

FOUR SECTIONS:

- INTRODUCTION
- MATERIALS AND METHODS
- RESULTS AND DISCUSSIONS
- CONCLUSION

INTRODUCTION

- Lychee (*Lichi chinensis* Sonn.) is an important subtropical fruit in the world with:
- + High nutritional and economic value;
- + Sedative to treat headache and insomnia.
- In Vietnam, lychee cultivated areas in 2012: 88,900ha with total production: 428,000tons, but:
- + Almost area are grown common varieties, harvesting time taken place about in 30 days in June,
- + Harvesting, storage and distribution face difficulties high postharvest losses, low price and low economic efficiency.

INTRODUCTION (continous)

- In 2005 2012 period, FAVRI has focused on investigation and selection of early lychee varieties with the aim:
- + Investigate and select of early maturing, high yield and good quality lychee varieties
- + Prolong the harvesting time, facilitating harvesting, processing, storage, distribution and improving economic efficiency for producers.

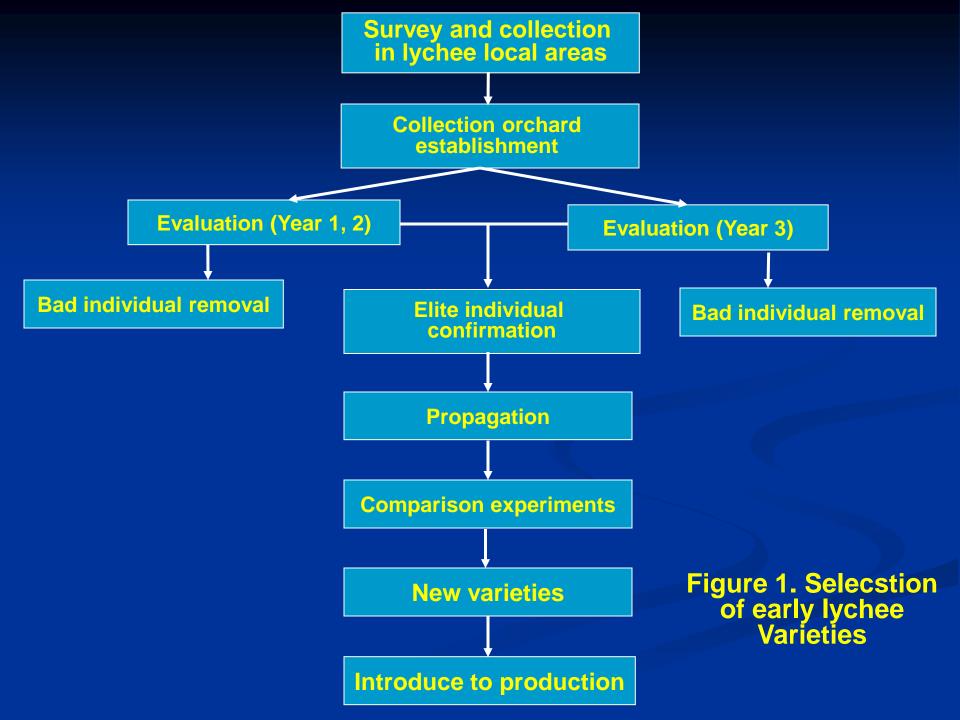
MATERIALS AND METHODS

- Materials

- + Lychee collections grown in local areas.
- + Lychee collections grown at the Fruit and Vegetable Research Institute

- Methods

- + Selection early lychee varieties from 8 major lychee producing provinces in Northern Vietnam as: Ha Tay, Ha Nam, Hai Duong, Phu Tho, Quang Ninh, Hoa Binh, Bac Giang and Hung Yen.
- + Characterization of the varieties according to the cited materials by IPGRI.
- + Evaluation and selection of elite trees, propagation and comparison.
- + The experiments was sequentially design on the orchards with the 8years-old trees in the same conditions to determine growth, development and economic eficiency.



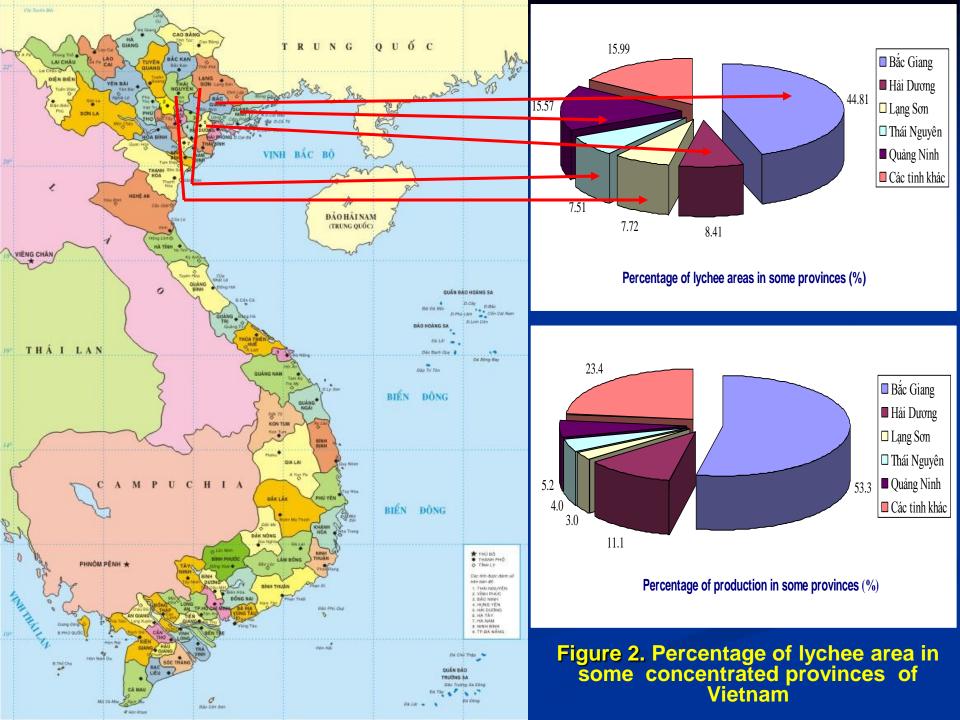
RESULTS AND DISCUSSION

Current situation of lychee cultivation in Vietnam

Table 1. Lychee cultivation in some major provinces in 2011

Region	Area (ha)	Percentage (%)	Harvested area (ha)	Yield (ton/ha)	Production (ton)
Bac Giang	39,835	44.81	39,238	5,8 2	228,558
Hai Duong	14,219	8.41	12,634	3,77	47,632
Lang Son	7,473	7.72	5,501	2,31	12,684
Thai Nguyen	6,861	7.51	4,692	3,67	17,219
Quang Ninh	6,700	15.57	4,981	4,51	22,465
Other provinces	13,812	15.99	12,410	4,13	100,342
Whole country	88,900	100.00	77,500	5,53	428,000

Source: GSO - 2011



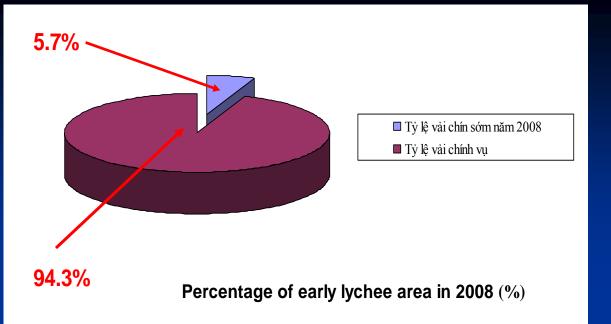
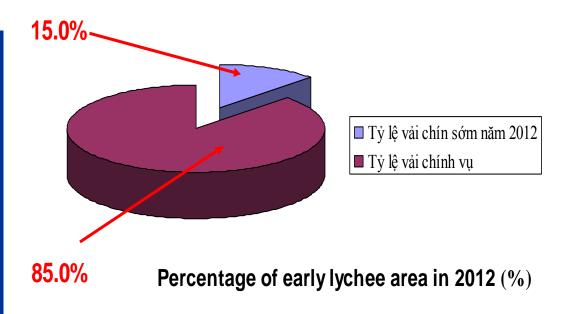


Figure 3. Percentage of early lychee area in Vietnam in 2008 and 2012



Results of eary lychee variety survey

Table 2. List of early lychee varieties in Vietnam

тт	Survey loctaion (Province)	Number of surveyed trees	Number of collected varieites	Name of variety
1	Ha Tay	1,050	15	Banh Troi, Duong Phen, Dua, Luc, Vang Anh, Canh Tra, Long Vang, Hoang Bao, Lai Dong Quang, Ot, Bau Đat, Mit Dai, Ong Thieu, Sung, Nho Noi.
2	Ha Nam	5,489	5	Do Le, Bop, Chin Trang, Nghe, Thach Binh.
3	Hai Duong	6,500	1	Lai Thanh Ha.
4	Phu Tho	4,200	1	Hung Long.
5	Quang Ninh	32,600	2	Yen Hung, Binh Khe
6	Hoa Binh	315	2	Lai Luong Son, Lai Lien Son
7	Bac Giang	10,300	1	Phuc Hoa.
8	Hung Yen	350	1	Yen Phu.
	Total	60,804	28	

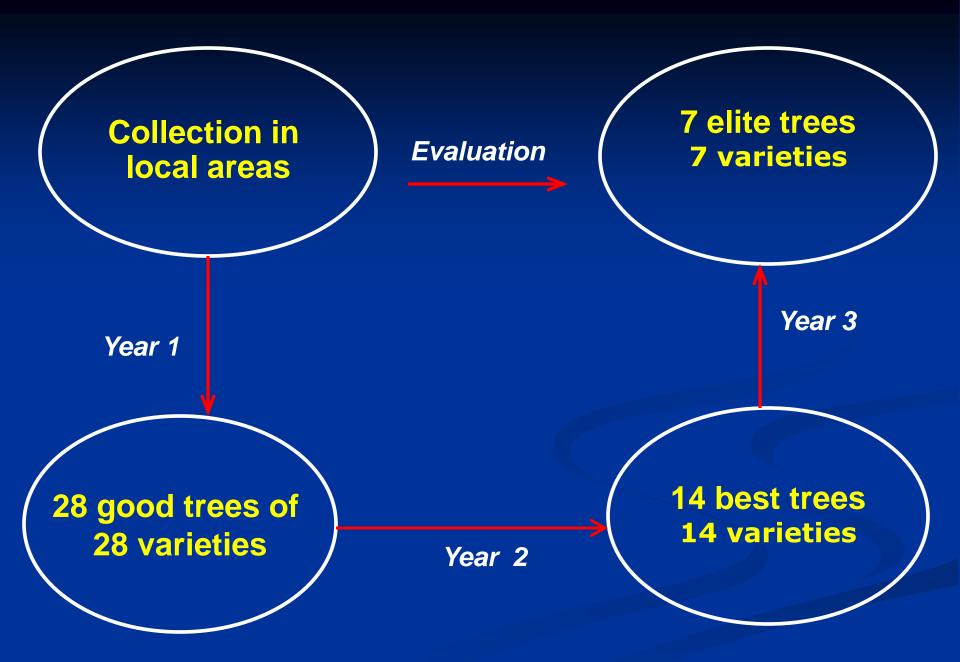


Figure 4. Result of early lychee variety evaluation

Results of elite tree evaluation of early lychee varieties

Table 3. Characteristics of 14 best trees of 14 selected varieties

No	Varieties	Tree code	Tree ages (Year)	Average yield of 3 years (kg/tree)	Fruit weight (g)	Flesh proportion (%)	Brix (%)	Harvesting time
1	Lai Luong Son	VLS.11	45	37.50	24.70	62.20	15.20	15/5-20/5
2	Lai Lien Son	VLS.16	40	65.50	17.40	56.40	14.60	15/5-20/5
3	Banh Troi	VHT.06	95	98.50	21.40	42.80	13.70	20/4-01/5
4	Duong Phen	VNT.05	105	104.30	23.60	65.40	15.80	20/4-01/5
5	Luc	VHT.07	95	95.50	21.30	38.90	14.50	20/4-01/5
6	Vang Anh	VHT.08	95	86.40	22.80	46.20	14.20	20/4-01/5
7	Do Le	VHN.12	95	90.50	24.50	43.90	14.70	30/4-05/5
8	Thach Binh	VPH.31	28	82.30	24.50	70.50	16.50	15/5-20/5
9	Hung Long	VPH.10	28	99.70	23.50	73.00	17.40	15/5-20/5
10	Lai Thanh Ha	VLTH.17	14	54.70	24.20	70.40	17.20	15/5-20/5
11	Yen Phu	VYP.15	45	85.60	27.20	74.50	18.60	10/5-15/5
12	Phuc Hoa	VPH.40	50	89.80	23.10	71.90	17.50	15/5-20/5
13	Yen Hung	VQN.09	19	62.10	30.10	73.20	17.80	15/5-20/5
14	Binh Khe	VBK.25	32	94.20	33.50	71.50	17.50	05/5-10/5

Table 4. Characteristics of 7 elite trees of 7 selected varieties

No	Varieties	Tree code	Tree age (Year)	Average yield of 3 years (kg/tree)	Fruit weight (g)	Flesh proportion (%)	Brix (%)	Harvesting time
1	Duong Phen	VHT.05	105	104.30	23.60	65.40	15.80	20/4-01/5
2	Thach Binh	VPH.31	28	82.30	24.50	70.50	16.50	15/5-20/5
3	Hung Long	VPH.10	28	99.70	23.50	73.10	17.40	15/5-20/5
4	Yen Phu	VYP.15	45	85.60	27.20	74.50	18.60	10/5-15/5
5	Phuc Hoa	VPH.40	50	89.80	23.10	71.90	17.50	15/5-20/5
6	Yen Hung	VQN.09	19	62.10	30.10	73.20	17.80	15/5-20/5
7	Binh Khe	VBK.25	32	94.20	33.50	71.50	17.50	05/5-10/5

Evaluation results of agronomic characteristics **Growth potential**

Table 5. Growth of early lychee varieties

No	Varieties	Tree height (mm)	Canopy diameter (mm)
1	Binh Khe	2,058	3,095
2	Duong Phen	1,833	2,348
3	Thach Binh	2,012	2,424
4	Yen Hung	2,193	2,762
5	Yen Phu	2,014	2,241
6	Phuc Hoa	2,121	2,642
7	Hung Long	2,093	2,772
8	Thieu Thanh Ha	1,615	1,724

Flowering

Table 6. Flowering of early lychee varieties

No	Varieties	Total number of flowers/	Male f	lowers	Female and hermaphrodite flowers		
	cluster (flowers)	No of flowers	Percentage (%)	No of flowers	Percentage (%)		
1	Binh Khe	3,758.4	3,255.3	86.61	503.10	13.39	
2	Duong Phen	2,196.4	2,026.8	92.28	169.60	7.72	
3	Thach Binh	2,186.4	2,044.1	93.50	142.30	6.50	
4	Yen Hung	2,719.0	2,381.3	87.58	337.70	12.42	
5	Yen Phu	1,688.7	1,369.1	81.10	319.60	18.90	
6	Phuc Hoa	2,025.6	1,798.7	89.00	226.90	11.20	
7	Hung Long	2,832.5	2,593.8	91.57	238.70	8.43	
8	T.Thanh Ha	1,057.5	940.60	82.23	116.90	11.10	

Fruit setting

Table 7. Fruit setting ability of early lychee varieties

No	Varieties	Total number of Flowers/cluster (flowers)	Number of set fruit (fruits/cluster)	Fruit setting percentage (%)
1	Binh Khe	3,758.4	6.30	0.17
2	Duong Phen	2,196.4	5.80	0.26
3	Thach Binh	2,186.4	5.20	0.24
4	Yen Hung	2,719.0	7.20	0.26
5	Yen Phu	1,688.7	8.40	0.49
6	Phuc Hoa	2,025.6	6.30	0.31
7	Hung Long	2,832.5	6.20	0.21
8	Thieu Thanh Ha	1,057.5	5.20	0.50

Yield

Table 8. Yield and yield components of early lychee varieties

No	Variety	No of Flower clusters /tree	No of fruits/cluster	Fruit weight (g)	Theoretical yield (kg/tree)	Actual yield (kg/tree)	Harvesting time
1	Binh Khe	165.40°	6.30 ^a	33.50 ^d	34.86°	25.91 ^b	5/5-10/5
2	Duong Phen	144.70 ^b	5.80a	23.61a	19.81 ^a	16.20a	20/4-5/5
3	Thach Binh	138.50 ^a	5.20a	24.50a	17.64 ^a	14.33 ^a	15/5-20/5
4	Yen Hung	126.00 ^a	7.20 ^b	30.10 ^c	27.31 ^b	24.40 ^b	15/5-20/5
5	Yen Phu	129.10 ^a	8.40 ^c	27.20 ^b	29.50 ^{bc}	22.32 ^b	10/5-15/5
6	Phuc Hoa	141.20 ^b	6.30a	23.08a	20.53 ^a	17.60a	15/5-20/5
7	Hung Long	135.60 ^a	6.20a	23.47a	19.73 ^a	17.23 ^a	15/5-20/5
8	T. Thanh Ha	127.20 ^a	5.30 ^a	20.70 ^a	13.95 ^a	11.50 ^a	5/6-20/6
	CV(%)	5.70	11.30	6.10	13.80	11.70	

Quality

Table 9. Fruit quality indicator of early lychee varieties

No	Name of variety	TSS (%)	Total acidity (%)	Vitamin C (mg%)	Dry matter (%)
1	Binh Khe	16.50	0.31	26.30	17.30
2	Duong Phen	12.30	0.38	29.80	14.90
3	Thach Binh	13.10	0.26	18.40	15.80
4	Yen Hung	15.20	0.37	21.30	16.70
5	Yen Phu	16.70	0.28	29.70	17.20
6	Phuc Hoa	13.80	0.22	15.80	16.10
7	Hung Long	13.20	0.30	17.20	16.80
8	Thieu Thanh Ha	16.90	0.26	27.10	18.50

Economic efficiency

Table 10. Economic efficiency of some lychee varieties

Varieties	Tree age	Yield (kg/tree)	Unit price (1.000d/kg)	Amount (1000d/ha)	Total expenditure (1.000đ/ha)	Net return (1,000d/ha)
Binh Khe	8	23.91	12.00	79,763	18,000	61,763
Đuong Phen	8	16.20	8.00	36,028	15,000	21,028
Thach Binh	8	14.33	8.00	31,869	15,000	16,869
Yen Hung	8	24.40	8.00	54,265	15,000	39,265
Yen Phu	8	22.32	12.00	74,459	18,000	56,459
Phuc Hoa	8	17.60	8.00	39,142	15,000	23,142
Hung Long	8	17.23	8.00	38,319	15,000	24,319
T. Thanh Hà	8	11.50	6.00	19,182	10,000	9,182

Based on growth, yield, quality and economic efficiency of 7 selected early lychee varieties. We have selected four promising varieties including: Hung Long, Binh Khe, Yen Hung and Yen Phu to recommend for large scale production.

These varieties have been introduced to production and the proportion of cultivating area under early lychee varieties in the North had increased from 5.7% in 2008 to 15.0% in 2012.

CONCLUSION

Early lychee variety collection in Northern Vietnam is very abundant, highy diverse. The investigation has collected 28 early lychee varieties in key lychee growing areas of Vietnam. This is an important material source for storage, evaluation and breeding activities.

Four early lychee varieties including Binh Khe, Yen Hung, Yen Phu and Hung Long were evaluated and selected to introduce to production. These varieties have good growth potential, high yield, good quality and harvested at 15 - 30 days earlier than the main varieties.

The cultivating area of early lychee varieties has increased up to 15% in 2012 compared to 5.7% in 2008, bringing higher economic benefits to growers.

Binh Khe Variety







Yen Hung Variety







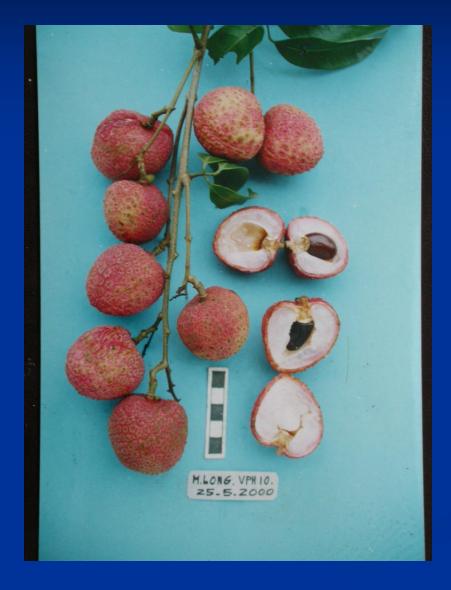
Yen Phu Variery







Hung Long Variety







Phuc Hoa Variety





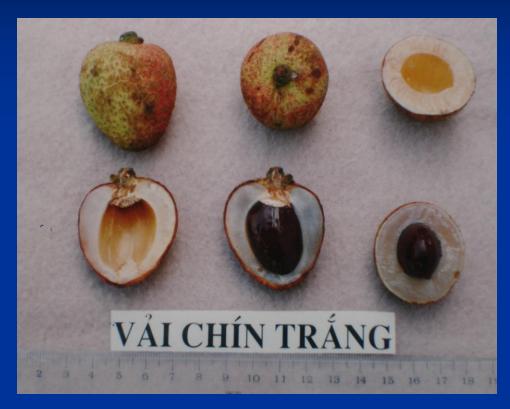








Thach Binh Variety





Chin Trang Varirty

Duong Phen Variety



Hoa Hong Variety



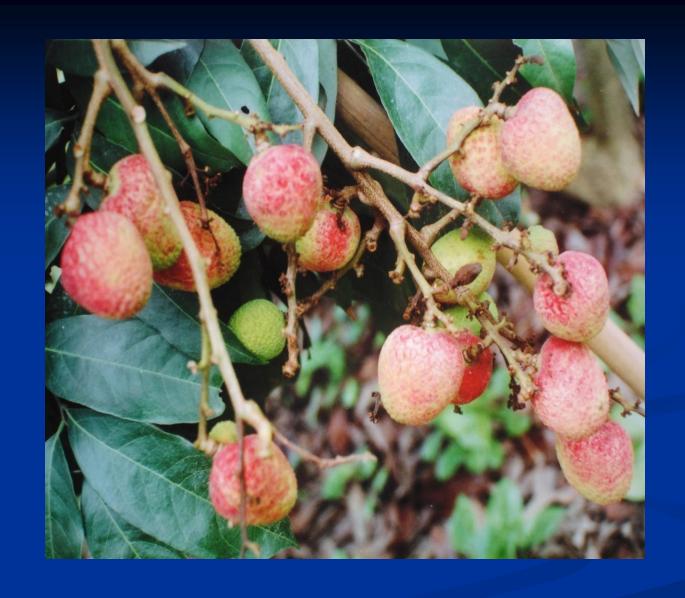
Luc Variety



Thuy Xuyen Variety



Hoang Bao Variety



Banh Troi Variety



Dua Variety



Chin Trang Variety

Thieu Thanh Ha Variety









The concentrated mainly lychee area in Bac Giang province





The concentrated early lychee area in Quang Ninh province

In 2008 - 2012 period, FAVRI has applied two methods for introducing early lychee varieties to production:

- Propagation of new planting material in nursery
- Top working technique to replace old variety

At present, early lychee varieties cultivating area has been increased rapidly in the North of Vietnam, bringing high economic profit to producers.



Propagation of new planting material in nursery



Top working technique to replace old variety



Top working technique to replace old varieties



New variety after top working



Fruit bearing after top working

