

Industry note: Current status and prospect of floriculture industry in Taiwan

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1 Introduction

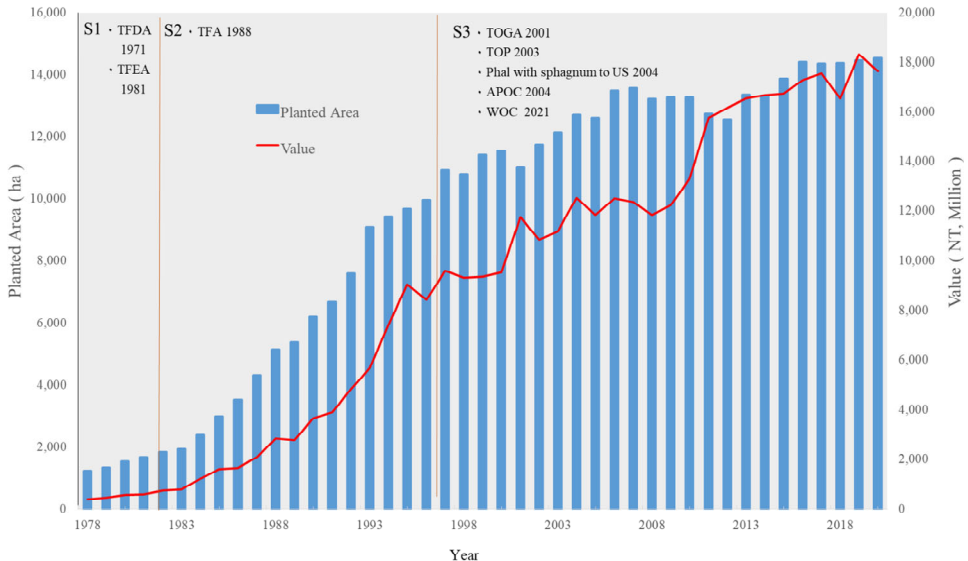
The subtropical climate of Taiwan is considered an ideal country for flower growth. However, the floriculture industry did not well-developed in Taiwan before 1970s. The 234 hectares of flower plantation area in 1971 generated a value of NT\$53 million in Taiwan (Fang et al., 2012). After decades of hard work, Taiwan's floriculture area is around 15,000 hectares, with an annual value of NT\$16.5 billion (US\$562 million) in recent years. In which, export takes NT\$6.6 billion. It occupied almost 40% of the total value. The main export items are *Phalaenopsis*, *Oncidium*, *Anthurium*, *Eustoma*, *Cymbidium* and *Pachira*. The main exported destinations are USA (39%), Japan (33%), Vietnam (11%) and the Netherlands (8%). However, the production scale was relatively small in Taiwan than in other countries. Moreover, the exportation destination has long been mainly dependent on the Japanese market. Once changes occurs in supply and demand in the international market, caused by factors such as the economic downturn in Japan, the rapid rise of floriculture in Southeast Asia and China, have forced Taiwan adopting seasonal adjustments in production and market expansion (Fang et al., 2012; Taiwan Orchid Growers Association, 2015). Moreover, the global markets and industries hit severely by COVID-19 pandemic since 2020, resulting in changes in global activities, consumption habits, logistics, and sales channels, the floriculture as well as other industries should bound to face a new wave of challenges.

2 The emerging stage (before 1981)

In early stage of flowers cultivation in Taiwan were mostly for amateur appreciation. It begins in 1895, the state started to setup plant nurseries in Taipei to introduce germplasm, research and breed on flowers which promoted development of floriculture industries. However, it was stagnated and reduced due to World War II. In late 1960s, cut flowers of

roses and chrysanthemum produced in Taiwan began to be exported to Hong Kong, since then, the scale continued to expand (Fang et al., 2012).

Figure 1 The planted area, output value of flower crops and important industry events in Taiwan at the emerging stage (S1), the rapid development stage (S2) and the stable development stage (S3) (see online version for colours)



Notes: TFDA 1971, TFEA 1981, TFA 1988, TOGA 2001, TOP 2003: Taiwan Floriculture Development Association, Taiwan Flower Export Association, Taipei Flowers Auction Co., Ltd., Taiwan Orchid Growers Association, Taiwan Orchid Plantation were established in 1971, 1981, 1988, 2001, 2003. Phalaenopsis with sphagnum exporting to US 2004: Phalaenopsis with sphagnum was allowed to export to the US in 2004. APOC 2004, WOC 2021: Taiwan hosted 8th Asia Pacific Orchid Conference and 23rd World of Conference in 2004 and 2021 respectively for the first time.

Together with the development of floriculture, Taiwan Floriculture Development Association (TFDA) was established in 1971 (Figure 1) (Fang et al., 2012). The planted area and output value for flower crops was 234 hectares and more than NT\$53 million respectively in the same year according to investigation by TFDA. It also helped open the channel of exporting cut flowers, such as rose and chrysanthemum, to Japan by air transport. In 1975, Taiwan Government drew up a project to accelerate the development of floriculture industry, including chrysanthemum, rose, gladiolus, annuals, biennials, perennials, woody and bulbous flowers (Fang et al., 2012). It laid the foundation for the vigorous development of the floriculture industry in the future. Thanks to the take-off of the domestic economy, the flower consumption was also increasing sharply. Since then floriculture industry has entered a period of rapid growth. In response to industry needs, the 'Taiwan Flower Export Association' (TFEA) established in 1981 mainly responsible for guiding the expansion of domestic flower exports (Fang et al., 2012). Since then, we have obtained first-hand information on the export business of domestic flower crops and the latest developments information of foreign flower industry.

3 The rapid development stage (1982~1996)

In the 1980s, domestic private *Phalaenopsis* industry began to be noticed by agricultural community. The team from National Taiwan University conducted various studies on *Phalaenopsis* and promoted the development of industry. At that time, Taiwan Sugar Company began to transform to grow *Phalaenopsis*, collect various varieties for breeding and introduce the venlo-type greenhouse from Netherlands. After research, the auto-controlled greenhouse was designed for Taiwan's climate. Moreover, the model for seedling relay cultivation and sphagnum as the medium was established, therefore, *Phalaenopsis* had gradually shifted from amateur appreciation to corporate management and some orchid growers had gradually turned to start the international trade.

'Cut flower refrigerated container shipping transportation technology' was developed by Taiwan Agricultural Research Institute (TARI) in 1983. It is a useful and efficient option to expand the amount of cut flower for export, especially to Japan. In 1985, Taiwan Government promulgated quality agriculture policy. It encouraged technology-intensive and potential flowers under facility cultivation, introducing a lot of new varieties for cut flower or pot flower, setting up modern nurseries, holding flowers exhibitions and promotional events in order to attract investments. In addition, Taipei Flowers Auction Co., Ltd. (TFA) was founded in 1988 to offer a platform for farmers to do joint marketing for flowers. It began to use computer-controlled auction clocks for cut flower transactions establishing an open and fair system for floriculture trading, which pushed floriculture industry step toward a new milestone (Fang et al., 2012). On the other hand, high-quality and more expensive flowers were accepted by consumers due to rapid growth of domestic economy. It enables domestic floriculture industry continued to grow.

In the 1990s, international trade tended to be liberalised. The growth rate of the flower export had slowed down due to the fierce competition from Southeast Asia, Netherlands, New Zealand, and USA. In order to develop the channels for flower production and sales, promote auction automation, and attain the purposes of logistics, industry automation, and information transparency, flower wholesale markets were established successively in main production area from 1994 to 1996. Since then, more than 80% of domestic cut flowers were sold through the wholesale market. In addition, Taiwan Government drafted agricultural construction program in 1995 aims to enhance competitiveness and reduce production costs (Fang et al., 2012). It designated floriculture as key developing industry. The main measures of the program included encouraging protective facility cultivation, integrating production and marketing groups, promoting automatic and mechanised management.

4 The stable development stage (1997~2021)

The planted area of flower crops increased to more than 10,000 hectares in 1997 (Fang et al., 2012). At the stage, orchids gradually emerged into the international market and *Phalaenopsis* became an exported product with mass production. An association that could unite growers was required to be organised and a fair and equitable system for reviewing varieties (Lai, 2016). Therefore, TOGA (2015) was organised by growers and established in Taiwan Orchid Plantation (TOP), the biggest orchid cultivation cluster. TOGA published orchid periodical on production and marketing, promoted orchid

expertise, held seminars and orchid shows or went abroad for exhibitions in order to assist growers to improve professional knowledge and develop the market. In order to accelerate upgrading of industry, TOP was set on Tainan County in 2003 that can provide growers with quick access to land and loans for building production bases, further exert the clustering effect of *Phalaenopsis* industry. Moreover, *Phalaenopsis* with growth media, sphagnum, was allowed to export to USA in 2004 due to a breakthrough in quarantine technology. Since then, *Phalaenopsis* had flourished and become the major item for exportation. In the same year, Taiwan hosted ‘8th Asia Pacific Orchid Conference, APOC8’ for the first time. Taiwan received many international orders from and stood firmer as an important supplier of *Phalaenopsis* for global market.

Taiwan International Orchid Show had been held every year since 2005. The show was listed as the top three orchid shows along with the Tokyo Orchid Show and World Orchid Conference in the world (Fang et al., 2012). Now, almost all partners connected to orchid and orchid lovers around the world earnestly waiting for the most important event of the world orchid industry that is held in March annually in Taiwan. So far, Taiwan orchids had been sold to 86 countries. Breeding capability is one of the key factors enable the continuous growth of Taiwan’s orchid industry. The Taiwan Government consulted with Japan and European Union for agreed Taiwan orchid to apply for Plant Breeders' Rights continuously, and the variety rights protection spread to 27 members of the European Union. It created a new page for us to apply for variety rights overseas. *Oncidium* with growth media, sphagnum, was also allowed to export to the US in 2016, thus Taiwan became the first country in the world to export *Oncidium* pot-flower with medium to the USA. In the past twenty years, Taiwan has become the largest supplier on cut flowers of *Phalaenopsis*, *Oncidium*, *Anthurium* and *Eustoma* in Japan.

Figure 2 Virtual 23rd World Orchid of Conference held in Taiwan in 2021 (see online version for colours)



Note: The figure is provided by TOGA.

COVID-19 pandemic was discovered in the beginning of 2020 and spread fast across the world. Many activities had been cancelled and cities were in lock down in many countries. As a result, flowers used in festivals and businesses had also been greatly reduced which lead to the severe impact of global floral trade. The export volume went down in April 2020 from 2,518 tons to 1,219 tons, with the export value decreased to NT\$130 million compare to the same month in 2019 (Floral Daily, 2020) (<https://www.floraldaily.com/article/9242450/impact-of-covid-19-on-the-taiwanese-floriculture-industry/>). After outbreak of the epidemic, auction market for traditional cut flower trade gradually declined, however, the pace of e-commerce would be accelerated. For younger generation, physical stores were no longer the major channels for purchasing flowers. Due to the rapid growth of online shopping and logistics, air and sea transportation have increased significantly, and global trade and transportation have been severely hampered. For avoiding spread of the epidemic, 23rd World Orchid of Conference (WOC) held in Taiwan in 2021 that also took an online conference for the first time (Figure 2). This is the first time ever that people from all over the world can participate in online conferences and exhibitions.

Flower is not main necessity during the period COVID-19 pandemic. However, many people income depend on the industry. Taiwan Government has adopted several measures to maintain the supply chain, from flower growing to its usage. The measures focusing on four major aspects are to purchase flowers for decoration use in public space, develop various channels which are closer to consumer's daily life, promote new ideas for flower consumption, stimulate regularly purchasing flower.

The above measures are still ongoing. Taiwan will continuous propose various bailouts and revitalisation measures in time. Hoping that, we can see the end of the pandemic as soon as possible.

5 Conclusions and future prospects

The rise and development of Taiwan floriculture industry came from a closely and fully cooperation between the associations and the private sector that leading to a stable development process. In particular, Taiwan become an important country to export orchids to global market. Due to the hit of pandemic, global flower consumption has the trend to online shopping. Flowers for business use gradually change into personal use. It is worth rethinking that how to provide a final product can fit e-commerce development and match the logistics system (Chuang, 2020). In terms of domestic sales, in addition to strengthening internet promotion through various media, it is also necessary to communicate closely with the floral industry on floral design, and provide a diversified selection for consumers instead of the primary agricultural products. For long-term development, flowers have both functions of beautifying the environment and healing. Floral aesthetics and floral designing courses for school education maybe become an efficient way to teach children love flowers. Let us keep boosting floriculture become a part of our life and create the mind since childhood, as the future consumers.

Nowadays, artificial intelligence, big data and IoT have become useful tools to integrate floriculture information, physiological research and post-harvest treatment. Facing the challenges from the global consumption and transportation limitation, Taiwan's floriculture industry should find high value-add products, strengthen the plant

breeder right protection, and maintain the international competitive for the new stage of post-COVID era.

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