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Mechanisms of Patent Licensing for Varietal Innovation

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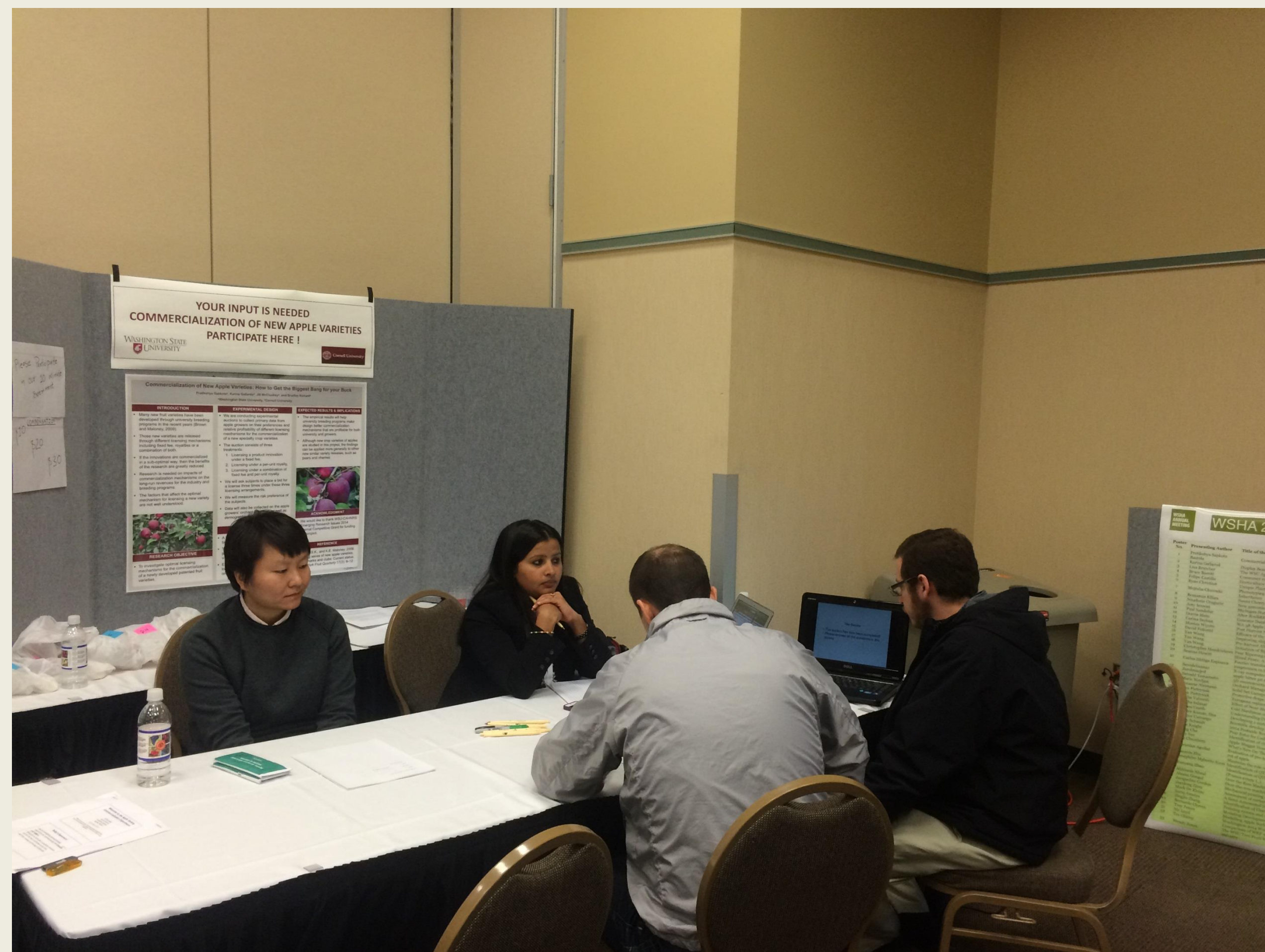
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INTRODUCTION

- Numerous new fruit varieties have been developed through university breeding programs in the recent years (Brown and Maloney, 2009).
- Universities such as Washington State University, University of Minnesota, Michigan State University, and Cornell University have employed different licensing schemes that include fixed fee, royalties, or a combination of both under exclusive and non-exclusive contracts to release these new patented varieties to growers.
- If the innovations are commercialized in a sub-optimal way, then the benefits of the research are greatly reduced (Richards and Rickard, 2014).
- Most of the previous research on optimal licensing design is theoretical and focused on cost-reducing innovation (process innovation).
- Research is needed to assess how commercialization mechanisms impact the long-run revenues for the industry and breeding programs.
- The factors that affect the optimal mechanism for licensing a new variety are not well understood.



RESEARCH OBJECTIVES

- To investigate optimal licensing mechanisms for the commercialization of a newly developed patented fruit varieties.
- To determine the factors affecting optimal mechanism for licensing a new variety.

ACKNOWLEDGMENT

- We would like to thank WSU-CAHNRS Emerging Research Issues 2014 Internal Competitive Grant for funding this project.

EXPERIMENTAL DESIGN

- We conducted an experimental auction during the Annual Washington State Horticultural Association's Meeting (2014).
- The subjects in this experiment were decision makers/owners of apple farms in Washington State.
- The auction consisted of three licensing arrangements, each with exclusive and non-exclusive contracts with a total of six treatments.
 - Licensing a product innovation under a fixed fee,
 - Licensing under a per-unit royalty,
 - Licensing under a combination of fixed fee and per-unit royalty.
- We asked subjects to place a bid for a license six times under these six licensing treatment options.
- The participants were also asked to fill out a short survey with questions about their orchard operation and about their risk preference and demographic characteristics. They were compensated \$10 to \$30 depending on the hypothetical profits they earned during the auction.
- After the subjects submitted their bids for six treatments, we randomly drew one of the six treatment options for which we randomly determined the bids that we would accept. If the bid placed by the subject for that treatment option was equal or greater than the randomly chosen market price, then the subject would be eligible to buy the trees at that market price. However, if the bid was smaller than the market price, then he/she would not be eligible to grow the new licensed variety.

PRELIMINARY RESULTS

Table: Summary statistics of the growers' willingness to pay for different licensing options

	Upfront Fixed Fee (UFF)		Per Box Royalty (PBR)		Combo & Exclusive		Combo & Non-Exclusive	
	Exclusive	Non-Ex.	Exclusive	Non-Ex.	UFF	PBR	UFF	PBR
Mean	4956.2	3154.8	2.06	1.12	2960.5	1.34	1607.1	0.71
St Dev	4777.1	3569.5	2.16	1.98	3971.8	2.00	2190.0	1.48
Median	3000	1500	1	0.5	2000	0.75	1000	0.3
Min	55	0	0	0	0	0	0	0
Max	18550	15000	10	10	15900	10	9000	8

- A total of 32 apple growers participated in the study
- On average they had 23 years of experience in apple production and they operate a total of 26,080 acres representing 16% of all apple acreage in WA state.
- Preliminary observations show that apple growers are willing to pay more for exclusive contracts than the non-exclusive contracts in all licensing options.

DISCUSSION

- Although we observe that growers are willing to pay more to engage in a contract that uses an exclusive license, it is not clear that such a licensing scheme is best for the university or for the growers.
- Recent research at Cornell University (Rickard et al., 2013) found that a non-exclusive contract that relies solely on fruit royalties would generate the greatest total revenue flow to the university.

NEXT STEP AND EXPECTED RESULTS

- This study will build on the information collected at the WA Hort Show with a new survey of WA apple growers which is now in progress. This new survey contains choice experiment scenarios that will enable us estimate the willingness to assume costs for handling new varieties, under different pricing and licensing treatments.
- The results from this research will provide information on how different mechanisms affect profits for both growers' and the innovator and how growers' willingness to pay varies according risk preference and orchard characteristics.
- The empirical results will help university breeding programs design better commercialization mechanisms that are profitable for both university and growers.
- Although new crop varieties of apples are studied in this project, the findings can be applied more generally to other new similar variety releases, such as pears and cherries.



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