

**MAJOR PRACTICE IN HYBRID RICE (*Oryza sativa* L.) SEED (MESTISO 82)
PRODUCTION (2018 DRY SEASON)**

PRINCESS JOEMATY SARMIENTO MAGAWAY

An undergraduate major practice manuscript submitted to the faculty of the
Department of Crop Science, College of Agriculture,
Central Luzon State University in partial
fulfilment of the requirements
for the degree

**BACHELOR OF SCIENCE IN AGRICULTURE
(Crop Science - Agronomy)**

JUNE 2019

ACCEPTANCE SHEET

This undergraduate Major Practice entitled "**MAJOR PRACTICE IN HYBRID RICE SEED (MESTISO 82) PRODUCTION (2018 DRY SEASON)**" prepared and submitted by **PRINCESS JOEMAY SARMIENTO MAGAWAY** in partial fulfilment of the requirement for the degree of **BACHELOR OF SCIENCE IN AGRICULTURE**, is hereby accepted:


CARLOS C. ABON JR. Ph.D.
Adviser

06-10-2019
Date signed


FRANCIS E. MINA
Co-adviser

06-12-2019
Date signed


HARRY JAY M. CAVITE
Department Major Practice Coordinator

06-12-2019
Date signed

Accepted as partial fulfilment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURE (CROP SCIENCE - Agronomy)**


ROSEMARIE T. TAPIC, Ph.D.
Department Chairperson

6-12-19
Date signed


PACIFICO T. VIZMONTE JR.
College Major Practice Coordinator

12 Dec 2019
Date signed


ERNESTO A. MARTIN, Ph.D.
Dean, College of Agriculture

06-12-2019
Date signed

The author, **MAGAWAY, PRINCESS JOEMAY SARMIENTO** was born on September 05, 1996 at Barangay West, Guimba, Nueva Ecija.

She is the only daughter of Mr. Joseph D.C. Magaway and Mrs. May S. Magaway.

She finished her elementary education in Guimba East Central School in 2008. She continued her secondary education at Bartolome Sangalang National High School at St. John, Guimba, Nueva Ecija in 2012.

To fulfil her dream, she pursued her college education at Central Luzon State University, Science City of Muñoz, Nueva Ecija. She took up Bachelor of Science in Agriculture major in Crop Science with specialization in Agronomy.

As part of the requirement of her BS Agriculture degree program, she conducted her field practice at Philippine-Sino Center for Agricultural Technology (PhilSCAT) Science City of Muñoz, Nueva Ecija.

While studying, she experienced difficulties but she did not give up. However she was able to overcome her trials and hardship through the help of Almighty God, as well as her family and friends.

ACKNOWLEDGEMENT

First of all the author would like to thank our God Almighty for all that she had been blessed with and for His presence in her life who had given her strength to complete the work successfully.

The author would also like to express her sincere gratitude to her very supportive parents, Mr. Joseph D.C. Magaway and Mrs. May S. Magaway and relatives for the unconditional love, moral and financial support and inspiration.;

To her special one, Kevin Kier C. Salvador for the love, advice, inspiring words, and motivations;

To her son Kier Jaze M. Salvador for the inspiration and happiness;

To Central Luzon State University for letting her fulfil her dreams of being a student;

To Dr. Ernesto A. Martin, College Dean; Dr. Rosemarie T. Tapic Chairperson, Department of Crop Science; The Department Major Practice Coordinator, Mr. Harry Jay M. Cavite; the Department Research Coordinator, Mr. Pacifico Vizmonte specially to her Adviser, Dr. Carlos C. Abon Jr.; and to all faculty and staff of the Department of Crop Science, for the knowledge and guidance and skills to made her more ready for the future career;

To the project manager in charge Mr. Francis E. Mina, Mr. Raymark Fulgencio and Mr. Erickson Frediles, of Head Technology and Product Division for their piece of advice, time, knowledge and effort;

The staff of HRTU of PhilSCAT, Kuya Roben, Kuya Hernan, Kuya Jun, Kuya Luis, Kuya Cesar, Kuya Alvin, Kuya Lito, Kuya Jovite for the help,time, guidance, technical skills and happy moments they shared during the conduct of the major practice;

To the all personnel hired by HRTU from pulling, transplanting of seedling and harvesting, for their helped, unconditional love, encouragement and piece of advice;

To her co-major practice student, Rina Jane Magbitang, Norizza Alejo, and Raymond Hallares for the patience and joy shared during the major practice;

To her friends, for the love, encouragement, joy and moral support during the times of difficulties.

PRINCESS JOEMAY SARMIENTO MAGAWAY

TABLE OF CONTENTS

	PAGE
TITLE PAGE	i
APPROVAL SHEET	ii
BIOGRAPHICAL SKETCH	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	vi
LIST OF APPENDIX TABLES	ix
LIST OF APPENDIX FIGURES	x
ABSTRACT	xiii
INTRODUCTION	1
Importance of the Major Practice	1
Objectives of the Major Practice	3
Time and Date of the Major Practice	3
REVIEW OF RELATED LITERATURE	4
Hybrid Rice	4
Heterosis	5
Advantages of Hybrid Rice	5
Disadvantages of Hybrid Rice	6
Systems of Hybrid Rice	6
Three-line System	6
Cytoplasmic Male Sterility (A-Line)	6
Maintainer (B-Line)	7
Restorer (R-Line)	7
Two-line System	7
One-Line System	8

METHODOLOGY	10
Orientation	10
Input and Equipment Required	10
Cultural Management Practices	11
Soaking and Incubation	11
Seedbed Preparation	11
Sowing of Seeds	12
Nursery Management	12
Land Preparation	13
Pulling, Transplanting and Replacing of Seedling	13
Remedies for Asynchronous Flowering	14
Panicle Dissection	14
Nutrient Management	14
Pest and Disease Control	15
Weed Control	15
Water Management	15
Gibberelic Acid (GA ₃) Application	16
Supplementary Pollination	16
Roguing	17
Harvesting and Post harvesting Operations	18
Harvesting	
Threshing	18
Drying	19
Seed Cleaning, Bagging and Labelling	19
Storing	19
Data Gathered	20
Yield and Yield Components	20

Cost and Return Analysis	21
RESULT AND DISCUSSION	23
Brief Description of the Major Practice Area	23
Agro-climatic Condition of the Area	23
Yield and Yield Components	26
Cost and Return Analysis	28
PROBLEMS ENCOUNTERED AND RECOMMENDATION	30
Problems Encountered	30
Recommendation	30
SUMMARY AND CONCLUSION	31
Summary	31
Conclusion	31
LITERATURE CITED	33
APPENDICES	36

LIST OF TABLES

TABLE NO.		PAGE
1	Schedule of soaking and sowing of (P9 Ax R)	12
2	Schedule of gibberellic acid application	16
3	Agro-climatic condition of the area from January to May 2018	24
4	Data gathered during the major practice and recorded data at PhilSCAT	26
5	Summary income statement for hybrid rice seed production (20,000 m ²)	28

LIST OF APPENDIX TABLES

APPENDIX TABLE NO.		PAGE
1	Program of activities	37
2	Cost and return analysis of hybrid rice seed production	39
3	Average temperature, relative humidity, wind speed and total rainfall during the conduct of the major practice (January to May 2018)	40

LIST OF APPENDIX FIGURES

APPENDIX FIGURE NO.		PAGE
1	Layout and row ratio of the A-line and R-line in the field	41
2	Soaking of Seeds	42
3	Land preparation	42
4	Seedbed Preparation	43
5	Sowing of seeds	43
6	Spraying of molluscicide	44
7	Nursery Management	44
8	Repairing of dikes	45
9	Pulling of seedlings	45
10	Field lay outing	46
11	Measuring distance	46
12	Transplanting of A- line	47
13	Transplanting of R-line	47
14	Fertilizer application	48
15	Primordial sampling	48
16	GA ₃ application	49
17	Supplementary pollination	49
18	Rouging	50
19	Final rouging	50
20	Appearance of off-types	51

21	Harvesting of R-line	51
22	A-line harvesting	52
23	Threshing	52
24	Drying of M82-F1 seeds	53
25	Cleaning of M82-F1 seeds	53
26	Weighing of cleaned M82-F1 seeds	54
27	Seed packaging	54
28	Major practice student with the farmers while pulling of Seedling	55
29	Seed Inspector Mrs. Lourdes S. Belonio	55

ABSTRACT

MAGAWAY, PRINCESS JOEMAY SARMIENTO, Department of Crop Science, College of Agriculture, Central Luzon States University, Science City of Muñoz, Nueva Ecija, June 2018.

Title: Major Practice in Hybrid Seed Production (Mestiszo 82) Dry Season 2018

Venue: Osmeña Rice Production Area, Central Luzon State University, Science City of Muñoz, Nueva Ecija.

Adviser: DR. CARLOS C. ABON JR.

Co-Adviser MR. FRANCIS E. MINA

The major practice in hybrid rice seed production was conducted at Osmeña Rice Production Area, CLSU, Science City of Muñoz, Nueva Ecija from January 2018 to May 2018.

The objectives of the major practice were the following: to expose the student to actual operations and management of hybrid rice seed production, this aims to enhance student's knowledge and skills in hybrid rice seed production; expose student to actual operations and management of hybrid rice seed production; produce 500 kg of clean hybrid rice seeds in 5,000 m² area; and enhance the student's ability in terms of entrepreneurial aspects of hybrid rice seed production.

The assigned area to the major practice students were 2 ha⁻¹. The field practice students exposed and experienced different activities like preparation of seedbeds,

nursery management, transplanting, nutrient and pest management, application of GA₃, panicle dissection, rouging, supplementary pollination, harvesting, cleaning of seeds, drying, labelling and storing.

The yield obtained in 5,000 m² area was 428 kg (0.85 t ha⁻¹) in F1 seeds while the R-line has 458 kg (0.92 t ha⁻¹) seed produce. The gross income was Php 116,618.00 (Php 233,236.00 ha⁻¹) with a total net income of Php 78,180.60 (Php 156,361.20 ha⁻¹) and the ROE was 203.39%.

LITERATURE CITED

- ABEYSIRIWARDENA, D.S.DE.Z., OHBA, K. and MARUYAMA, A. 2002.** Influence of temperature and relative humidity on grain sterility in rice. *Journal of the National Science Foundation of Sri Lanka*. 30, 33 - 41.
- [DA] DEPARTMENT OF AGRICULTURE 2017.** Q and A on Hybrid Rice. Retrieved on January 05 2018 at <http://www.da.gov.ph/tips/hybrid-rice.html>.
- ECKARDT, N. A. 2006.** Flowering Synchronization between Parental Lines of Hybrid Rice under Bogor Tropical Environment 45:721-231.
- EL-NAMAKY, A. G. 2008.** Developing Technologies to Surpass the Dry Season Irrigated Lowland Rice Yield Plateau. pp. 65-821.
- [FAO] Food and Agriculture Organization. 2004.** Hybrid Rice for Food Security. Fact Sheet. Food and Agriculture Organization of the United Nations. Retrieved on 2018-02-19 from <http://www.fao.org/>.
- FLORA, I. O., and CRUZ, T. A., 2007.** Technical Efficiency of Philippine Rice Producing Regions and econometric Approach 103-425.
- GAAFAR, R. M., ADEL R. E. 2017.** Induction of apomixis and fixation of heterosis in Egyptian rice Hybrid1 line using colchicine mutagenesis. pp.26.
- [IRRI] International Rice Research Institute. 2009.** Hybrid Rice Seed Production, Differential seeding times for CMS Multiplication. Retrieved on April 16, 2018 at <http://www.Knowledgebank.irri.org>.
- KOTCHONI, S. O., and GACHOHOMOEW, JIMENEZ-LOPEZ. 2010.** A New and Unified Nomenclature for Male Fertility Restorer (RF) Proteins in Higher Plants. *PLoS ONE* 5(12): e15906.
- LI, J. 2009.** Hybrid Rice Technology Development Ensuring China's Food Security. Food Policy. Retrieve on March 5, 2018.
- LIU, F. M., M. ILYAS AHMED and M. H. HOWLADER, 2007.** Proceedings of the Regional Workshop for the Development and Dissemination of Hybrid Rice Technology. Retrieved on January 09,2018 LP22.pdf.
- LONGPING, Y.2004.** Hybrid Rice for Food Security in the World. Organization. FAO Rice Conference Rome, Italy.

- LU, Q. S., Y. SUN and Z. T. HUA. 2002.** Heterosis of Cereal Crop Science and Technology of China Agricultural Press, Beijing (Chinese) p. 24
- MANANESA, E. S., RICHARD, R. D., BUMATAY, E. I PhD. 2012.** Central Luzon Farmer's Acceptability and Adoption of Hybrid Rice Technology in their Rice Farming System. Science Research Specialist, Department of Agriculture-PhilRice Los Baños, Pili Drive, UPLB Campus, College, Laguna. Retrieved on January 12, 2018 at 873-544-1-PB.pdf
- MAO, C. X., VIRMANI, S. S., Z. X. SUN, T. M. MAU, and A. JAUHAR ALI 1998.** Two Line Hybrid Rice Breeding Manual. pp. 36—67
- MATSUI, T., NAMUCO, O. S., ZISKA, L. H. and HORIE, T. 1997.** Effects of high temperature and CO₂ concentration on spikelet sterility in indica rice. *Field Crops Research* 51, 213–219.
- NAKAGAWA, H., HORIE, T. and MATSUI, T. 2003.** Effects of climate change on rice production and adaptive technologies. In *Rice Science: Innovations and Impact for Livelihood. Proceedings of the International Rice Research Conference, Beijing, China, 16–19 September 2002* (Eds T. W. Mew, D. S. Brar, S. Peng, D. Dawe & B. Hardy), pp. 635–658. Manila, The Philippines: IRRI.
- NALLEY, L. TACK, J. DURAND, A. THOMAS, G. and BARKLE, A. 2015.** The Production, Consumption and Environmental Impacts of Rice. Hybridization in the United States. *Crop economics, production and management.* 18 763.pdf.
- PELAYO, R., 2018.** Hybrid rice production increases in Nueva Ecija. Retrieved on January 15, 2018 at <https://untvweb.com/news/hybrid-rice-production-increases-nueva-ecija>.
- QIUPING, L., LAN, Y., JIANWEL, W., SHENGDE, C., CONG, H., QI, L., and JIYU, L. 2017.** Distribution law of rice pollen in the wind field of small UAV. *International Journal of Agricultural and Biological Engineering*, 32-40
- PRABA, L. M and THANGARAJ M. 2005.** Effect of Growth Regulators and Chemicals on Pollen Sterility in TGMS Lines of Rice. Retrieved on January 06, 2018 at <http://www.Springerlink.com/content/v264808816727786/>.
- VIRMANI, S.S. and KUMAR, I. 2006.** Development and use of hybrid rice Technology to increase rice productivity in tropics. 54-64
- VIRMANI, S.S, C.X. MAO, R.S. TOLEDO, M. HOSSAIN and A. JANALIAH 1982.**

Hybrid rice seed production, technology and its impact o seed industries and rural employment opportunities in asia. International Rice Research Institute DAPO 7777, Metro Manila Philippines.920.pdf..

VIRMANI, S.S., MALABANAN,F.M., R.S. TOLEDO, L.J. JAVIER, E.D. REDONIA, P.I. REBUELETA, R.F. BARROGA S.R. OBIEN 1998. Hybrid Rice Technology in the Philippines: From Laboratory to Farmers Field. pp. 783-848.

YAN, C., DING, Y., WANG, Q., LIY, Z., LI, G., MUHAMMAD, I. AND WANG, S. 2010. The impact of relative humidity, genotypes and fertilizer application rates on panicle, leaf temperature, fertility and seed setting of rice. *Journal of Agricultural Science. Cambridge.* 148, 329 – 339.

YUAN, L. P. and PENG A. 2005. What is hybrid Rice. Retrieved on February 15, 2018 at 3649/3958.

YUAN, L.P. 2002. The second generation of hybrid rice in China. Sustainable rice production for food security, Proceedings of the 20th Session of the International Rice Commission, Food and Agriculture Organization of the United Nations. Retrieved on <http://www.bios.net/daisy/RiceGenome/3649/3958.html>.