On the First Step of Tropical Tulip Breeding in Hot and Humid country as Thailand

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Abstract

In the past, no one believed that Thailand has ability to produce tulip bulbs because there was no cold winter and long chilling period. In fact, tulip were planted in Thailand for more than twenty years. Some of Thai companies planted tulip to show their beautiful flowers for tourist attraction in northern region of Thailand. But there were very few researchers thought about breeding program for entire life cycle of tulip in Thailand. Recently, a Thai pioneer researcher studied his tulip experiments for more than ten years. Although there were hundreds of tulip varieties had been planted in Thailand but there were only 5-6 varieties able to produce bulbs in Thailand such as 'Strong gold', 'Negrita', 'Ile de France', 'Golden parade' and 'Strong love'.

In 2017-2018 season, four varieties of tulip; 'Strong gold', 'Negrita', 'Ile de France' and 'Golden parade' were planted at Queen Sirikit Botanical Garden, Chiang Mai and Doi Phamon High Land Extension and Development Centre, Chiang Rai, Thailand. Only tulip varieties which grew at Chiang Rai station able to produce tulip bulbs in percentage of 34.13, 20.17, 10.30 and 15.83 respectively. This is the first endeavour to produce tulip bulbs in Thailand report. In 2018-2019 season, five tulip varieties; 'Strong gold', 'Negrita', 'Ile de France', 'Golden parade' and 'Strong love', were planted in 3 stations; Doi Phamon High Land Extension and Development Centre, Chiang Rai, Phufa Development Centre, Nan and Tak Horticulture Research Centre, Tak, Thailand. In Chiang Rai station, tulip bulbs which were ordered from Netherland and former year collected tulip bulbs were both flowers and produced tulip bulbs. Notice that tulip bulbs which were collected from former year produced their bulbs significantly higher than the new ordered. In Nan and Tak station, all five varieties produced flowers less than Chiang Rai station caused by late planting and became hot weather. However, except of 'Strong love', all varieties in Tak station produced tulip bulbs in percentage of 18.54, 56.14, 12.00 and 3.31 respectively while all tulip varieties planted in Nan station failed to produce bulbs. Although there were only 5-6 varieties which able to produce bulbs in Thailand, their bulbs were selected as parent tropical tulip lines for breeding program in the future. Conventional breeding was suitable to be done parallel with mutation breeding. Until we success to change tulip to tropical varieties as Thai ancestors have been done in rose, chrysanthemum, etc. in history.

Keyword: tulip, tropical, bulb, breeding

First endeavour to produce Tulip bulbs in Thailand

1. Selection of tulip varieties which able to flower in Thailand.

Table1 Tulip characteristics at Doi Pha Mon Highland Agricultural Extension Center, Chiang Rai, Thailand in 2017-2018 season

Variety	Color	Days from planting to flowering	Plant height (cm)	Flower size (cm)	Flower period (day)	Root and rot disease resistance	Fungal on flower disease resistance
Strong gold	yellow	30	50-55	7.0x12.5	10	good	good
Negrita	purple-blue	28	35-40	7.0x12.0	12	adequate	good
Ile de France	red	32	35-40	5.0x9.0	9	adequate	susceptible
Golden parade	yellow	30	40-45	8.0x14.0	14	susceptible	susceptible

2. Selection of tulip varieties which able to produce bulbs.

Table2 Tulip bulbs products at Doi Pha Mon Highland Agricultural Extension Center, Chiang Rai in 2018-2019 season.

Variety	Number of Tulip plants (New ordered)	Percentage of bulbs produced (%)	Number of Tulip plants (Former year)	Percentage of bulbs produced (%)
Strong gold	2,000	35.00	1000	79.80
Negrita	2,000	22.50	600	70.17
Ile de France	2,000	10.25	300	67.67
Golden parade	2,000	13.50	400	53.75
Strong love	2,000	9.85	-	-

Table3 Tulip bulbs products at the three experimental station in Thailand in 2018-2019 season.

	Chiang Rai		Nan		Tak	
Variety	Number of Tulip plants	Percentage of bulbs produced (%)	Number of Tulip plants	Percentage of bulbs produced (%)	Number of Tulip plants	Percentage of bulbs produced (%)
Strong gold	2,000	35.00	1,185	0	151	18.54
Negrita	2,000	22.50	1,485	0.81	57	56.14
Ile de France	2,000	10.25	1,065	0	175	12.00
Golden parade	2,000	13.50	1,500	1.67	121	3.31
Strong love	2,000	9.85	1,485	0	58	0

All of the tulip bulbs that were collected has been stored in the refrigerator at 8-12 °C for 4-6 months in dark condition at the Thailand Institute of Nuclear Technology to stimulate the flower bud to be used in the growing season next year.

Fig.1 Tulip field at Doi Phamon high land extension centre, Thailand

Fig.2 'Strong gold' (A), 'Negrita' (B), 'Ile de France' (C) and 'Golden parade' (D)

Fig.3 First Tulip bulbs produced in Thailand

Conclusion

The two or three success agricultural station would become to base for breeding program. Although there were only a few varieties which able to produce bulbs in Thailand, but their bulbs were selected as parent Thailand tulip lines for breeding program in the future. Conventional breeding was suitable to be done parallel with mutation breeding. Because genetic germplasm of tulip which able to produce bulbs in Thailand was indeed narrow, mutation induction by gamma irradiation may increase genetic variation for tropical tulip breeding program. Thailand has no suitable cool atmosphere to produce tulip seed by conventional breeding, therefore, mutation breeding was first selected. After we have enough heat tolerance lines, crossing between parent lines will be done in cool greenhouse of our co-partner; PTT company ltd. Tropical tulip is now on pregnant and will born soon.

A long journey of thousand miles begins with a single step, a long journey of tropical tulip begins with this report too.