〈 Summary 〉

Purpose& Contents	- Development of control technology of lipid material from apple skin by pre-harvesting treatment. - Evaluate effect of 1-MCP and polyethylene(PE) film packaging on fruit quality during cold storage and distribution process. - Identification of causal agents which cause abnormal symptoms on apple. - Development of guideline for diagnosis of unknown disease or symptoms on apple cultivated in Korea. - Development of novel pesticide spray program for management of major apple diseases and effective control of multiple pesticide resistant fungi. - The objective of this study was to determine the optimal crop load for obtaining middle size apples suitable for export, good fruit quality and moderate vegetative growth, without producing biennial bearing, in the 'Gamhong' and 'Hongro' apple cultivars bred in korea. - To enhance competitiveness of Korean apple 'Hongro' and 'Gamhong' for FTA, survey and analyses were conducted on status of production by fruit size and marketing, shipping price, farmer preference on the fruit size and production problems. And analysis was done on farms producing the small to medium size fruit and their success factors. - Developing and practicing technology to improve coloration and physiological disability suitable for small and medium export of 'Hongro' and 'Gamhong' apple varieties to FTA.
Results	- Ratio of Ursolic acid in the Triterpenoid series was the most abundant and is higher as the total amount of lipid is higher. Pre-harvesting treatment of AVG, 1-MCP inhibits the generation of endogenous ethylene and flesh epidermal lipid during storage at room temperature(about 30 days). - Classification of fruit size of 'Hongo' and 'Gamhong' apple for export. - Development of inhibition of weight loss and the effect of ethylene regulators for apple fruit quality. - Effect of ethylene regulators on fruit quality on Apple Mock Distribution for export. - Apple diseases occurred on 'Hongro' and 'Gamhong' cultivar cultivated in Korea was investigated. - Causal agents of abnormal symptoms occurred on apple fruit was identified as *Alternaria* sp., *Fusarium decemcellulare and Fusarium tricinctum.* - Guideline for diagnosis of apple diseases was developed. - For both 'Hongro' and 'Gamhong' cultivar, the production of non-commercial and small-sized fruit increased as the crop load increased and 40% greater than normal fruiting was observed biennial bearing. Research suggests that the maximum limit of crop load for production of middle sized fruit is 20% greater treatment than normal fruiting. - For the production of small to medium size fruits in 'Hongro' and 'Gamhong', fruit set rates were managed 30% higher than the conventional production. And there was no negative effect on tree vigor and fruiting for 3 years while the yield increased by 10%. - Success factor in small to medium fruit producing farms in 'Hongro' was direct marketing through internet sales and local festivals. - Average income/tree in the conventional large fruit was 12,257 Won for 3-years, which was higher than the income of 8,371 Won in small to medium fruit production of 'Hongro'. Income decrease was the reason avoiding small to medium fruit production. - Development of calcium agent for suitable in 'Hongo' and 'Gamhong' apple varieties. - Development of cultivation method for fruit coloring in 'Hongro' varieties. - Development of spray timing and appropriate concentration in GH-Ca calcium agent. Development of technology to reduce the occurrence of water core in 'Hongro' and bitter pit 'Gamhong' variety.
Expected Contribution	- Development of technology to prevent production lipid materials by pre-harvesting treatment in apple pericarp. - Improvement of shelf life due to decrease of lipid substances in 'Hongro'. - Securing export competitiveness on classification of fruit size and improving shelf life in 'Hongo' and 'Gamhong' apples for export. - Improvement of pesticide spray program using disease diagnosis result and identification of causal agent of abnormal symptoms on 'Hongro' and 'Gamhong' apple cultivars. - Increase of apple productivity by development of pesticide spray program which can control multiple pesticide resistance fungi effectively. - It may be used as a cultivation method for the production of middle size apples of 'Gamhong' and 'Hongro' apple for export. - Farm income increase and enhancing competitiveness by production of small to medium fruit in 'Honhro' apple(for policy recommendation). - Prevention of bitter pit in 'Gamhong' apple(practical farming technique). - Application of technology to reduce physiological disorders of 'Hongro' and 'Gam Hong' in apple grower. - Stable production of 'Hongo' and 'Gamhong' apples which are the best varieties of domestic cultivation and creation of high value-added products. - Increase apple grower income due to small and medium export

Keywords	apple	Hongro	Gamhong	export	fruit grading system