



Trends in Ornamental Plant Breeding Research and Development

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Preface

Due to the rapid development of the Industrial Revolution, the continuous enhancement of synthetic chemistry, the emergence of unlimited capitalism, the high consumption of natural resources, the greenhouse effect of high carbon footprint, the unending expansion of drought, the serious pollution and depletion of air and water sources, the price that countries have to pay for destroying the environment in order to get rid of poverty is huge and heavy!

Coupled with the population explosion and increasingly limited living space, the rise in environmental awareness, the developed countries, influenced by the book "Silent Spring", have all implemented increasingly stringent pesticide policies.

With the intensification of climate, population and soil changes, the existing "old varieties" are bound to gradually decline, and ornamental plants that improve the living environment are the first hit to receive attention; cultivating ornamental plants with drought resistance, heat resistance, cold resistance and other stress resistance is obviously urgent and imperative.

In order to ensure a pollution-free, environmentally friendly and "green" healthier society, relevant public and private institutions in progressive countries have adopted a two-pronged approach of

"legislative constraints" and "selection and awards"; attempting to regulate (reduce or lower) the use limits of chemical pesticides, fertilizers and water resources, which is stimulating the research and development of these "new plants" that are adapted to the transformation which would promote the incentive of business opportunity, the scientific research and breeding communities are longing to invest in this emerging field, which maybe explored as Money Tree!

"Crisis is an opportunity"! Since the impact of such complex environmental changes provided these prospects.

In fact, the current research trends, including all species, must no longer rely on harmful chemical pesticides, but focus on "ecology" as the essential research core; and ornamental crops, in addition to stress resistance, "plant aesthetics" is full of prospects, the advance research on this vitality energy is thrilling.

Breeding Strategy

Keywords: Eco friendly + low maintenance + compact + recurrent flowering + fragrance + diversity + long flowering period + off-season + adaptability + shade tolerance + fewer thorns + self-rooting ability + infertility + vigorous. It is a big puzzle to be filled and missing any one of them will show concern!

- **Natural Selection Environment:** The efforts of ornamental breeders go beyond the trend of "Eco friendly", let the plants show their own nation perception, as their flowers, fruits, branches and leaves are eye-catching like living art (sculptures); therefore, in a natural field trials environment without any facilities and no chemical treatment are carried out to meet the nation selection "Survival of the fittest" criteria.

- **Diversification:** Different countries have different preferences, which are often influenced by trends and seasons and change year by year, especially color difference. Consumer demand for ornamental plants is becoming increasingly diversified (e.g. True Bloom Roses series) to define market demand. Not limited to ornamental elements such as frequent flowering, long flowering period, low maintenance, infertility, resistance to adversity, adaptability to local climate, shade tolerance, few thorns, etc., but also highlight unique fragrance, small and large flowers, color changes, and varieties that can be viewed both indoors and outdoors, as well as off- season flowering, which are easy to attract the favor of "consumers". (e.g. Atomic Bloom, which is short flowering stalk, shade-tolerant, off-season and has a long flowering period, is so stunning consumers in no time).
- **Production Chain:** The grade that determines the output value, ease of propagation, shelf life of transportation, select seedlings that are easy to root, shorter cultivation time, rapid flower bud initiation (e.g. hibiscus with two or three flower buds would make quick impulse sales etc. These series of factors are the driving force behind the profitability of the "producers-farmers"; breeders must not only continuously launch novel products but also grasp the favorable factors for a good growing outcome, which is the key to a win-win situation. (e.g. The popular variety True Integrity rose was forced to retire because it was difficult to produce in Arizona fields and was not profitable for growers. Therefore, selecting seedlings with the ability to quick root cutting as tissue culture seedlings that can be rapidly multiplied for accessible export as well.
- **Gene Bank:** Establishing a rich gene bank and constantly enriching the portfolio to enhance the opportunity to renew breeding bloodlines. An abundant gene pool is a necessary condition

for developing new varieties! In the globalized plant industry, international technical exchanges and cooperation are increasingly influenced by each other. Be actively participated to obtain more information including gene sources, policies, innovation and movements.

- **Recombinant Genetics:** The backcrossing and recombinant genetics quantitative trace effect is an essential means of breeding, such as early flowering and short internodes, fragrance, disease resistance, cold resistance, growth vigor, easy rooting, etc. The more diverse the genetic recombinant gene group, the more conducive It is to specific goals, so that your own varieties can be positioned uniquely, be innovative, and win!
- **Data Manipulation:** Breeding is not only a complicated genetic puzzle, but also a time-consuming effort, one-in-thousand selection operation. The development of a new plant (rose, hibiscus) requires at least 5 years of stable field testing, plus 2-3 years to expand it to a large enough quantity to be marketable.

The acceleration of time (Fast Track) determines the sustainability of costs. Using data rules to improve the overall breeding and test process, to reduce investment risks as taking chances of blind guesswork. Of course, gene editing technology can be used to precisely change and reorganize plant genes, greatly accelerating the breeding process and creating varieties with unprecedented new characteristics (e.g. Suntory's blue rose "Applause").

The use of molecular markers to assist in breeding, which can quickly screen out plant individuals with target traits, especially those that are affected by long-term environmental factors (disease resistance, cold resistance). However, the overall value of ornamental plants economic scale cannot afford the huge investment costs as

food and medicinal crops, thus the current trend in ornamental plant breeding is still dependent on the traditional one-to-one pollination method, with a rate of success relying highly on luck. Since it relies on experience in selecting parents to obtain specific genes and familiarity with the application of computer data statistics, accurate collection and analysis of seasonal assessment data, avoiding repeated errors and increasing the probability to the objectives.

Promotion Tactic

There are so many available ornamental plants on the market today that it causes confusion, and consumers are fatigued by trying to find a needle in a haystack. To make consumers feel at ease to place orders requires not only availability, but well-known "brand confidence", including the establishment of a brand series, exquisite packaging design, stable quality, also virus-free (Clean Plant) is deeply rooted in the brand's soul! For example, the eye-catching design of the True Bloom rose series helps to identify and promote itself. Customers may not know that this is a real gem, and breeders have the obligation to lead the trend. Be bold in praising what you sell; it's a treasure! By understanding the characteristics of customers, promotion would be developed effectively that will achieve market gain quickly.

By understanding market trends and knowing competition would enhance confidence to lead the market movements.

- **Registered Trademarks:** variety protection, patents, registered trademarks, etc. are all "amulets". Master the various laws and regulations to ensure that the intelligent rights continue to make profits. Branding is the magic sword of "marketing" and should be properly maintained; the sustainability of breeding depends entirely on the economic benefits of its promotion results!

- **Brand Advantage:** Particularly important in mass-market (Box Stores) that do not provide professional gardening advise services, where prices can easily be 20% to 30% higher than those of unbranded black pots. In the United States, a variety can only be considered a successful and "profitable" variety if it can be popular in the market for more than decade!
- **Global Expose:** Partake international competitions and Horticultural conference display platforms, trust agents and research institutions, horticultural media, and even youtubers to strive for recognition and exposure, and to win awards for the variety to quickly be promoted into the market.

Conclusion

Ornamental plant breeding is a genetic project that upgrades people's well-being, health, and ecology. It is also a cause that makes great contributions to maintaining and beautifying our civilization's living environment. Low-maintenance ecology is a great demand and a promising future. Effective application of scientific methods, data induction, and artistic qualities, seeking innovation and change, controlling costs that could successfully bring varieties to the market quickly to breed a plant with plenty of Chi (internal energy life force). The colorful world is full of colorful flowers, and subtle fragrances from the sunshine. Everyone who sees it can enjoy it!

Located closely to the geographical center of Asia, the potential of Taiwan's ornamental plants research likewise has the magic of its orchids miracle that could leap to the world in fashion!