

## COLLECTIONS OF ORNAMENTAL FLOWER SPECIES OF "AL.BORZA" BOTANICAL GARDEN – A PERMANENT ‘EXHIBITION’

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**Abstract:** This paper presents a brief analysis of the evolution of the collections of decorative flower species within the Ornamental Sector of "Al. Borza" Botanical Garden, in the period 2014–2018.

The collections are grouped into two principal categories: I. Bulbous and biennial species planted in the autumn (*Tulipa*, *Narcissus*, *Hyacinthus*, *Allium*, *Crocus*, *Viola*, *Bellis*, *Myosotis*), and II. Species of bulbs and annual plants planted in the spring (*Dahlia*, *Canna*, *Lilium*, *Hemerocallis*, *Gladiolus*).

With this information, as well as making a true ‘inventory’ of all horticultural species and varieties (absolutely necessary in an ornamental sector), are also recorded aspects regarding the technology of culture, the behaviour of plants under different climatic and soil conditions, and the possibilities of multiplication and preservation of the ‘perenniality’ of some species.

**Key words:** Ornamental sector, tulips, daffodils, *Allium* spp., dahlias, horticultural species

### Introduction

It is very difficult to establish when and where man first cultivated flowers, but it is certain that since the beginning of human existence he has noticed their beauty, appreciated their perfume and tested their practical value.

Of the six sectors of the "Al. Borza" Botanical Garden, it is the Ornamental Sector that ‘hosts the flowers’. Here are all the collections of horticultural species, both annuals and perennials, as well as the botanical species cultivated for decorative purposes. The multitude of species and cultivars ensures a gradual flowering over the seasons, resulting in a true permanent open-air ‘exhibition’.

### Presentation of collections

#### 1. Collection of bulbous species and biennial plants, planted in the autumn:

##### ✓ Collection of tulips (*Tulipa* spp.)

The Tulip – considered the ‘garden queen’ in the spring season – is one of the flowers that man has made history in his endeavour to perfect their beauty and adapt them to different living conditions. The genus *Tulipa* comprises over 150 perennial herbaceous species, their area of origin considered to be Central Asia (Tian-Shan, Pamir). In 1753, C. Linné brought together all the horticultural forms of the tulip under the name *Tulipa gesneriana*, as a tribute to Conrad Gesner (1516–65), the first botanist to describe this plant. Today, there are approximately 5,600 highly decorative varieties and hybrids grouped from the horticultural (commercial) point of view, into 16 groups or divisions, depending on their flowering and flower aspect [3, 4, 11], and botanically there are nine species (*T. kaufmanniana*, *T. fosteriana*, *T. turkestanica*, *T. greigii*, *T.*

*clusiana*, *T. praecox*, *T. praestans* and *T. sylvestris*) which are the basis of the horticultural forms [7, 8, 13].

In the "Al.Borza" Botanical Garden, the cultivation of tulips has been a tradition since its establishment, when in the Ornamental Sector the narrow beds along the alleys were made, well exposed to the sun, where these flowers could show their beauty and elegance. In the first numbers of Botanical Gardens' Informative Bulletins, the culture of tulips is mentioned, but the number of varieties is not specified. In 2002 there were 80 varieties, most belonging to the species *Tulipa gesneriana*, along with several other botanical species [5]. In the following years, the collection was substantially enriched, so we currently note more than 180 varieties and botanical species, with all 16 divisions represented, in a record number of c. 30,000 bulbs.

**Table 1: Collection of tulips of "Al. Borza" Botanical Garden (2018)**

Name of the group		Cultivar	Flowering (month)	Height (cm)	Colour
<b>I. Single early tulips</b>	1	<i>Apricot Magic</i>	IV	35	light orange (apricot)
	2	<i>Candy Prince</i>	IV	35	light pink
	3	<i>Couleur Cardinal</i>	IV	45	dark red
	4	<i>Flaming Prince</i>	IV	40	pink+white
	5	<i>Hermitage</i>	IV	35	orange-red
	6	<i>Merry Christmas</i>	IV	35	red
	7	<i>Pretty Princess</i>	IV	35	pink+red
	8	<i>Prinses Irene</i>	IV	35	orange+dark orange
	9	<i>Prinses Margriet</i>	IV	35	yellow+dark orange
	10	<i>Sunny Prince</i>	IV	35	light yellow
	11	<i>White Prince</i>	IV	35	white
	12	<i>Yokohama</i>	IV	45	yellow
<b>II. Double early tulips</b>	13	<i>Brownie</i>	IV	35	apricot/orange
	14	<i>Foxtrot</i>	IV	30	light pink
	15	<i>Foxy Foxtrot</i>	IV	40	dark orange
	16	<i>La Belle Epoque</i>	IV	45	brown
	17	<i>Mondial</i>	IV	30	white
	18	<i>Monsella</i>	IV	30	yellow+red
	19	<i>Monte Orange</i>	IV	30	orange
	20	<i>Viking</i>	IV	50	shinny red
<b>III. Triumph tulips</b>	21	<i>Annie Schilder</i>	IV	40	orange
	22	<i>Bourbon Street</i>	IV	40	orange
	23	<i>Brown Sugar</i>	IV/V	50	pink+orange
	24	<i>Calgary Flames</i>	IV	20	light yellow+white
	25	<i>Carnaval de Rio</i>	IV/V	45	white+red
	26	<i>Don Quichotte</i>	IV	50	pink
	27	<i>Dynasty</i>	IV	45	pink
	28	<i>Escape</i>	IV	55	red
	29	<i>Francoise</i>	IV	45	white + yellowish

	30	<i>Gander's Rhapsody</i>	IV	40	pink-carmine
	31	<i>Golden Dynasty</i>	IV	45	golden yellow + light yellow
	32	<i>Grand Perfection</i>	IV	45	red + white
	33	<i>Happy People</i>	IV	45	white + yellowish
	34	<i>Holland Chic</i>	V	45	pink + white
	35	<i>Ice Lolly</i>	IV	20	red + yellow
	36	<i>Île de France</i>	IV	50	red
	37	<i>Jan van Nes</i>	IV	45	yellow
	38	<i>Liberation</i>	IV/V	50	dark red + yellow
	39	<i>Librije</i>	V	50	pink + white
	40	<i>Mistress</i>	IV/V	50	pink
	41	<i>Mistress Mystic</i>	IV/V	40	pink + lavender
	42	<i>National Velvet</i>	IV/V	50	dark red
	43	<i>Negrita</i>	IV	45	purple
	44	<i>Neper</i>	IV	45	pink
	45	<i>Outbreak</i>	IV/V	45	red with orange
	46	<i>Pallada</i>	IV	45	dark red
	47	<i>Pim Fortuyn</i>	IV/V	45	white
	48	<i>Playgirl</i>	IV	50	white + red
	49	<i>Rosalie</i>	IV	45	pink
	50	<i>Spitsbergen</i>	IV	50	bordo with white
	51	<i>Striped Flag</i>	IV/V	60	white with magenta
	52	<i>Strong Gold</i>	IV	45	yellow
	53	<i>Suncatcher</i>	V	50	yellow with orange
	54	<i>Synaeda Amor</i>	IV	40	pink
<b>IV. Darwin hybrid tulips</b>	55	<i>Ad Rem</i>	IV	60	carmin red
	56	<i>American Dream</i>	IV	55	yellow + red
	57	<i>Apeldoorn</i>	IV	55	red
	58	<i>Apeldoorn Elite</i>	IV	55	yellow + red
	59	<i>Banja Luka</i>	IV	50	yellow + red
	60	<i>Beauty of Apeldoorn</i>	IV	55	yellow with red
	61	<i>Daydream</i>	IV	55	red and orange
	62	<i>Golden Apeldoorn</i>	IV	55	light yellow
	63	<i>Golden Oxford</i>	IV	60	Yellow
	64	<i>Jaap Groot</i>	IV/V	55	yellow + white
	65	<i>Light and Dreamy</i>	V	55	light pink
	66	<i>Oxford</i>	IV	60	Red
	67	<i>Pink Impression</i>	IV	55	Pink
	68	<i>Red Impression</i>	IV	55	Red
	69	<i>Salmon Impression</i>	IV	55	salmon pink
	70	<i>Spryng Break</i>	IV	75	red with white
	71	<i>Sweet Impression</i>	IV	55	Salmon
	72	<i>Walsrode</i>	IV	50	Apricot

	73	<i>World Friendship</i>	IV/V	40	light yellow
<b>V. Single late tulips</b>	74	<i>Atlantis</i>	V	55	violet + white
	75	<i>Blushing Lady</i>	V	55-60	pink + yellow+orange
	76	<i>Clearwater</i>	V	65	White
	77	<i>Helmar</i>	V	55	yellow + red
	78	<i>Kingsblood</i>	V	60	red
	79	<i>La Courtine</i>	V	65	yellow + red
	80	<i>Muscadet</i>	V	50	Yellow
	81	<i>Perestroyka</i>	V	65	pink-apricot
	82	<i>Queen of Night</i>	V	60	dark violet
	83	<i>Renown</i>	V	65	Fuchsia
	84	<i>Rhapsody of Smiles</i>	V	45	yellow-orange
	85	<i>Shirley</i>	V	50	white with ivory
		86	<i>Sorbet</i>	V	
<b>VI. Lily-flowered tulips</b>	87	<i>Budlight</i>	V	50	yellow + white
	88	<i>China Pink</i>	V	45	Pink
	89	<i>Claudia</i>	V	55	violet+ white
	90	<i>Elegant Lady</i>	V	50	pink + yellow
	91	<i>Firework</i>	V	45	red + yellow
	92	<i>Fly Away</i>	IV/V	55	red + yellow
	93	<i>Greenstar</i>	IV/V	50	white with green
	94	<i>Marilyn</i>	V	55	white + red
	95	<i>Merlot</i>	V	50	dark red
	96	<i>Pieter de Leur</i>	IV/V	40	dark red
	97	<i>Purple Dream</i>	V	50	Violet
	98	<i>Sanne</i>	V	55	pink+white
	99	<i>West Point</i>	V	50	yellow
		100	<i>White Triumphator</i>	V	60
<b>VII. Fringed tulips</b>	101	<i>Canasta</i>	V	45	cyclamen + white
	102	<i>Carrousel</i>	V	45	white + red
	103	<i>Cummins</i>	V	45	violet with white
	104	<i>Curly Sue</i>	V	45	dark violet
	105	<i>Hamilton</i>	V	65	yellow
	106	<i>Honeymoon</i>	V	55	white
	107	<i>Labrador</i>	V	50	Claret
	108	<i>Lambada</i>	V	50	yellowish-orange
	109	<i>Mascotte</i>	V	50	violet (double)
	110	<i>Matchpoint</i>	IV	45	dark pink (double)
		111	<i>Pacific Pearl</i>	V	50
<b>VIII. Viridiflora tulips</b>	112	<i>Artist</i>	V	30	orange + green
	113	<i>China Town</i>	IV	30	pink + green (spotted leaves)
	114	<i>Esperanto</i>	V	30	red + green
	115	<i>Flaming Spring Green</i>	V	50	white + red+ green

	116	<i>Golden Artist</i>	V	30	orange + green
	117	<i>Nightrider</i>	V	50	violet + green
	118	<i>Red Spring Green</i>	V	50	red + green
	119	<i>Spring Green</i>	V	50	white + green
	120	<i>Virichic</i>	V	45	pink + green
<b>IX. Rembrandt tulips</b>		Mix	IV/V	50	bicolored
<b>X. Parrot tulips</b>	121	<i>Apricot Parrot</i>	V	50	light pink + green
	122	<i>Black Parrot</i>	V	50	Claret
	123	<i>Blue Parrot</i>	V	55	Violet
	124	<i>Estella Rijnveld</i>	V	50	red with white
	125	<i>Flaming Parrot</i>	V	50	yellow + red
	126	<i>Garden Fire</i>	V	50	Red
	127	<i>Green Wave</i>	V	50	light pink
	128	<i>Irene Parrot</i>	V	55	orange + red
	129	<i>Parrot King</i>	V	50	apricot + yellow
	130	<i>Parrot Negrita</i>	V	50	violet
	131	<i>Topparrot</i>	V	40	red
	132	<i>Yoko Parrot</i>	IV	45	yellow
<b>XI. Double late tulips</b>	133	<i>Angélique</i>	V	45	pink
	134	<i>Black Hero</i>	V	60	dark violet
	135	<i>Cartouche</i>	V	45	light pink + yellow
	136	<i>Drumline</i>	V	60	red with white
	137	<i>Mount Tacoma</i>	V	45	white
	138	<i>Negrita Double</i>	IV	40	purple
	139	<i>Orange Princess</i>	IV	35	orange
	140	<i>Red Princess</i>	V	35	red
	141	<i>Renown Unique</i>	V	50	pink + white
	142	<i>Uncle Tom</i>	V	45	dark violet
	143	<i>Yellow Pomponette</i>	IV/V	50	yellow
<b>XII. Kaufmanniana tulips</b>	144	<i>Heart's Delight</i>	III	20-25	pink + carmine red
	145	<i>Ice Stick</i>	III	35	white + pink + yellow
	146	<i>Love Song</i>	III	25	orange
	147	<i>Shakespeare</i>	III	25	orange
	148	<i>Showwinner</i>	III	25	red (spotted leaves)
	149	<i>Stresa</i>	III	25	yellow + red
	150	<i>The First</i>	III	20	white + red
<b>XIII. Greigii tulips</b>	151	<i>Albion Star</i>	IV	30	white
	152	<i>Cape Cod</i>	IV	30	red + yellow
	153	<i>Für Elise</i>	III	25	apricot
	154	<i>Grand Prestige</i>	IV	45	red
	155	<i>Natura Artis Magistra</i>	IV	30	yellow
	156	<i>Pinocchio</i>	IV	25	red + white
	157	<i>Quebec</i>	IV	35	yellow with coral red

	158	<i>Redwood</i>	IV	45	red (spotted leaves)
	159	<i>Roodkapje (Red Riding Hood)</i>	IV	30	red (spotted leaves)
	160	<i>Toronto</i>	IV	35	coral red
	161	<i>Trautmansdorff</i>	IV	30	red
	162	<i>Willem van den Akker</i>	IV	35	pink + white
<b>XIV. Fosteriana tulips</b>	163	<i>Apricot Emperor</i>	IV	40	apricot + yellow
	164	<i>Concerto</i>	III	25	cream with white
	165	<i>Exotic Emperor</i>	IV	35	white with green
	166	<i>Flaming Purissima</i>	IV	40	pink with white
	167	<i>Juan</i>	IV	40	red
	168	<i>Madame Lefeber</i>	IV	45	red
	169	<i>Orange Emperor</i>	IV	40	apricot
	170	<i>Purissima</i>	IV	40	white
	171	<i>Solva</i>	IV	40	red
	172	<i>Sweetheart</i>	IV	40	light yellow
	173	<i>Yellow Purissima</i>	V	40	yellow
<b>XV. Botanical species tulips</b>	174	<i>Tulipa linifolia</i>	IV	10	red
<b>XVI. Multiflowering tulips</b>	175	<i>Antoinette</i>	V	40	white + pink + yellow
	176	<i>Candy Club</i>	V	50	white + light violet
	177	<i>Happy Family</i>	IV/V	40	pink
	178	<i>Praestans Fusilier</i>	IV	35	red-orange
	179	<i>Praestans Shogun</i>	IV	15	orange
	180	<i>Roulette</i>	V	40	red

The collection features some of the most spectacular cultivars, which vary in flower shape and the colour of the tepals: those with a fimbriate flower (e.g. 'Cummins', 'Labrador', 'Mascotte', etc.); with a large serrated, parrot-like flower (e.g. 'Blue Parrot', 'Irene Parrot', 'Parrot King', etc.); with simple ('Hermitage', 'Yokohama', 'Christmas Marvel' etc.) or flowers with many petals, like a peony (e.g. 'Abba', 'Viking', 'Monte Carlo', etc.); like a lily ('Firework', 'Merlot', 'Pieter de Leur' etc.); with tepals from pure white ('White Triumphator) to all pink shades ('Angelique', 'Apricot Beauty'), yellow ('Golden Apeldoorn'), orange ('Orange Princess'), red ('Kingsblood', 'Merry Christmas'), brown ('La Belle Epoque'), to the so-called 'black tulip', which in fact is dark violet ('Paul Scherer', 'Queen of Night', 'Black Hero'); with bicoloured flowers ('Drumline', 'Gavota'), and even colourful leaves ('Grand Prestige', 'Red Riding Hood' etc.); and finally, multiflorous varieties ('Happy Family', 'Antoinette', Praestans group, etc.) [7, 10, 13].

Among the varieties that 'break the ice' and bloom the earliest, we may mention 'The First' and 'Show-winner' (mid-March). One of the much-appreciated historical varieties, 'Madame Lefeber' derives from the first varieties of cultivated tulips. The Triumph group is always the best represented, being the group with most varieties. This year the collection has 30 such varieties.

In order to have the necessary space to expand the collection, each cultivar, of *c.*100 bulbs, is represented only once, along with the other cultivars of the division (group) to which it belongs. Early varieties are usually planted in the narrow beds at the entrance to the Botanical Garden, and late ones on the narrow beds near the greenery production.

Generally, it has been found that the bulbs retain their decorative qualities for a maximum of two years, and then degenerate, so the collection must be assembled annually. Many bulbs cannot be multiplied because of the lack of space in the Botanical Garden, but a small ‘bulb nursery’ was attempted at Arcalia (Bistrita-Nasaud County), aiming to bring them to the stage of bulbs capable of producing flowers.

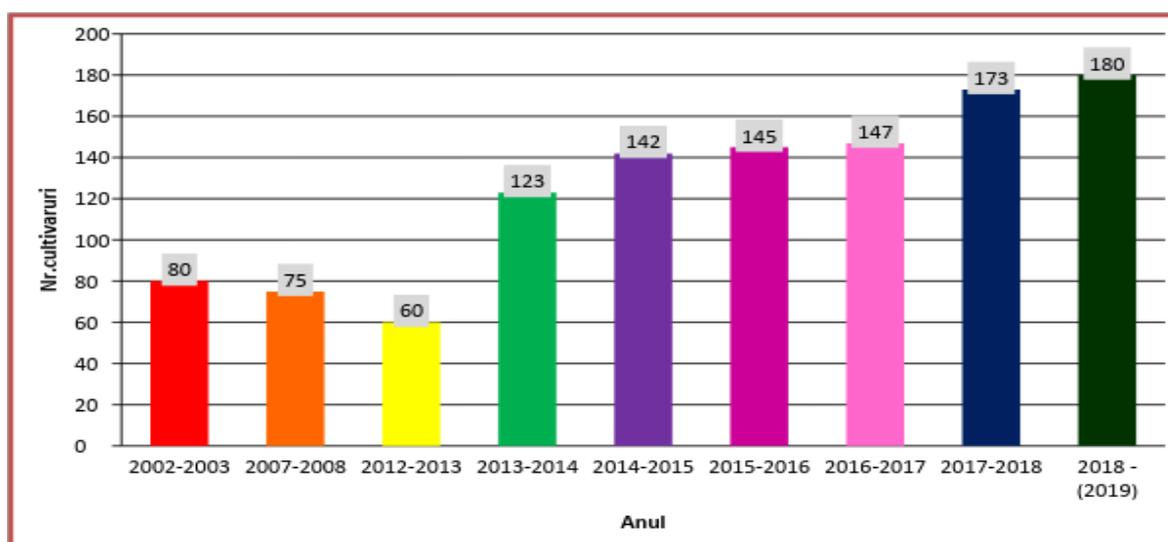


Fig. 1: Evolution of the number of tulip cultivars at “Al. Borza” Botanical Garden (2002–2018)

#### ✓ Daffodil collection (*Narcissus* spp.)

Daffodils (*Narcissus* spp.), which originated in the Mediterranean Basin, extending to North Africa, Central Europe and Asia, have become some of the most popular and well-loved plants, harbingers of spring. Over the whole world, the daffodil flower is a symbol associated with rebirth and prosperity, the spring equinox and Easter holidays. The name derives from Greek mythology, from the young Narcissus, eternally in love with his own beauty, who ended up drowned in the water that mirrored his face, in that place arising a delicate flower with the name Narcissus (daffodil) [5, 6].

There are approximately 50 species of daffodils that have been used in the laborious improvement work of floriculture specialists, so that today over 1,000 varieties and cultivars are cultivated: with simple flowers or flowers with many petals, with a small or large paracorolla or corona, entire or divided, with fragrant or less perfumed flowers, criteria based on which 13 groups have been denoted [3, 5].

Our collection, with 30–40 species and cultivars, is in the three narrow beds occupied during the summer by the Canna collection. The lack of space does not allow this collection to expand, even though the bulbs of daffodils keep better than those of tulips and especially of hyacinths. However, every year, the collection is complemented by new varieties with extra-quality bulbs.

Among the varieties with a simple flower, the Trumpet Daffodils group (with a trumpet-

shaped paracorolla), we can mention 'Avalon', 'Mount Hood', 'Dutch Master', etc.; Large Cupped Daffodils group (large paracorolla), 'Gigantic Star', 'Stainless', 'Accent', salmon paracorolla and white corolla, etc.; from the Double Daffodils group, 'My Story', white with salmon, 'Dick Wilden', yellow-lemon, 'Ice King', white, etc.; Small Cupped Narcissi (small paracorolla), 'Actaea' with a simple white flower, 'Recurvus' with recurved petals, etc., from the group of daffodils with a divided paracorolla (Split Corona Daffodils, 'Cassata', 'Printal' etc.[3, 10]. There are also varieties of botanical species (Botanical Narcissi: *N. poeticus*, *N. tazetta*, *N. jonquilla*, *N. odoratus*, etc.), with delicate flowers in yellow-lemon colours, pale yellow, white, simple or with many petals, etc., dwarf plants, 15–20 cm (eg 'Tête-à-tête', 'Rip van Winkle', 'New Baby', etc.) [6, 8].

✓ **Hyacinth collection (*Hyacinthus* sp.)**

Hyacinth (*Hyacinthus orientalis*) originates in Turkey and the Middle East and has been cultivated in Europe since the time of the Greeks and the Romans. The scientific name comes from the Greek word *hyakinthos*. In Greek mythology, Hyakinthos was a young man adored by Apollo (the God of the Sun) and was jealously murdered by Zephyr (the God of the West Wind). From his blood the beautiful Hyacinth appeared [5, 11].

Every spring, in the Botanical Garden, the hyacinth becomes the 'star' of March, when the perfumed and colourful flowers appear, in a minicole of c. 15 varieties (e.g. 'Pink Pearl' - pink, 'Blue Jacket' - blue, 'Purple Sensation' - violet, 'White Pearl' - white, with double flowers: 'Prince of Love' - pink, 'Royal Navy' - blue, etc. The collection is kept around this level due to lack of space and the smaller assortment of varieties in the genus. In winter, the bulb degrades very strongly, so new bulbs are needed every year to obtain the desired decorative effect [5, 10].

✓ **Ornamental onion collection (*Allium* spp.)**

The genus *Allium*, originating in Europe, North Africa, Asia and North America, includes more than 280 herbaceous species, which can reach up to a height of 1.50 m. The ornamental onion belongs to the category of 'spring flowers' and is cultivated for the beauty and attractiveness of the inflorescences (umbels). The flowers appear at the top of the scape, are hermaphrodite, star- or bell-shaped, and are coloured white, blue, lilac or yellow. Most of the ornamental species and varieties have a slight smell of onion or garlic if they are crushed, and some varieties are slightly perfumed.

Ornamental alliums can successfully be used in horticultural arrangements in parks and gardens, as potted plants, and as cut flowers (whether fresh or dried) [6, 8, 10].

The onion collection is new (since 2017). It started with an assortment of 33 species and varieties, and this year had 37. We noticed that the collection raised a real interest among the visitors to the Botanical Garden, attracted especially by the huge globe inflorescences, ball-like, many people associating onions only with culinary consumption, being unaware of these distinctive decorative forms.

Besides these bulb species, there are also a smaller number of species of *Crocus* (hybrids: 'Flower Record', 'Golden Yellow', 'Jeanne d'Arc', 'Pickwick', 'Remembrance'), which have been planted in autumn into lawns, in spring being among the first seasonal harbingers, vividly coloured violet, yellow, white, the decorative effect being special. Other species of small bulbous plants grown are: *Leucojum aestivum*, *Muscari botryoides* 'Superstar' and *M. neglectum*, and

this year: *Scilla litardieri*, *S. libanotica*, *S. peruviana*; *Sparaxis* spp., *Iris reticulata*, with the varieties 'Alida' and 'Pauline'; *Eranthis cilicica* and *E. hiemalis* [6, 10, 11].

**Table 2: Decorative onion collection (*Allium* spp.)**

Srt. no.	Name	Height of the plant (cm)	Colour of the inflorescence
1	ALLIUM AMPELOPRASUM "White Cloud"	80	white
2.	ALLIUM AMPLECTENS "Graceful Beauty"	35	white
3.	ALLIUM AFLATUNENSE	80	violet-bluish
4.	ALLIUM ATROPURPUREUM	60	dark violet
5.	ALLIUM sp. "Ambassador"	100	violet
6.	ALLIUM CAERULEUM	40	blue
7.	ALLIUM CERNUUM	40	pink
8.	ALLIUM CHRISTOPHII	50	dark violet
9.	ALLIUM COWANII	40	white
10.	ALLIUM sp. "Cameleon"	30	light pink
11.	ALLIUM FLAVUM	40	yellow
12.	ALLIUM sp. "Firmament"	80	dark violet
13.	ALLIUM sp. "Forelock"	65	light violet
14.	ALLIUM GIGANTEUM	150	violet
15.	ALLIUM sp. "Gladiator"	125	light violet
16.	ALLIUM sp. "Globemaster"	80	light violet
17.	ALLIUM HOLLANDICUM "Purple Sensation"	90	dark violet
18.	ALLIUM sp. "His Excellency"	90	light violet
19.	ALLIUM KARATAVIENSE	20	grey-greyish
20.	ALLIUM MOLY	25	yellow
21.	ALLIUM sp. "Miami"	80	dark violet
22.	ALLIUM sp. "Monte Blanc"	100	white
23.	ALLIUM NEAPOLITANUM	35	white
24.	ALLIUM NIGRUM	80	grey
25.	ALLIUM OREOPHILUM	15	pink-cyclamen
26.	ALLIUM sp. "Peruviana"	20-25	dark blue
27.	ALLIUM sp. "Purple Rain"	90	dar violet
28.	ALLIUM ROSEUM	25	light pink
29.	ALLIUM sp. "Red Mohican"	100	dark cherry
30.	ALLIUM SCHUBERTII	40	pink
31.	ALLIUM SPHAEROCEPHALON	90	cherry
32.	ALLIUM sp. "Spider"	50	cherry
33.	ALLIUM sp. "Summer Drummer"	175	violet
34.	ALLIUM URSINUM	35	white
35.	ALLIUM VINEALE "Dready"	70	green
36.	ALLIUM VINEALE "Hair"	70	green
37.	ALLIUM sp. "Violet Beauty"	70	dark violet

Every spring, biennial plant species are also present. These mainly decorate the bulb patches: *Viola x wittrockiana*, with 14 F<sub>1</sub> hybrids, in a wide range of colours – yellow, white, blue, orange, purple, uni- or bicolourous, etc., combined in different artistic modes; *Bellis perennis*, with white, pink or red flowers; *Myosotis alpestris* and the hybrids 'Bluesylva' - blue, 'Rosylva' - pink and 'Snowsylva' - white [5, 6, 11]

## 2. Collections of bulb species, and annual plants seeded in the spring:

### ✓ Dahlia collection (*Dahlia* spp.)

*Dahlia* (after Swedish botanist Dr. Andreas Dahl, 1751–89) originates in Mexico, and of

the 16 species known today, through crossing, through ample and laborious improvement works, have been obtained the c. 50,000 varieties and hybrids grown today in most regions of the world [3, 8, 12].

In our country, it is one of the most popular 'cottage garden' flowers, frequently found in the gardens of houses or in public parks and gardens. They have always been present in "Al. Borza" Botanical Garden, since its establishment [1, 2, 14].

At present, this collection approaches 100 varieties and hybrids that can be differentiated into several groups, depending on the size of the plant, but especially based on the colour and shape of the inflorescences (capitula): simple, anemone-type, cactus, semi-cactus, miniature, pompon, orchid and decorative. From the small cultivars for borders, of 35–40cm ('Pulp Fiction', Topmix series, etc.), to cactus-types ('Purple Gem', 'Park Princess', etc.), to the decorative group ('Lilac Time', 'Kelvin Floodlight'), with huge inflorescences 25–30 cm in diameter and a height of over 1.50 m, from July to the first frosts in autumn, create a real 'colour show' ... deserving the title of "autumn queen flower" [11, 12].

Some of the horticultural varieties that complete the collection are purchased each year, but other durable varieties are well preserved and have been present in the collection for many years ('Albert Regent', 'Kennemerland', 'Blonde Dame', 'Entrues Sultan', 'Pillango', 'Patka Kinga', 'Laura Patka', 'Madeleine', 'Red Pigmy', 'Rote Dame').

#### ✓ *Canna* collection (*Canna* spp.)

The genus *Canna*, originally from tropical and subtropical America, comprises c. 54 vividly coloured species (about 2 m in height), with varieties derived mostly from the species *Canna indica* and *Canna x generalis*. *Canna* or Indian cane is a decorative plant that can be grown in gardens and pots, for its exotic flowers that appear in early summer, offering a special chromatic show that can be admired even after the onset of autumn [3, 5, 6].

Each year, the canna collection, located on the narrow beds adjacent to the dahlias, comprises about 50 cultivars, which are distinguished by the colouring of the flowers, the leaves and the height of the plants. It is one of the 'veteran' species in the Botanical Garden, having been cultivated, along with the other species mentioned, since its establishment [2, 14]. In the last two years, besides the reproduction material represented by rhizomes harvested each autumn from the old plants or filled with new varieties, plants were obtained also from seeds. These were seeded in March, with the precultivation of rhizomes in pots, resulting in the achievement of uniform plants with a small height (very suitable for the narrow beds adjacent to alleys), with abundant flowering and ... in tandem with rhizomes. These are the hybrids of *Canna x generalis*, the Tropical series ('Rose', 'Yellow', 'White' and 'South Pacific Scarlet'). Among the older cultivars found in the collection we should mention: *Canna indica* 'Picasso' with yellow flowers with red freckles, *C. indica* 'Black Knight', with red flowers and dark cherry-coloured leaves, and *C. indica* 'Angelli Emleke' with orange flowers.

#### ✓ *Lily* (*Lilium* spp., *Hemerocallis* spp.) and sword lily (*Gladiolus* spp.) collections

The *Lilium* spp. collection, re-established in 2015, has reached 22 species and cultivars, with the species *Lilium regale*, *L. tigrinum*, *L. asiaticum*, *L. orientale*, *L. candidum*, etc.

Day-lilies (*Hemerocallis* spp.), previously represented by one variety (unidentified), has been completed with 15 new cultivars, creating a very decorative mini-collection.



Fig. 2: *Tulipa* ssp. collection (photo: Angela D. Pui)



Fig. 3: *Narcissus* ssp. collection (photo: Angela D. Pui)



Fig. 4: *Hyacinthus orientalis* 'Woodstock' (photo: Angela D. Pui)



Fig. 5: *Tulipa turkestanica* (photo: Angela D. Pui)



Fig. 6: *Narcissus pseudonarcissus* 'Changing Colors' (photo: Angela D. Pui)



Fig. 7: *Viola x wittrockiana* + *Tulipa* ssp. (photo: Angela D. Pui)



Fig. 8: *Bellis perennis* (photo: Angela D. Pui)



Fig. 9: *Dahlia x hybrida* collection (photo: Angela D. Pui)



Fig. 10: Annual plants collection (photo: Angela D. Pui)



Fig. 11: *Myosotis alpestris* (photo: Angela D. Pui)



Fig. 12: *Canna* spp. collection (photo: Angela D. Pui)



Fig. 13: Centennial 1918 – 2018 (photo: Angela D. Pui)

The sword lily (*Gladiolus* spp.) collection, re-established in 2014, was best represented in 2015 and 2016 by 30 and 38 species and cultivars. This year it reached 8 cultivars, the major problem being the lack of space, but also the fact that the tuberose bulbs of the previous years were very difficult to keep, being of poor quality. Among the varieties that were much appreciated was 'Green Star', with green-yellow flowers [6, 10].

### ✓ Collection of annual flower plants

Annual floral plants have a limited lifecycle (4–7 months), spread over a year. In the temperate climate they appear in the spring from seed, grow, bloom and fruit, and in the autumn they wither [6]. On the narrow beds that border the alleys, from the entrance to the Botanical Garden, after the bulbous species have released the ground (end of May to the beginning of June), these plants are present in a multitude of varieties, hybrids and horticultural varieties, ensuring the summer background until late autumn [2, 5, 9, 14].

Among the European species, we can mention: *Matthiola incana* (stock) which charms us with its magic scent on summer evenings, present in collection with small varieties 'Cinderella' and 'Ten Week', along with her 'sister' *M. longipetala* (night-scented stock), with the variety 'Starlight Sensation', less decorative but particularly perfumed; *Antirrhinum majus* (snapdragon) with a variety of horticultural varieties, e.g. "Circus Clowns" and "Tom Thumb", of small height suitable for the narrow beds; the well-known and much appreciated pot marigold (*Calendula officinalis*) with the hybrids 'Gitana yellow' and 'Gitana orange', 'Art Shades', etc.

The Asian continent is represented by *Celosia cristata* and *C. plumosa* (cockscomb), with uni- and multicoloured varieties; *Impatiens balsamina* (rose balsam); and one of the most popular 'cottage garden' ornamental plants, originating in China and Japan, *Callistephus chinensis* (China aster), with a rich palette of colours, from pure white to indigo, with hybrids such as 'Milady', 'Pompon' and 'Palette', of small or medium height, etc. We cannot forget basil (*Ocimum basilicum*) and sweet marjoram (*Majorana hortensis*), much cultivated in the countryside, and more recently in the city, in the chic window boxes of kitchens. New varieties have been created: lemon-scented 'Lemon', with clove fragrance - 'Red Leaved', with aniseed aroma - 'Thai', small-leaved - 'Piccolino', dwarf - 'Minette', etc.

African flowers are represented by species such as: *Lobelia erinus* (edging lobelia), with the elegant and refined African daisies (*Osteospermum ecklonis*).

From far-away Australia, the precious everlasting flowers (*Helichrysum bracteatum*), to North America, the floss flowers (*Ageratum houstonianum*), and to Mexico, where we are charmed by the elegant zinnias loved by the Aztecs (*Zinnia* spp.), with new hybrids such as: 'Whirlygig' (spotty zinnias), 'Thumbelina' and 'Zinnita' (small zinnias) belonging to the species *Zinnia elegans*, but equally decorative are the species *Z. haageana* (Mexican zinnias) and *Z. peruviana*.

South America has offered us species such as: *Nicotiana alata* (Queen of the Night), *Salvia splendens* (scarlet sage or tropical sage) with red, pink, white, cerise flowers, etc., but also the fantastic petunias (*Petunia grandiflora*), in vivid colours [1, 2, 3, 9, 14].

If in past years each species was represented by 1 or 2 varieties/horticultural varieties, lately, the number of plants/cultivars has been reduced from 60–80 plants to a maximum of 30, precisely in order to have the necessary space for as many new cultivars as possible. This year,

for example, the genus *Tagetes* was represented by 16 species and hybrids (*Tagetes patula*: 'Bonanza Deep Orange', 'Red Cherry', 'Bonanza Harmony', 'Hero Gold', 'Marigold Chasca', 'Marigold Strawberry', 'Hero Yellow', 'Hero Spry', 'Durango', 'Nana'; *T. Erecta*: 'Vanilla', 'Taishan Gold', 'Taishan Yellow', 'Taishan Orange', 'Kees Orange'; *T. tenuifolia* 'Lemon Gem'). This great variety of horticultural species and varieties, each correctly labelled, besides scientific input, creates an extraordinary palette of elegant colours, shapes and fragrances.

On both sides of the main alley, not far from the entrance to Botanical Garden, you will find two pyramid patches, beautifully crafted by the landscape architect's hand, in arabesques and other artistic compositions created by mosaic plants: *Coleus blumei*, *Begonia semperflorens*, *Alternanthera amoena*, *Iresine lindenii*, *Cineraria maritima*, but also numerous species and varieties of Crassulaceae: *Sedum* spp., *Echeveria*, *Kleinia*, etc., which follow the biennial species [5, 6, 9].

At the same time, to mark the Centenary of the Great Union (1918) in a novel way, a map of Great Romania was created, made of pansies and tulips followed by mosaic plants (*Coleus blumei* varieties) and the national tricolour flag, made of bulb plants and annual flowers. 2019 will mark the anniversary of the Centenary of the foundation of our University, which is why the UBB logo was created from blue and white pansies and the tricolour flag, both in pansies of three colours and from the bulbs of the small tulips (*Tulipa linifolia* - red), daffodils ('Rip van Winkle', botanical species - yellow) and grape hyacinth (*Muscari neglectum* 'Joyce Spirit' - blue).

**Table 3: Evolution of the collection of ornamental flower plants in the ornamental sector (2014-2018)**

Srt. no.	Genus/species	No. of cultivars				
		2014	2015	2016	2017	2018
1.	Allium	-	-	-	33	37
2.	Canna	21	29	35	43	47
3.	Dahlia	47	56	84	92	97
4.	Gladiolus	20	30	38	15	8
5.	Hemerocallis	-	-	-	15	15
6.	Hyacinthus	5	10	12	15	15
7.	Lilium	-	15	13	20	22
8.	Narcissus	20	28	30	31	44
9.	Tulipa	123	142	147	173	180
10.	Annual flower species	65	80	130	147	160

### Conclusions

The large diversity of horticultural species and varieties in the Botanical Garden provides study material for specialists and students in biology and horticulture, while also representing an important attraction for visitors keen on knowledge or recreation.

This diversity, coupled with arrangement modalities, is a 'source' of inspiration for amateur gardeners, and for plant lovers generally.

The acquisition of new varieties and hybrids is an important desideratum, but it must not affect the preservation of traditional, primitive or cottage garden variants, as a testimony to the efforts of those unknown persons of previous generations.

### BIBLIOGRAPHY

1. Borza, A., 1931, *Printre flori*, Tip. Națională S.A. Cluj.

2. Borza, A., 1939, *Grădina Botanică din Cluj*, Tipografia Națională S.A. Cluj.
3. Cristea, V., 2014, *Plante vasculare: diversitate, sistematică, ecologie și importanță*, Presa Universitară Clujeană, Cluj-Napoca.
4. Dobbs, L., 2002, *Tulip*, Quadrille Publishing Ltd., Londra.
5. Micle, F., Șuteu, A., Hentea, S., Csergő, A.M., Mocan, C., Cristea, V., Feszt, G., Pușcaș, M., Constantinescu, M., 2002, *Grădina Botanică “Alexandru Borza” din Cluj-Napoca*, Ed. Presa Universitară Clujeană, Cluj-Napoca.
6. Preda, M., 1979, *Floricultura*, Ed. Ceres, București.
7. Preda, M., 2002, *Cultura lalelelor*, Ed. Ceres, București.
8. Preda, M., 1989, *Dicționar dendrofloricol*, Editura Enciclopedică și științifică, București.
9. Rațiu, O., Micle, F., 1978, *Grădina Botanică-ghid*, Cluj-Napoca.
10. Sanne, H., L., Hogeweg, *JUB Holland Catalogue 2018/2019*, Jac. Uittenbogaard & Zonen BV, Noordwijkerhout
11. Sonea, V., Pavel, A., Ailincăi, N., Șelaru, E., 1979, *Floricultură*, EDP București.
12. Șelaru, E., Mucescu, E., 1976, *Daliile*, Ed. Ceres, București.
13. Șelaru, E., Ceașescu, M.E., 1980, *Lalelele*, Ed. Ceres, București.
14. Țopa, E., 1956, *Călăuza Grădinii Botanice din Cluj*, Ed. Universității “V.Babeș” Cluj.

#### COLECȚIILE DE SPECII FLORICOLE ORNAMENTALE ALE GRĂDINII BOTANICE “AL.BORZA” – O “EXPOZIȚIE” PERMANENTĂ

##### (Rezumat)

În Sectorul Ornamental al Grădinii Botanice “Al. Borza” se află mai multe colecții de specii horticole, anuale și perene, dar și de specii botanice, cultivate în scop decorativ, a căror înflorire eșalonată urmărește succesiunea anotimpurilor. Astfel, primăvara debutează cu o colecție impresionantă de lalele (*Tulipa* spp.), având în 2018, 180 de cultivaruri, alături de narcise (*Narcissus* spp.), zambile (*Hyacinthus* spp.), crocuși (*Crocus* spp.), dar și de panseluțe catifelate (*Viola x witrockiana*), părăluțe (*Bellis perennis*) sau gingașe flori de nu-mă-uita (*Myosotis* spp.). Locul acestora este ocupat, rând pe rând, de colecțiile de dalii (*Dahlia* spp.), cupeste 90 de cultivaruri, cana (*Canna* spp.), cu 40 de cultivaruri, gladiole (*Gladiolus* spp.), crini (*Lilium* spp. și *Hemerocallis* spp.), dar și deo multitudine de specii și varietăți floricole anuale, originare de pe toate continentele, cu scopul de a menține decorul până în toamnă.

An de an, aceste colecții sunt îmbogățite, astfel că, ultima colecție înființată (în 2017), a fost cea de ceapă decorativă (*Allium* spp.), cu peste 30 de specii/hibrizi, care s-a dovedit a fi interesantă și atractivă, deopotrivă pentru specialiști și vizitatori.

Totodată, pentru a marca Centenarul Marii Uniri (1918) într-un mod inedit, a fost creată o hartă a României Mari, din panseluțe și lalele, urmate de plante de mozaic (varietăți de *Coleus blumei*) și drapelul cu cele trei culori, realizat din specii de bulboase și flori anuale.

Ca importanță, plantele acestor colecții oferă material de studiu specialiștilor și reprezintă un important punct de atracție pentru vizitatori, care se pot delecta cu forma, coloritul și parfumul florilor, dar și inspirăm amenajarea grădinilor proprii.