

When can you Safely Mow in-grass Spring Bulbs Without Harming Future Flower Display?

Mass plantings of spring bulbs, facilitated by in-grass bulb planting machines have been popular in Europe for many years and thanks to recent efforts by the Flower Bulb Research Program, are gaining in popularity in the USA.

In-grass plantings offer a number of unique features and advantages, the most obvious is greatly reduced labor costs for planting large quantities of bulbs versus installation in traditional beds. Dutch companies have taken this to a high art with beautiful promotional materials for plantings that attract bees and butterflies, have monochromatic or mixed color schemes, long flowering periods and so on.

Possibilities and benefits of massed in-grass bulb plantings:

- Spread of bloom time by mixing species and cultivars.
- Mono-chromatic and massed monoculture plantings or vivid mixed displays varying in color, height and time of bloom.
- Excellent potential for attracting pollinators and improving habitat for bees and butterflies.
- Increased diversity of landscapes to improve resilience.
- Ability to use deer-resistance species and cultivars that are excellent perennials.
- Due to the need to withhold mowing to allow bulbs to grow after flowering, mowing time, cost and exhaust emissions from mowers are reduced.
- No extra weeding.
- Greatly reduced labor and time commitment for planting making bulb planting much easier on installation staff. Reports from the City of Detroit state the machine reduced worker fatigue, and improved staff attitude toward bulb planting season.
- Opportunities to educate visitors on relationships of grass, mowing, emissions and sustainable landscapes. For example Cornell places small instructional "Tall grass, small gas" signs in areas of reduced turf moving.

In the fall of 2017, Cornell received an in-grass Geerlings planter from Anthos along with several pallets of bulbs. We installed a number of demonstration plantings in the fall of 2017 and several more in the 2018 and 2019 planting seasons. Installations were primarily made in Ithaca NY (upstate NY, zone 5b-6a) and on Long Island (zone 6b). The majority were on institutional or public grounds properties and the plantings represented a diversity of style, formatting and complexity. The objective of these plantings was to stoke awareness and interest in the equipment and to highlight possibilities for its use. In addition, videos of the process have been posted online and are easily accessible by Googling "Cornell bulb planter".

Images that follow show some of the results of these efforts. Everyone who sees these in-grass, massed bulb plantings are impressed with their beauty and impact.

But there is a lingering question, and that is “how early can you mow” in-grass bulbs? Most landscape managers like their turfgrass to be uniformly mowed and take pride in perfectly manicured and well-groomed turf. A patch looking like a wild grassland is not usually their intent! Of course, this is something of a “cultural” issue, as many people can appreciate the “wild” nature of less-mowed in-grass bulbs and attribute ecosystem services to such plantings (for example insect refuge). A manicured grass strip alongside the more wild bulb area improves appearance and gives a sense of proper maintenance.

It is common knowledge that bulb foliage should be allowed to die back completely and should not be tied up or removed until it is completely yellow or brown. This is because after flowering, the leaves continue to produce food (through photosynthesis) that is critical to building up the bulb for the next season. Therefore, the bulb optimally needs to have functional leaves as long as possible and this can conflict with the landscape manager wants to mow the grass and bulb leaves to improve appearance after flowering.

So, just how early can you mow bulb foliage without adversely affecting future years’ bloom? Aside from the standard wisdom of leaving the leaves on as long as possible, it is not easy to find any *actual* research that shows this...it is just common sense based on the bulb’s life cycle. In a bulb production scenario in a field, this is acceptable as there is no competing aesthetic issue. We thought it likely that mowing can happen earlier than the moment of full dead leaves on the basis that with many plants leaves lose a lot of photosynthetic capacity well before complete leaf death. Thus, we felt there is probably a “safe moment” when mowing can happen without reducing future flower display.

What we did

To address this question, we installed “mowing date” experiments at Cornell in the fall of 2017 and 2018. Using 4 kinds of bulbs: *Crocus tommasinianus* ‘Ruby Giant’, *Crocus* ‘Pickwick’, *Scilla sibirica* and *Narcissus* ‘Tete-a-Tete’. We used the bulb planter in a normal manner, but without any bulbs...allowing us to “roll back” the grass slices and place bulbs by hand so as to plant exactly 24 bulbs in each plot. Each plot (mow date) was replicated 4 times. After planting bulbs, the grass was rolled back and left for the winter.

In the spring, plants were allowed to develop and flower normally and data was collected on flower numbers per plot. After flowering, plots were mowed on a schedule thought to span a time frame from mowing too early through to mowing only after all foliage was dead. The nearby Table shows the actual mow dates in the experiment thus far.

What we found

Spring 2020 is the third time flowering in this experiment, and is the second flowering following mowing treatments done in spring 2018 and 2019.

Simply put, the cultivars showed differences in response to mow date, but none of them required the leaves to remain until fully yellowed. For example, ‘Ruby Giant’ crocus, the earliest flowering species, showed very little response to mow date, showing it can be mowed in upstate New York at any point starting from the last week of May without reducing future flower response. Interestingly, the much later flowering *Scilla sibirica* showed a similar response...there was no effect of 2 years of different mow dates on its flowering. *Scilla* plots mowed in July were no more vigorous than plots mowed in mid-late May. This goes against conventional wisdom and at this point we really do not have a good explanation for this finding.

Crocus ‘Remembrance’ required more time after flowering for its first mowing. The earliest two mowing dates (ca. May 16 and May 27) had somewhat fewer flowers than the three later dates such that mowing anytime 8 June or later did not diminish flower numbers in subsequent years even though functional foliage was still present on those dates.

‘Tete-a-Tete’ was similar and the experiment thus far suggests mowing as early as June 8-10 is acceptable and will not adversely affect future flowering. Perhaps in future years, mowing in early June would show an effect, it is important to keep in mind this is just the results after two mowing seasons. Weather differs each year and some seasons are slow and others fast. But in any case, Tete-a-Tete leaves are still quite green on June 8-10 in Ithaca (see nearby Figure).

What does this mean?

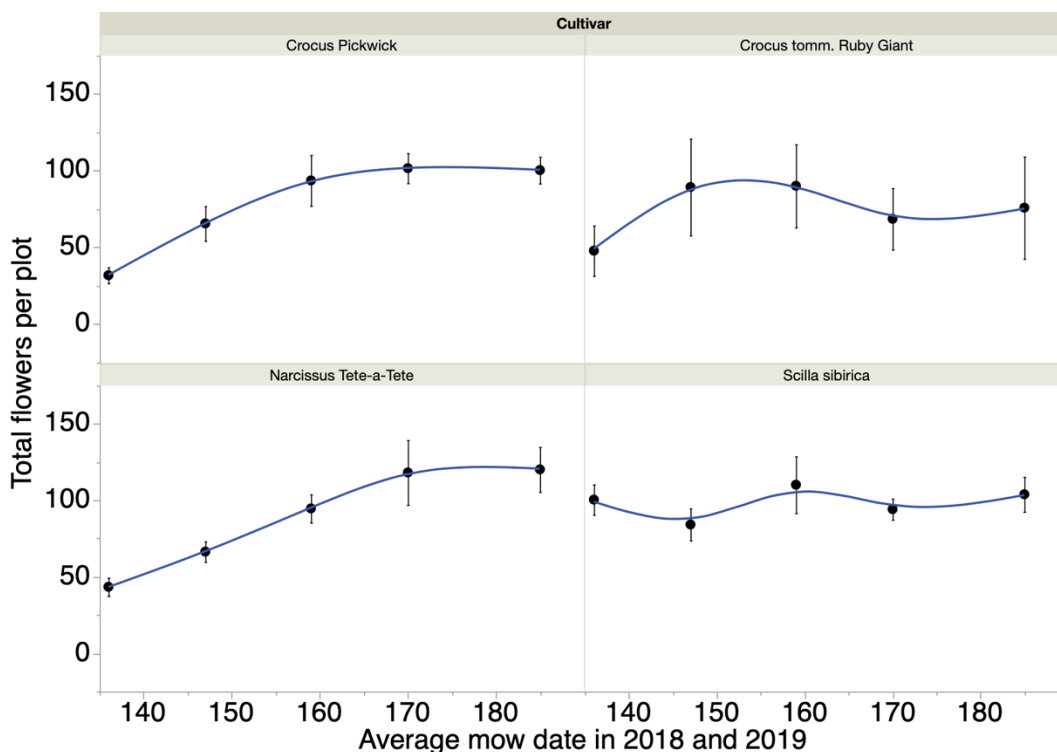
The experiment so far suggests that these cultivars can be mowed significantly earlier than the “fully yellow or dead leaves” stage. We expect these trends to continue, but will need to wait for spring 2021 (with the mowing schedule maintained in spring 2020) for complete data. A follow-up experiment, planted in fall 2018, which was mowed for the first time in 2019 and currently flowering in spring 2020 suggests that Tete-a-Tete is showing a very similar response completely in line with the earlier experiment. These experiments are necessarily long-term and progress comes slowly.

The results from this experiment are easily applied in upstate New York and much of the northern US in zones 5 to 6a. Presumably in warmer locales (Long Island, southern New Jersey or southern Pennsylvania), safe mow dates would be somewhat earlier owing to the earlier flowering of plants in those areas, but we cannot be sure. Additional experiments would need to be done in those and more southern areas.

However, we can say with confidence that landscape managers do not need to routinely withhold mowing until mid-summer (eg. early July) when leaves are fully dead.

Actual mow date per year and two-year average.

Treatment	2018	2019	Average
1	16 May	16 May	16 May
2	24 May	30 May	27 May
3	7 June	10 June	8 June
4	14 June	24 June	19 June
5	1 July	8 July	4 July



Effect of mowing date in the two previous years on flowering in 4 bulb species. Data are numbers of individual flowers coming from 24 planted bulbs. In the case of Scilla, stems (which could have multiple flowers) were counted. Average mow dates on the x-axis are May 16, May 24, June 8, June 19 and July 4.



“Tall grass, small gas” educational signs as used at Cornell.



The Geerlings planter (0.5 meter width) on our 45 HP tractor with turf tires. 7583



Examples of demonstration plantings on the Cornell campus. Location is the “bioswale” at Cornell Botanical Gardens, spring (left) and the same planting in early summer with Allium and Camassia (right).



Planter in action at Cornell Cooperative Extension demonstration farm, East Meadow, NY (Nassau County) with Master Gardeners looking on.



Mixed daffodil planting at Eisenhower Park, Nassau County, Long Island. Early season, second year flowering. Note the simple and unobtrusive black link fencing and mowed edges. Image 1188.



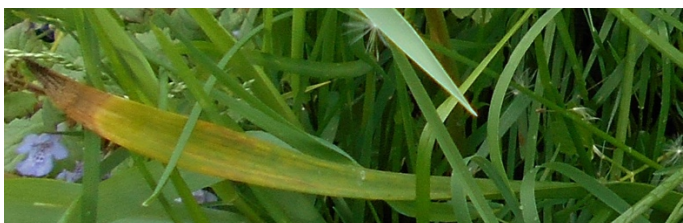
Mixed daffodils in mass planting in the great yard of Bayard Cutting Arboretum in Great River on Long Island. Very early season first year flowering. Image 1149.



Overall view of the experimental mow-date plots in spring 2020 (year 3 of flowering). Image 1307.



Effect of spring mowing date on Tete-a-Tete (top), Scilla (middle) and Crocus 'Pickwick' (bottom). There are 24 bulbs per plot. Third year flowering, following 2 previous years of first mowing on the following average dates (L to R): May 6, May 27, June 8, June 19 and July 4. Images 1325, 1452 and 0695.

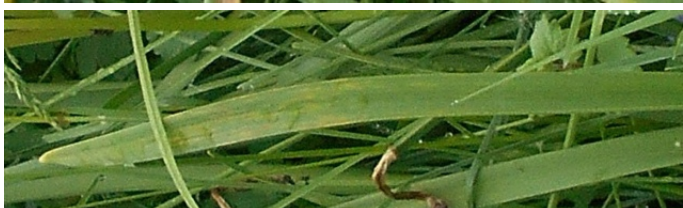




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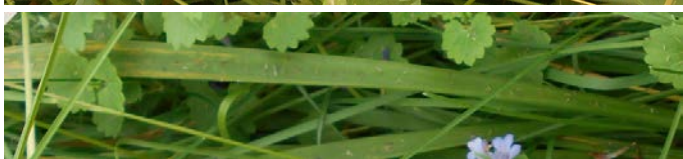
Appearance of 'Tete-a-Tete' leaves at the 30 May mow date in 2019.



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Appearance of 'Tete-a-Tete' leaves at the 10 June mow date in 2019.