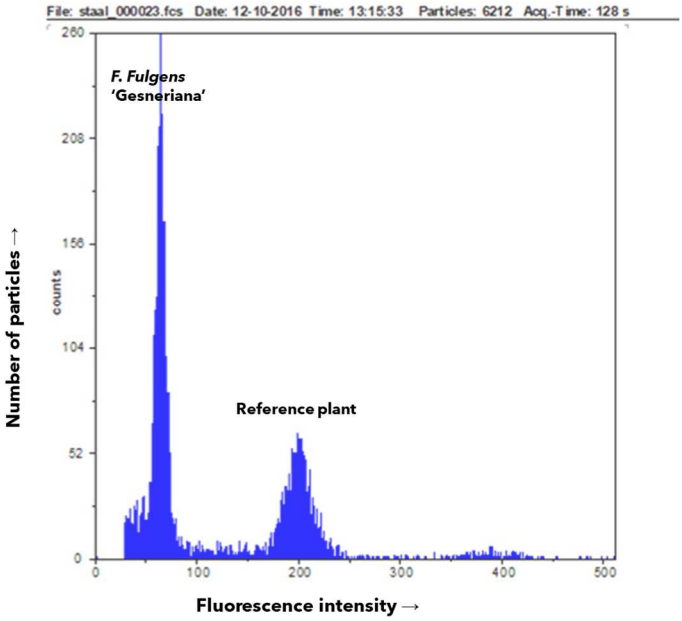
F. fulgens 'Gesneriana'

a diploid *Fuchsia*

Position *F. fulgens* 'Gesneriana' = 68
Position Reference plant = 208

2C DNA value reference = 9.09 pg (picogrammes)

2C DNA value *F. fulgens* = (68/208) x 9.09 = 2.97 pg



Example of 2C value resulting from a crossing : *F. juntasensis* x *F. inflata*

F. juntasensis **2C = 5.04 pg**

F. inflata **2C = 5.23 pg**

F. 'I 90-01' **2C = 4.99 pg**

2C DNA value of seedling (expected) = (2C *F. juntasensis* + 2C *F. inflata*)/2 = 5.14

Some examples of puzzles solved

These examples were taken from the SIG zoom meeting presentation on 18 March, 2021.

Easy puzzle: checking the doubling of the number of chromosomes of a *Fuchsia* species.

The number of chromosomes can be doubled by colchicine treatment of seeds or plant tissue.

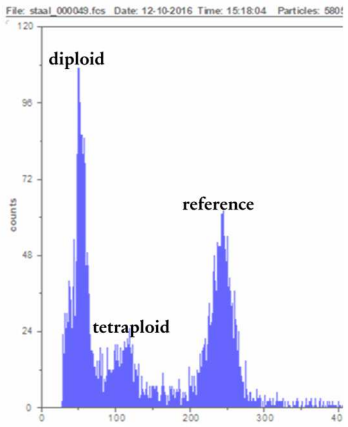
- Has the treatment been successful?
- Has formation of mixoploids occurred?

***F. boliviana* 'Alba'**
a diploid *Fuchsia*

Treated with colchicine for making a tetraploid plant.

The histogram shows two types of tissue:
diploid and tetraploid.

Courtesy of Mr. Henk Waldenmaier, who performed the colchicine treatment



More difficult puzzle: checking the outcome of a crossing.

This is sometimes a difficult puzzle because odd things may happen when making the crossing, such as formation of unreduced gametes.

An example is the elucidation of the genome of *Fuchsia* 'Göttingen'.

'Göttingen' = *F. triphylla* x *F. fulgens*

2C *F. triphylla* = 3.90 ; the species makes TT gametes
2C *F. fulgens* = 3.0 ; the species makes F gametes

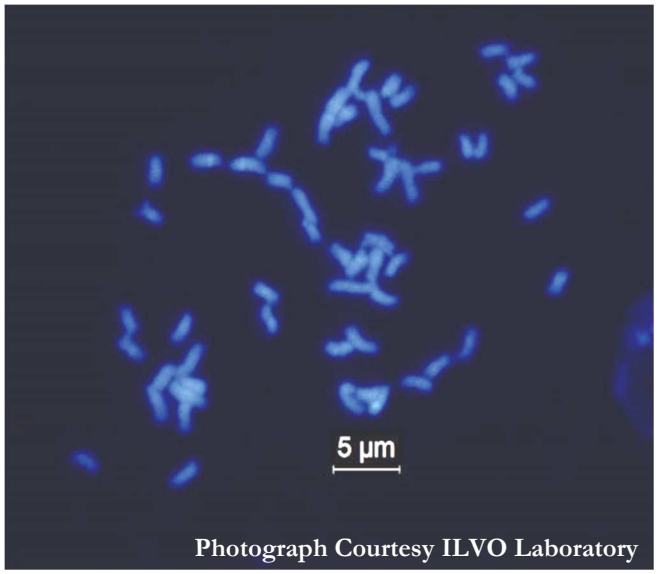
2C DNA value expected = (3.90 + 3.0)/2 = 3.45
2C DNA value measured = 5.30

Evidently, an unreduced gamete has been involved.

Two possible outcomes:
3.0 + 1.95 = 4.95 unreduced gamete FF from *F. fulgens* involved.
3.90 + 1.50 = 5.40 unreduced gamete TTTT from *F. triphylla* involved.
The most plausible explanation is, that a *F. triphylla* unreduced gamete has been involved, producing the genome TTTTF.
This has been verified by a chromosome count, which shows 44 smaller (the T) and 11 larger chromosomes (the F).

Chromosome count was performed by ILVO

'Göttingen' = *F. triphylla* x *F. fulgens*



'Göttingen' chromosomes, 2n = 5x = 55

Difficult puzzle: exploring the genome of seedling N 16-20.

N 16-20 = 'Daryn John Woods' x 'Purcellian Elegancy'

'Daryn John Woods' = TTJJ ; it makes TJ gametes.
T = set of *F. triphylla* chromosomes
J = set of *F. juntasensis* chromosomes
2C = 4.46 pg

'Purcellian Elegancy' = TTTT ; it makes TT gametes.
F. triphylla genome
2C = 3.90 pg

Expected outcome of the crossing:
2C of seedling N 16-20 = (4.46 + 3.90)/2 = 4.18 pg
Measured: 2C N 16-20 = 6.28 pg

Also in this crossing an unreduced gamete has been involved.

Two possibilities for the origin of the unreduced gamete:

- Unreduced gamete TTJJ from 'Daryn John Woods'
  Then genome N 16-20 = TTTTJJ ;
  2C = **4.46** + 1.95 = 6.41 pg
- Unreduced gamete TTTT from *F. triphylla*
  Then genome N 16-20 = TTTTTJ ;
  2C = **3.90** + 2.23 = 6.13 pg

Too close to call, so we need additional information!

Observations:

- Seedling N 16-20 has excellent fertility, which speaks in favour of the TTTTJJ genome;
- The dominant purple colour of seedling N 16-20 originates from the J-chromosomes. All progeny of N 16-20 has a purple colour (hundreds of seedlings raised) which speaks in favour of TTJ gametes;
- 2C DNA values of various crossings N 16-20 x species *Fuchsia* suggest involvement of TTJ gamete.

Conclusion:
The N 16-20 genome can with high probability be described as TTTTJJ.
Decisive check would be a chromosome count.

Conclusion on Flow Cytometry:

Flow cytometry is a useful tool in *Fuchsia* hybridization as it aids in elucidating the genome of *Fuchsia* crosses. In a number of cases, however, additional information from a chromosome count is needed to be able to draw unequivocal conclusions.

Fuchsia inflata, a diploid or tetraploid species?

By Mario de Cooker

Photographs in this article by Mario de Cooker

Introduction

The previous article (p. 9-13) showed how Flow cytometry helps us elucidate the genome of *Fuchsia* species, manipulated species and hybrids. Flow cytometry turns out to be also of great help in solving the question of whether *F. inflata* is a diploid or tetraploid species, leading us to a plausible estimate of the *F. inflata* genome.

Fuchsia inflata

Fuchsia inflata is a member of the *Hemsleyella* section. Extensive detailed information on *F. inflata* can be found in Mr. Paul Berry's article ***The Systematics of the Apetalous Fuchsias of South America, Fuchsia Sect. Hemsleyella (Onagraceae)***.[1]

The *F. inflata* flower lacks petals like all members of the *Hemsleyella* section; the floral tube measures well over 10 cm. It's a dry-season flowering species (producing flowers in the winter season in the Western hemisphere), found in the Dept. Cuzco, Peru, endemic to several valleys on the eastern slopes of the Andes at 2,350-3,600 m. Considerable differences in flower colour, floral tube shape, and leaf size and shape were found.

Chromosome counts have yielded values of 2n = 22 (which is the accepted diploid value in the literature) as well as 2n = 44 (tetraploid) for a number of different *F. inflata* plant specimens. According to the Berry article, the 2n = 44 specimens might well have originated from an interspecific crossing, but no final unambiguous conclusion on this can be drawn.

Fuchsia inflata has occasionally been used for making crossings. It has produced progeny having all kinds of tube sizes, the largest up to about 10 cm as is the case for 'Treslong' (Van der Post). It could therefore be an interesting crossing partner for making all kinds of new triphyllas, for example purple triphyllas with very long tubes.

Efforts will be made to elucidate the genome of *F. inflata* from phenotypes and Flow cytometry data from various crosses in which *F. inflata* has been involved, thereby specifically focusing on the question of whether it concerns a diploid or tetraploid species. Such knowledge aids to the effectiveness of choices to be made in crossings.

Starting point in a line of consecutive crossings is seedling I 90-01, produced by Dutch hybridist Jan van den Bergh in 1990 by crossing *F. juntasensis* x *F. inflata.*

F. inflata

Any conclusions therefore relate specifically to the plant as used by Mr. Van den Bergh to make this crossing. *Fuchsia inflata,* raised from seeds obtained form a long tube type from Peru, is available since 1986 in The Netherlands for hybridisation.[2] One of these seedlings was used to make seedling I 90-01.
The *F. inflata* seedling is still used by various breeders, for example by Mr Jo Geurts and recently also by the author, who lost his own specimen a few years ago.

F. juntasensis

Photograph Courtesy Mr. Hartwig Schütt

'Treslong'

Analysis of the *F. inflata* genome

1. Seedling I 90-01

I 90-01 = *F. juntasensis* x *F. inflata*

The I 90-01 phenotype (see page 16) is a clear intermediate phenotype between *F. juntasensis* and *F. inflata*.

Assuming that *F. inflata* is a diploid species, the I 90-01 genome can be described as JJI (J = set of *F. juntasensis* chromosomes, I = set of *F. inflata* chromosomes).

2C expected = 5.14 pg; 2C measured = 4.99 pg, which is an excellent match.

I 90-01 has fair to good fertility. This is not to be expected for a triploid fuchsia, however not impossible.

2. 'Winter Joy' = I 90-01 x I 90-01

The 'Winter Joy' phenotype bears close resemblance to seedling I 90-01. It has fair to good fertility.

2C measured = 5.10 pg, which is in excellent agreement with the genome JJI, assuming a diploid *F. inflata*.

It's not clear how such seedling would easily originate from a triploid I 90-01 selfing.

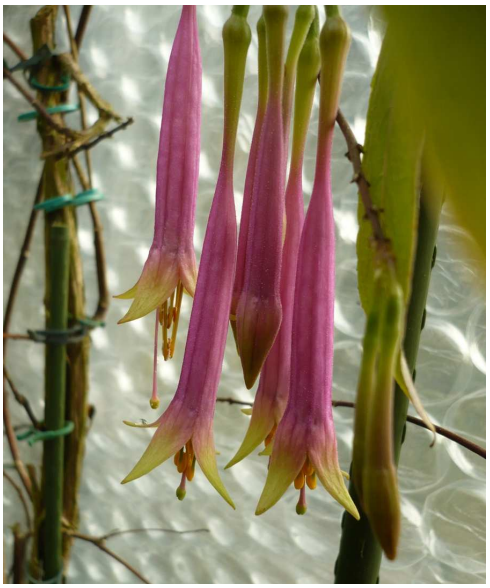
Flow cytometry and crossing data

2C is the DNA value (in picogrammes; measurements by ILVO) of the full genome.

2C *F. inflata* = 5.23
2C *F. juntasensis* = 5.04
2C I 90-01 = 4.99
2C 'Winter Joy' = 5.10
2C 'Purcellian Grace' = 4.05
2C N 18-31 = 4.66

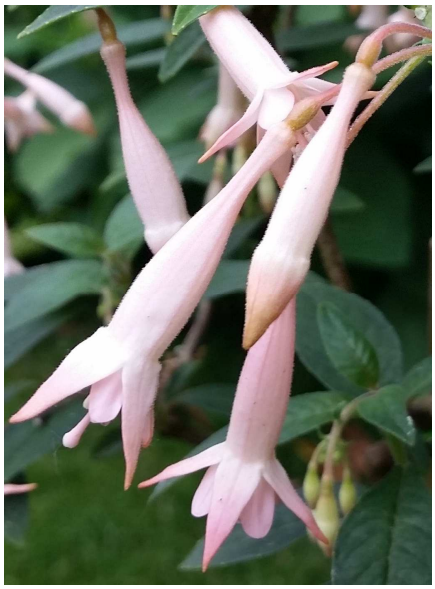
I 90-01 = *F. juntasensis* x *F. inflata*
'Winter Joy' = I 90-01 x I 90-01 (selfing)
'Purcellian Grace' has the *F. triphylla* species genome TTTT.
N 18-31 = 'Winter Joy' x 'Purcellian Grace'

However, assuming a tetraploid *F. inflata,* the I 90-01 genome would be JJII, which could well explain its fertility. And in this case the outcome of the I 90-01 selfing, i.e. 'Winter Joy', would also, quite understandably, be JJII, and expected to be fertile.



Seedling I 90-01

'Winter Joy'



'Purcellian Grace'

3. Seedling N 18-31 = 'Winter Joy' x 'Purcellian Grace'

2C measured = 4.66 pg.

How could such value be obtained?

Unreduced gametes have not been involved in the crossing, as this would yield a much higher 2C value.

'Purcellian Grace' as the male parent has then delivered two sets of *F. triphylla* chromosomes, so a DNA value contribution of 2.03 pg.

Seedling N 18-31 has a purple colour. Therefore, based on the crossing partners, at least one set of *F. juntasensis* chromosomes is part of the N 18-31 genome, representing a DNA value of 1.26 pg.

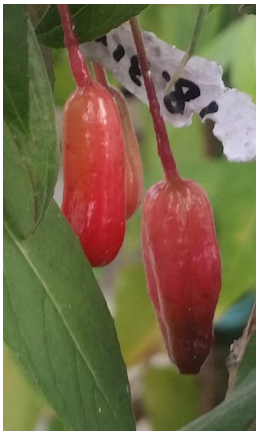
What then still needs to be accounted for is a DNA value contribution of 4.66 - 2.03 - 1.26 = 1.37 pg.

This value could well be delivered by a second set of *F. juntasensis* chromosomes (derived from a triploid 'Winter Joy'), which would result in a N 18-31 genome represented by TTJJ. But such genome would be equivalent to the 'Daryn John Woods' genome, and as the phenotypes of 'Daryn John Woods' and seedling N 18-31 are very different, a TTJJ genome for seedling N 18-31 would be highly unlikely.

Let's then again assume that *F. inflata* is a tetraploid species with a DNA value of 1.31 pg per single set of chromosomes. The N 18-31 genome would then correspond to **TTJI**, which would provide a perfect match with the Flow cytometry value.

Seedling N 18-31

Seedling N 18-31 (at the bottom) vs 'Daryn John Woods'



Seed pod N 18-31

Seed pod *F. inflata*

Moreover, the N 18-31 flower phenotype with its rather long tube differs also appreciably from other seedlings derived from *F. juntasensis* x *F. triphylla* (and vv.) crossings.

Finally, seed pod phenotypes often provide valuable information as regards the genome. Seedling N 18-31 seed pods are rather elongated, resembling a bit those of *F. inflata*. Also seed pods of I 90-01 and 'Winter Joy' are more elongated than those of *F. juntasensis*, presumably caused by the *F. inflata* genes. The 'Daryn John Woods' seed pod's shape has clearly traits derived from *F. triphylla*. Mark that seed pods may exhibit some variation as caused by growth conditions and age.

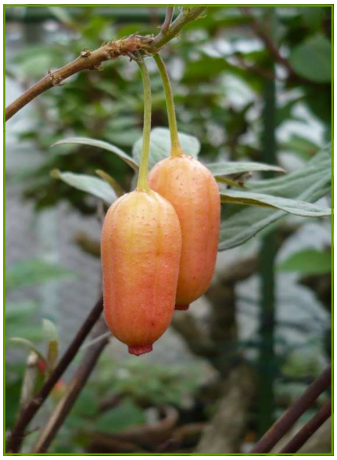
And last, but not least, it should be remarked that seedling N 18-31 has extremely poor fertility and has only produced a single seed from dozens of crossings, which would plea for the TTJI genome.

The analysis does, all in all, not provide a full 100% evidence that *F. inflata*, contrary to the common opinion of being a diploid, is a tetraploid species. But it provides at least a fair indication that indeed a tetraploid *F. inflata* has been used in the crossing for producing seedling I 90-01. A chromosome count would be more than welcome.

Seed pod 'Daryn John Woods'

Seed pod *F. juntasensis*

Seed pod 'I 90-01'



Seed pod 'Winter Joy'

References

[1] Paul E Berry
Annals of the Missouri Botanical Garden 69:1-198 (1982)
[2] M. Goedman-Frankema, Botanische Fuchsia's; Uitgeverij Terra Zutphen, ISBN 90-6255-486-5 (1992), p. 59.

What's in a name.

By Mario de Cooker

This week I read in the BFS Fuchsia News (July 2021) a comment by Mr. Arthur Phillips on the Fuchsia cultivar 'Poermenneke'. Mr. Philips came across this cultivar in the United States. It was not clear how it got there, and its name was mentioned as 'Pour le Menneke'. As a comment it was stated by Mrs Carol Gubler: *I reckon that it was imported via Hendricks Young Plants who sell fuchsias everywhere! However, looking at FuchsiaFinder the name seems to be 'Poermenneke' and there are references to a statue of a man fishing for eels!!*

And this is indeed correct! 'Poermenneke' is the only valid name for this long-tube cultivar. The name refers to a special way of fishing for eels with a bunch of worms. It's called 'poeren' or 'peuren' in Dutch. This bunch is suspended in the water and invites the eel to bite into it. Then the string of worms is carefully pulled up and the eel is shaken off into a floating wooden trough. Best time for 'poeren' is on summer evenings from 8pm – midnight, and about 60 years ago I spent many evenings with my father on the waterfront catching eel this way. Even my wife Sonja has joined us several times for catching eel.

It used to be very popular in Flanders (Belgium) and Zeeuws-Vlaanderen (in the southwest of the Netherlands). It therefore seems no coincidence that the name was used by a Belgian breeder, Mr. Michel Deelkens, to name one of his new fuchsia introductions. As will now be clear, 'Poer' comes from 'Poeren'. 'Menneke' translates as something like lad, boy, guy or man. So 'Poermenneke' is a man fishing for eels.

Unfortunately, most of the eels are gone now, and I wonder if 'poeren' is still practiced today.

Photograph 'Poermenneke' courtesy of Mr. Robert Czarnecki

Contents of the next issue

The next issue is scheduled for the end of December 2021.

Seeing Double

(by Edwin Goulding)

In our next article we explore the possibilities inherent within larger blooms. Doubleness is often related to polyploidy; its relevance to hybridists will be discussed. Riches already abound but are seldom sought anew.

Formation of gametes in pentaploid purple triphyllas

(by Mario de Cooker).

The presence of one or more sets of *F. juntasensis* chromosomes in purple triphylla seedlings, responsible for the dominant purple colour hues, offers a unique opportunity to investigate the formation of gametes in pentaploid fuchsias.

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 must be available by 10 December, 2021.

The Fuchsia Breeders Initiative

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The Fuchsia Breeders Initiative is edited under the flag of Euro-Fuchsia.

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