EVALUATION OF MONITORED ASPECTS OF PROPAGATION OF ROSE SECTION GALLICANAE

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During the years 2000–2004 selected aspects in propagation of roses of a section *Gallicanae* were monitored; especially yield and share of ready seedlings of the first quality. The used method of breeding was a budding; ready seedlings were sorted according to a relevant quality norm. Results were statistically evaluated by a variance analysis (ANOVA). An average yield was 64.2%. A taxon with the least yield was Fantin Latour with yield 42.7%. On the contrary, the highest yield was proved in the variety Love Story 80.4%. A conclusion has been made that from a viewpoint of yield *Gallicanae* does not differ significantly from control tea hybrids. A share of the first quality in all taxons during the entire monitored period was 45.9%. The smallest share of the first quality occurred in Blanche Moreau, i.e. 18.7%. The highest was then in Love Story 79.4%. A more detailed analysis proved a lower share of ready seedlings of first quality in *Gallicanae* compared to tea hybrids. A substantial influence has been found out in a taxon genotype; seasonal variations were not marked.

Rosa; *Gallicanae*; budding of roses; yields of seedlings; quality of seedlings

INTRODUCTION

A genus *Rosa* belongs among the oldest cultural plants. Their growing signalizes a level of civilization because use of plants for decorative purposes shows evidence of an achieved degree of security of basic material needs. They were secured by growing of plants of production character (V e č e ř a et al., 1967). Roses of the section *Gallicanae* belong to the oldest cultural roses in Euro-Asian area (K r ü s s m a n n, 1986). Although their growing was suppressed to a great extent at a break of 19th and 20th century by other groups of roses, at present they are used more in connection with a popularity of new varieties of English breeders Austin (M a r r i o t t, 2003).

On this account it is desirable to rank this group of roses in a context of current assortment. It has changed during a certain absence of these roses and parameters of claims and use of roses in green subjects and the entire park practice are set completely newly.

Possibilities of use are influenced to a certain extent by problems of breeding of these roses. From a viewpoint of breeding yield and a share of seedlings of the first quality is substantial. Just in evaluation of these qualities it is possible to look for one of elements of the current potential of enlargement of roses of the section *Gallicanae* in green subjects.

MATERIAL AND METHODS

A vegetation experiment monitoring aspects of reproduction of roses of the section *Gallicanae* was realized on private land of the author in the municipality Vysoká u Mělníka, a local part Strážnice in Central Bohemian region. From possible methods of vegetative breeding budding was chosen as the most common way of breeding of rose crossbreds (Hartmann, Kester, 2002). As a roostock *Rosa dumalis* subsp. *coriifolia* Froebelii was used, which is suitable for heavy and limy soils (L e e m a n s, 1964; K r ü s s m a n n, 1986). Every year 1000 pieces of rootstocks were grown in nursery. In time of the second sap, i.e. on break of July and August, budding was realized in 2000 to 2004. In all taxons ten pieces of rootstocks was budded in three repetitions, whereas variant was order chessboard metod. Planting distance of rootstocks was 80 x 15 cm and size of the root collar was 3/4. In total 28 roses from the section *Gallicanae* and 5 tea hybrids were ranked to be able to compare monitored characteristics of interest group of roses with the most often grown group of roses at present. The following table shows a review of taxons:

Growing group	Taxon
Gallicanae	Baron de Wassenaer
Gallicanae	Belle de Grecy
Gallicanae	Blanche Moreau
Gallicanae	Captaine Bassroger
Gallicanae	Celsiana
Gallicanae	de la Grifferaire
Gallicanae	du Maitre d'Ecole
Gallicanae	Fanny Bias
Gallicanae	Fantin-Latour
Hybrid Tea	Gloria Dei
Gallicanae	Great Maiden's Blush
Gallicanae	L'Imperátrice Joséphine
Hybrid Tea	Love Story
Gallicanae	Madame Hardy
Gallicanae	Maiden's Blush
Gallicanae	Mme. Legras de St. Germain
Hybrid Tea	Mount Shasta
Gallicanae	*Rosa alba*
Gallicanae	*Rosa alba* Maxima
Gallicanae	*Rosa centifolia*

Gallicanae	*Rosa centifolia* Cristata
Gallicanae	*Rosa centifolia* Muscosa
Gallicanae	*Rosa centifolia* Parvifolia
Gallicanae	*Rosa gallica*
Gallicanae	*Rosa gallica* Splendens
Gallicanae	*Rosa gallica* Versicolor
Gallicanae	Salet
Hybrid Tea	Super Star
Gallicanae	Surpasse Tout
Hybrid Tea	Sutter's Gold
Gallicanae	The Bishop
Gallicanae	Triginpetala
Gallicanae	Unique Blanche
Gallicanae	William Lobb

After growing up the seedlings yields and a share of plants of particular quality classes were evaluated conformable with ČSN 464902-1 Plants of ornamental evergreen woody species.

Within statistic processing of results, a statistic unit was the grown roses classified in particular quality classes. These statistic units formed the evaluated statistic set. Assessed quantitative statistic character was a number of strike-rooted plants after budding and a number of pieces of particular taxons of roses ranked in particular quality classes. Authors chose a method of hypothesis test on equality of parameters of two normal divisions – *F*-test. For evaluation the analysis of variance (ANOVA) was used. A minimal conclusive difference of particular statistic units was determined using T-method (according to Tukey). The own calculations were processed by the help of program statistic parcel Statgraphic, Statistica CT and Microsoft Excel.

Fig. 1. Bud in rootstock

Fig. 2. Headed back rose stock

RESULTS AND DISCUSSION

The evaluated statistic set were the results of the whole monitored period.

Evaluatoin of yeld

The first assessed statistic character was the yield in the monitored set.

A simple arithmetical mean of the monitored yield for the total set was 64.7%. Taxon with the lowest yield was Fantin Latour with the yield 42.7%. On the contrary, the highest yield proved the variety Love Story 80.4%.

Besides monitoring of differences in yields among particular taxons of the monitored set also differences among particular years of the monitored period were analyzed. A simple arithmetical average shows particular differences in yields: 73.9% in year 2001, 75.2% in 2002, 71.9% in 2003, 48.5% in 2004 and 57.6% in 2005. Presumably it

is dealt with a consequence of low sum of rain falls in the period of budding in years 2003 and 2004.

The own calculation of one-factorial ANOVA for monitoring of differences in the yield among particular taxons during the monitored period was realized by the F-test when a significance level $\alpha = 0.05$ was determined and a number of degrees of freedom was $f_1 = 27$ and $f_r = 117$. From these data it results that a critical table value is $F_\alpha = 1.52$.

The result are these valued: $F = 2.23, f_1 = 27, f_r = 117, p = 0.0017$.

T-methods generated only two couples with statistically significant differences. It is a couple of taxons Fantin Latour – Love Story and Love Story – *Rosa gallica*, with higher yield in both cases in Love Story. The fact that other taxons did not prove statistically significant differences inside the monitored set evidences that the yield is not an outstanding problem factor of *Gallicanae* reproduction by budding and that there is no reason to breed them by this method from a viewpoint of yield.
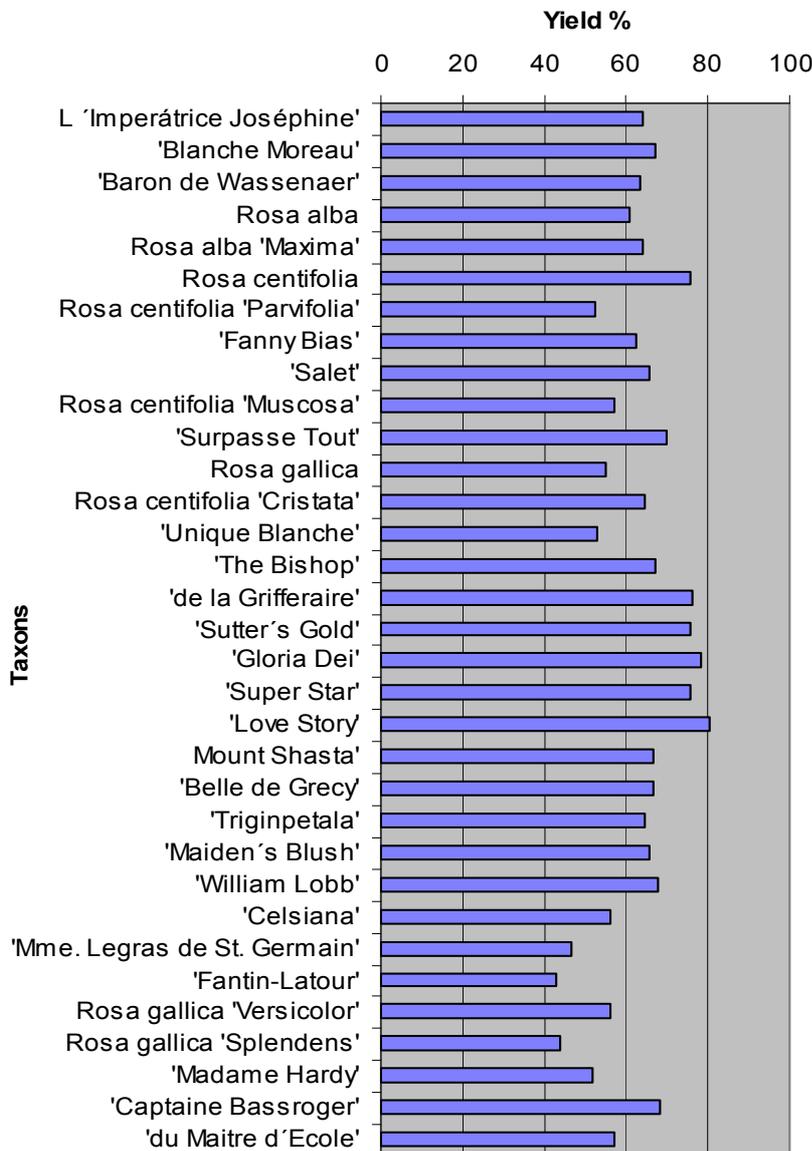

Fig. 3. Yield of particular taxons in the year 2000–2004

Evaluation of share of the first quality

Besides yield, a share of the first quality is substantial from a viewpoint of application of ready seedlings of roses. That is why a share of this quality was analyzed in the monitored set.

A simple arithmetical mean of the share of the first quality in all taxons during the whole monitored period is 45.9%. The smallest share of the first quality was recorded in Blanche Moreau e.i. 18.7%. The highest one was in Love Story 79.4%. In principle all monitored roses of the tea hybrids group showed a higher share of the first quality than 69%. From roses of the section *Gallicanae* the highest share of the first quality was in *Rosa alba* 59.3%, in de la Grifferaire 54.9% and in Salet 53.1%. In these taxons probably the influence of hybridization with roses of other sections manifests itself. The following chart illustrates the share of the first quality of ready seedlings during monitoring (Fig. 4).

Null hypothesis was formulated as a statement that there is no statistically significant difference in share of first quality of ready seedlings of roses. Author is calculation ANOVA of a simple classification was made by the *F*-test. A level of significance was determined as $\alpha = 0.05$. A number of degrees of freedom was $f_l = 27$ a $f_r = 117$. From these data it results that a critical table value is $F\alpha = 1.52$.

The results are the following values: $F = 11.32$, $f_l = 27$, $f_r = 117$, $p = 0.0000$.

The use of T-method evaluated 102 couples of taxons with statistically conclusive difference from a viewpoint of a share of the first quality of seedlings of roses. The most significant differences were recorded in a share of the first quality of roses from the tea hybrids group and taxons from the section *Gallicanae*. All showed a negative variation towards tea hybrids and on the contrary tea hybrids confirmed a positive variation in comparison with roses from the section *Gallicanae*. The biggest variation is evident Blanche Moreau and Love Story: − 60.7. But for example the couple Love Story and Salet had a variance 26.2 which with a limit of this couple 25.1 was only near above the border of the statistically conclusive differ-
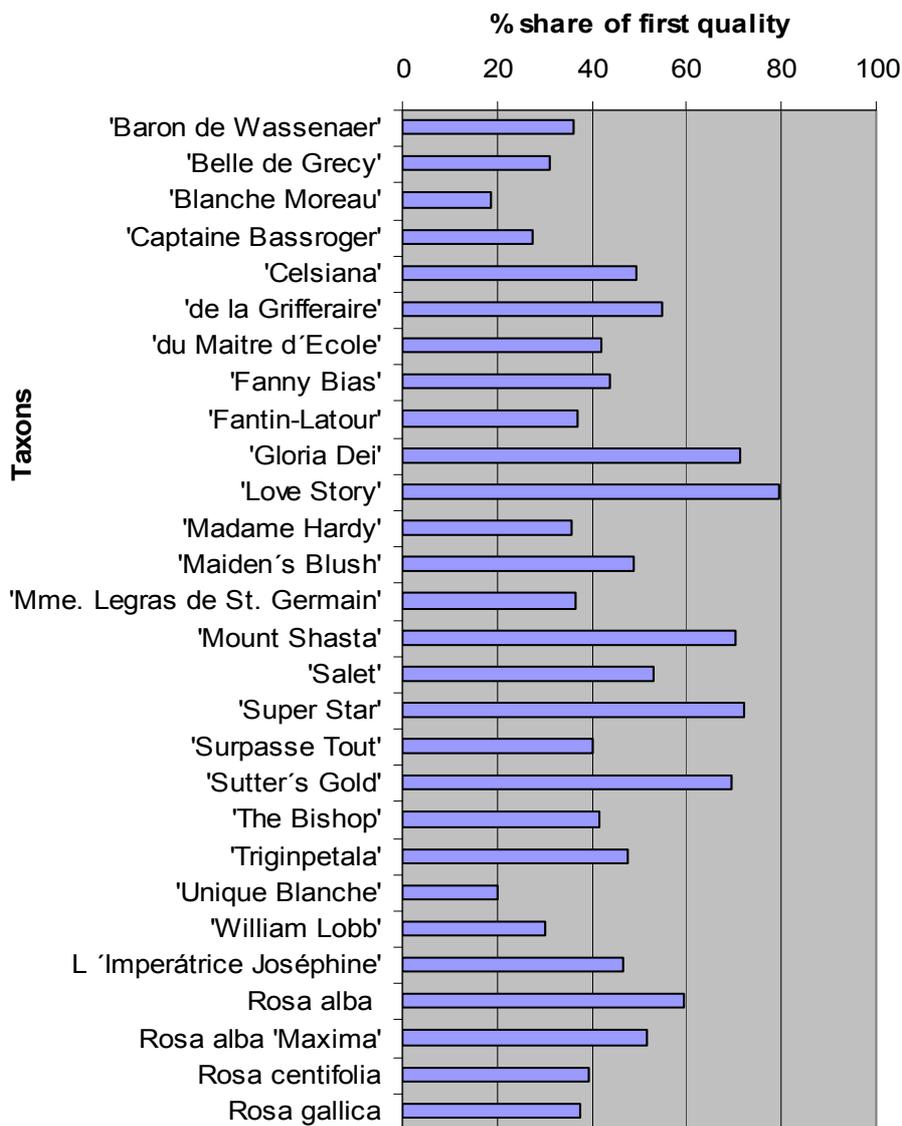

Fig. 4. Share of the first quality of ready seedlings of roses

Fig. 5. Buds of *Gallicanae* beginning to grow

Fig. 6. Buds of Hybrid Tea beginning to grow

ence. Similarly also the tea hybrid Sutter's Gold with *Gallica* Fanny Bias showed a difference – 25.7 with limit 25.1. So it is evident that there are differences also among taxons from *Gallicanae*. Concretely using this method 21 couples from *Gallicanae* were found out, which showed statistically significant differences in a share of the first quality of seedlings. In all cases it was dealt with negative difference. It is evident that this variety is problematic in this point of view in breeding. Roses from the tea hybrids group did not create any couple with conclusive differences of the monitored criterion.

The measured character of analyzed se was subjected also to the analysis of variance of double classification. Besides the criterion of taxons used in the abovementioned analysis a second classifying criterion was used – differences among particular years of the monitored period.

Calculation by the help of the *F*-test determined a significance level $\alpha = 0.05$ and a number of degrees of freedom for taxons $f_1 = 27$ and $f_r = 113$ and for years $f_1 = 4$ and $f_r = 113$. Critical table values for taxon are $F\alpha = 1.52$ and for a year $F\alpha = 2.44$.

The results are the following values for a taxon: $F = 14.11$, $f_1 = 27$, $f_r = 113$, $p = 0.0000$ and for a year $F = 7.80$, $f_1 = 4$, $f_r = 113$, $p = 0.0000$.

From the results it is unambiguously evident that a factor of influence of particular years is less significant than influence of belonging to particular taxons ($F_{\text{taxon}} > F_{\text{year}}$). In other words, it was proved in a statistically conclusive way that in terms of the share of the first quality of ready seedlings of roses the influence of taxon is more substantial than the influence of year-on-year differences of the monitored period.

Use of the T-method confirmed that in this case influence of taxon genotype is substantial. It is dealt with an influence of character of growth of all these sections as it is characterized in particular types for example by V ě t v i č k a (1995) – as a little branched bushes or sticky bushes. From point of view of branching to a longitudinal axis it can be spoken about acrotonous branching of secondary shoots, which appears on basitonous shoots. A high share of non-standard seedlings is unfavourable in grower's point of view, of course. A starting point could be a prolongation growing by one year. Naturally, this way would led to rise in price of the plants. Other possibility is breeding of these taxons by softwood cuttings. This way was absolutely common in roses according to S m r ž (1923) and is used also in Rosarium BÚ AV in Průhonice (B á r t o v á , V ě t v i č k a , 2000). Regarding the fact that this way of breeding is promoted also in low shrub roses for areal outplanting (B ä r t e l s , 1995), it seems to be solvable at present. In this direction it would be possible to monitor differences among these auto-vegetative and xeno-vegetative ways of breeding and characters of seedlings obtained in this way. In taxons derived from *Rosa gallica* and *Rosa centifolia* most probably root sprouting capacity and generation of polycormons would manifest themselves, as also B u s i n s k ý (1987) indicated. This character could be desirable perhaps on slopes but in mixed outplantings and smaller green subjects would be then problematic.

Generally it can be stated that aims of the work were achieved. The yield of this section of roses was not found problematic, but the share of seedlings of the first quality shows that it is necessary to pay attention to growing technology so that ready seedlings would fulfill parameters given by the relevant standard. Possibilities of solution and possible aims of further experiments are indicated above.

REFERENCES

BÄRTELS, A.: Der Baumschulbetrieb. Eugen Ulmer, 1995. 739 pp.

BÁRTOVÁ, E. – VĚTVIČKA, V.: Průhonice comparatistic collection of roses. In: Zbor. Ref., Banská Štiavnica, 2000, pp. 106–109.

BUSINSKÝ, R.: Evaluation of planting evaluable qualities of selected assortment of roses for condition of Czech Republic. Acta Pruhoniciana, *53*, 1987: 91–126.

HARTMANN, H. T. – KESTER, D. E.: Plant Propagation. Prentice Hall, 2002. 880 pp.

KRÜSSMANN, G.: Rosen Rosen Rosen. Verlag Paul Parey, 1986. 447 pp.

LEEMANS, J. A. : Rootstock for Roses. Plant Propaganda Holland, 1964: 72.

MARRIOTT, M. : History of Roses in Cultivation. In: Encyclopedia of Rose Science, Elsevier, 2003. 981 pp.

SMRŽ, O.: History of flowers. II. Vol.: History of roses. Josef Vaněk Chrudim, 1923. 121 pp.

VEČEŘA, L. et al.: Roses. Praha, SZN 1967. 183 pp.

VĚTVIČKA, V.: *Rosa*. In: SLAVÍK (ed.), Flora of the Czech Republic Vol. 4. Academia, 1995. 529 pp.

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Hodnocení sledovaných aspektů množení růží sekce *Gallicanae*.

V letech 2000–2004 byly sledovány vybrané aspekty množení růží sekce *Gallicanae*, zejména výtěžnost a podíl hotových sazenic první jakosti. Jako kontrolní skupina růží byly zvoleny čajohybridy. Metodou množení bylo očkování, hotové sazenice byly tříděny podle příslušné normy jakosti. Výsledky byly statisticky vyhodnoceny analýzou rozptylu (ANOVA). Průměrná výtěžnost byla 64,2 %. Taxon s nejmenší výtěžností byl Fantin Latour s výtěžností 42,7 %. Naopak nejvyšší výtěžnost prokázala odrůda Love Story, a sice 80,4 %. Byl učiněn závěr, že z hlediska výtěžnosti se *Gallicanae* významně neliší od kontrolních čajohybridů. Podíl první jakosti u všech taxonů během celého sledovaného období byl 45,9 %. Nejmenší podíl první jakosti se objevil u Blanche Moreau, a to 18,7 %, Nejvyšší pak u Love Story – 79,4 %. Podrobnější analýza prokázala nižší podíl hotových sazenic první jakosti u *Gallicanae* oproti čajohybridům. Podstatný vliv měl genotyp taxonu, sezonní výkyvy nebyly výrazné.

Rosa; *Gallicanae*; očkování růží; výtěžnost sazenic; jakost sazenic

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