A. Variety Improvement and Pest Management

1. Screening of selected Phil 2014 series clones/varieties for resistance to smut A. Casupanan, N. Guiyab, MV. Serrano, B. Manlapaz, R. Sarol, J. Agsaoay

Resistance to smut is one of the criteria all clones/varieties must pass before they can be released as commercial varieties. In this study thirty selected clones from the Phil 2014 series Row test at LGAREC and two check varieties were planted and ratooned to test their reaction to sugarcane smut. Among the thirty clones 10 were rated very highly resistant, namely, Phil 14-0727, Phil14-0703, Phil 14-0723, Phil 14-0085, Phil 14-0729, Phil14-0679, Phil 14-0459, Phil 14-0475, Phil 14-0389 and Phil 14-0395. Six clones, Phil 14- 0405, Phil14-0317, Phil 14-0919, Phil 14-0781, Phil 14-0955 and Phil 14-0983 were rated highly resistant while two clones, Phil 14-0243 and Phil 14-1057 were rated resistant. Phil 14-0005, Phil 14-0009, Phil 14- 0013, Phil 14-0663, Phil 14-0733, Phil 14-0451, Phil 14-0125 and Phil 14-0267 were rated intermediate resistant. On the other hand, Phil 14-1007 was rated intermediate average. The three other test varieties were rated susceptible to smut. Clones rated very highly resistant to intermediate resistant are recommended to go further testing for downy mildew resistance.

2. Screening of selected Phil 2013 series clones/varieties for resistance to downy mildew A. Casupanan, N. Guiyab, MV. Serrano, B. Manlapaz, R. Sarol, J. Agsaoay

Resistance to downy mildew is one of the criteria all clones/varieties must pass before they can be released as commercial varieties. In this study ten selected clones from the Preliminary Yield Test 2013 series at LAREC and two check varieties were screened and evaluated for resistance to sugarcane downy mildew in the plant and ratoon cane. Among the ten clones of Phil 2013 series, eight clones were rated very highly resistant namely, Phil 13-1495, Phil 13-1319, Phil 13-0287,Phil 13-1585, Phil 13-0279, Phil 13-0771, Phil 13-1627 and Phil 13-1667 while the two clones, Phil 13-1619 and Phil 13-1599 were rated highly resistant. All the clones showed resistance to downy mildew and are recommended to undergo further testing in the agronomic and ecological test.

B. Production Technology and Crop Management (9)

1. Growth and yield performance of Phil 2009-1867 and Phil 2009-1969 under different densities of planting N. Guiyab, B. Manlapaz, R. Sarol, MV. Serrano, R. Locaba

Varieties have different characteristics that dictates certain management practices such as planting density to attain potential yield. A study was conducted at LAREC, Floridablanca, Pampanga from November 2018 to January 2020 to test the growth and yield performance of Phil 2009-1867 and Phil 2009-1969 using 3.5, 4.0, 4.5 and 5.0 lacsas of canepoints per hectare with three meters distance between furrows. The experiment was laid out in strip plot design using 6 rows x 9 m plots with four replications.

Tonnage (TC/Ha) and sugar yield (Lkg/Ha) were significantly highest at 4.5 and 5.0 lacsas. Sucrose content (Lkg/TC) of the two varieties did not vary significantly under different level of densities of planting. Highest net income and ROI of 0.76 and 0.75 for Phil 2009-1867 and Phil 2009-1969 were obtained when 4.5 lacsas per hectare were used. These findings mean that the highest sugar yield and profitable income may

be achieved when the varieties are planted using 4.5 lacsas of canepoints and three meters furrow distance. This may serve as a guide for farmers using these two varieties.

2. Growth and yield performance of Phil 2010-0107 under different densities of planting N. Guiyab, B. Manlapaz, R. Sarol, MV. Serrano, R. Locaba

Planting density is one of the important considerations in the production of a certain variety to obtain high yield and increase productivity. The growth and yield performance of Phil 2010-0107 was studied using 3.5,

4.0, 4.5 and 5.0 lacsas of canepoints per hectare with three meters distance between furrows to determine optimum planting density. The experiment was laid out at LAREC, Floridablanca, Pampanga from November 2018 to January 2020 using randomized complete block design with 6 rows x 9 m plots replicated four times.

Cane tonnage (TC/Ha) was significantly highest at 4.0 and 5.0 lacsas while sugar yield was significantly highest at 4.0 lacsas. Sucrose content (Lkg/TC) did not vary significantly under different level of densities of planting. Highest net income and ROI of 143,283.62 and 0.95, respectively, were obtained when 4.0 lacsas per hectare were used. Thus, highest sugar yield and profit for Phil 2010-017 can be obtained using 4.0 lacsas of canepoints

3. Yield potential assessment of Phil 2009-1867 and Phil 2009-1969 at different seasons of planting A. Alviar, MV. Serrano, B. Manlapaz

Environmental condition is an important factor that can affect sugarcane growth. In this study two recommended varieties Phil 2009-1867 and Phil 2009-1969 were planted at LAREC, Floridablanca, Pampanga from Nov 2018 to March 2020 using split-plot design to evaluate the potential yields under early-(November) middle-(January) and late-season(March) planting. Tonnage of 107.47 TC/Ha and sugar yield of 194.84 Lkg/Ha were significantly higher in early- and mid-season than late-season planting. Sucrose content increased from early to late-season planting and was found to be significantly highest at 2.24 LKg/TC at late-season planting. Stalk length, and diameter of both varieties were also comparable in the early and middle season but significantly higher than late-season planting. Stalk weight of 2.36 kg and stalk count of 449 per plot were significantly higher in the early- season.

Climatic conditions in terms of soil surface temperature and soil moisture content were found to be significantly varied across seasons with soil surface temperature 77.91 deg C highest during the late-season and soil moisture content of 32.33 (VWC) highest during the early season. Highest amount of rainfall before harvest was recorded in the early-season and least in the late-season. These conditions contributed to the variations in the yields obtained at different seasons of planting. Highest ROI of 0.73 for Phil 2009-1867 and 0.76 for Phil 2009-1969 were obtained during the middle- season planting. These results suggest that Phil 2009-1867 and Phil 2009-1969 are most suited for middle-season planting when climatic conditions are most conducive to growth, sucrose storage and harvesting resulting to highest sugar yield and profit.

4. Yield potential assessment of Phil 2010-0107 at different seasons of planting A. Alviar, MV. Serrano, B. Manlapaz

Sugarcane can be planted anytime of the year but seasonal variations can affect the yield performance of a variety. Phil 2010-0107, a recommended variety, was planted at LAREC, Floridablanca, Pampanga from November 2018 to March 2020 using randomized complete block design to evaluate the potential yields under early-(November) middle-(January) and late-season(March) planting. Early-season planting produced significantly the highest tonnage of 104.44 TC/Ha than middle- and late-season planting. In contrast, sucrose content of 2.34 LKg/TC was observed to be significantly highest when planted in the late-season. Sugar yield and the yield components were observed to be comparable in the three seasons.

Stalk length, diameter, weight and count were comparable in the three seasons but were generally higher when planted early in the season.

Climatic conditions in terms of soil surface temperature and soil moisture content were found to be significantly varied across seasons with soil surface temperature of 78.03 deg C highest during the late-season and soil moisture content of 37.43 (VWC) highest during the early season. Highest amount of rainfall before harvest was recorded in the early- season and least in the late- season. These conditions contributed to the variations in the yields obtained at different seasons of planting. Highest ROI of 0.72 was obtained when planting was done in the early season. These results suggest that Phil 2010-0107 is most suited for

early-season planting when earlier plant establishment with appropriate soil moisture influenced production of more tillers and millable stalks resulting to significantly the highest tonnage and thus, highest sugar yield and profit.

5. Influence of detopping on cane and sugar yield of Phil 2006-2289 and Phil 2006-1899 B. Manlapaz, R. Sarol, R. Locaba, N. Guiyab, MV. Serrano

Detopping or cutting the upper portion of the stalk before harvest is a practice among farmers to avail themselves of planting materials for the current planting season or as animal feed. This practice, however, could affect yields when cane is not immediately milled. This study was conducted at LAREC, Floridablanca, Pampanga from December 2018 to March 2020, using factorial in randomized complete block design to determine the yields of Phil 2006-2289 and Phil 2006-1899 when milled at 0, 2, 4, 6 & 8 days after detopping under Angeles sandy loam condition.

Phil 06-1899 produced significantly higher cane and sugar yield of 127.48 TC/Ha and 248.24 LKg/ha, respectively, than Phil 2006-2289 but significantly higher sucrose content of 2.09 LKg/TC was observed from Phil 2006-2289. Cut-to-crush delay of 0, 2 and 4 days after detopping produced comparable cane and sugar yields which are significantly higher than 6 and 8 days. On the average cane yield produced was 124.52 TC/Ha while sugar yield was 261.78 LKg/Ha. On sucrose content, cut-to-crush delay of 2 days after detopping produced significantly the highest LKg/TC of 2.22. Highest ROI of 1.14 and 1.24 for Phil 2006-1899 and Phil 2006-2289 was obtained on cut-to-crush delay of 2 days. The findings show that when detopping is practiced highest sugar yield and profits for both varieties may be obtained when crushed or milled 2 days after detopping. This could be the ideal number of days when the optimum polarization (pol) or sucrose content of cane juice is achieved and stalks had not yet deteriorated. This information may serve as a guide to farmers practicing detopping on the two varieties.

6. Tiller induction methods for wet season planting N. Guiyab, B. Manlapaz, R. Locaba, MV. Serrano

In most sugarcane areas where irrigation is not available farmers opt to plant during the rainy season. The environment during this season, however, is not good for the growth of sugarcane due to the absence of favorable climatic conditions that will enhance growth of the crop. This study examined the most suitable method of tiller induction on the growth and yield of Phil 80-13 during wet season planting. The study was laid out in randomized complete block design at LAREC, Floridablanca, Pampanga from July 2019 to May 2020.

Germination was highest from 30 cm bud to bud spacing(T4) while cutting of primary tillers at emergence (T1) resulted to significantly highest average tiller per stool and millable stalks. Stalk length, diameter and weight of Phil 80-13 varied significantly. It was observed that significantly highest results were obtained from 2/3 N & 1/2 K at planting (T2) with 217.15 cm, 2.78 cm and 1.59 kg, respectively. Cane yield (TC/Ha) and sugar yield (LKg/Ha) did not differ significantly. However, highest yields were observed on T1 with 108.65 TC/Ha and 2/3 N & ½ K at 1 ½ MAP (T3) with 179.66 LKg/Ha. On the other hand, significantly highest sucrose content of 1.84 LKg/TC was obtained from the recommended practice

(T5) comparable with T2 with 1.83 LKg/TC. Highest ROI of 0.65 was obtained from T4 due to less cost of planting materials. These results suggest that when planting during the wet season optimum sugar yield and profits can be obtained using the method of 30 cm bud-to-bud spacing.

7. Ratooning ability assessment of Phil 2009-1867 and Phil 2009-1969 J. Agsaoay, R. Locaba, MV. Serrano, J. Vicente

Ratooning is the growing of new shoots from the stubbles of harvested sugarcane to minimize cost of production. Thus, ratooning ability is one of the criteria a variety must pass before it can be recommended for commercial release. This study was conducted to assess the ratooning ability of Phil 2009-1867 and Phil 2009-1969 up to the third ratoon without replanting to determine inherent ratoon survival and potential

yields. The ratoon ability of control varieties Phil 75-44 and Phil 80-13 were also observed. The data were gathered from the ratoon of the Ecological test of Phil 2009 series varieties from February 2016 to February 2019 at LAREC, Floridablanca, Pampanga under sandy soil condition using recommended cultural practices.

Cane tonnage and sugar yield of both varieties decreased from first to third ratoon while sucrose content increased. On the average, Phil 2009-1867 produced 84.07 TC/Ha with a decrease of 70.55%, 173.82 LKg/Ha with a decrease of 68.84%, and 2.10 LKg/TC with an increase of 6.14%. On the other hand, Phil 2009-19969 produced 111.18 TC/Ha with a decrease of 49.70%, 204.52 LKg/Ha with a decrease of 43.70%, and 1.86 LKg/TC with an increase of 11.70%. The two control varieties, on the average produced 108.36 TC/Ha with a decrease of 45.09%, 228.60 LKg/Ha with a decrease of 38.10% and 2.15 LKg/TC with an increase of 13.16%. The decrease in sugar yield in Phil 2009-1867 and Phil 2009-1969 was brought about by the high decrease in tonnage due to decrease in number of millable stalks and weight which could be an influence of its genetic make-up. Economic analysis showed an average ROI of 1.24 and 1.39 for Phil 2009-1867 and Phil 2009-1969, respectively, and 1.69 and 1.77 for Phil 75-44 and Phil 80-13, respectively. These results show that Phil 2009-1867 and Phil 2009-1969 can still be profitable when planted up to the third ratoon and probably longer if replanting will be done. The two control varieties also showed better ratooning ability as evidenced by their higher yield and profit. A study should be done to determine ratooning ability under varying soil conditions.

8. Ratooning ability assessment of Phil 2010-0107 J. Agsaoay, R. Locaba, MV. Serrano, B. Manlapaz,

One of the methods practiced in most sugarcane farms is the ratooning of the crop. This method can save the farmer costs from planting materials and labor as well as land preparation activities. For this reason the ratooning ability of a variety is tested before they can be released for commercial planting. This study was conducted to assess the ratooning ability of Phil 2010-0107, without replanting, to determine inherent ratoon survival and potential yields. The ratoon ability of control varieties Phil 75-44 and Phil 80- 13 were also observed. The data was gathered from the ratoon of the Ecological test of Phil 2010 series varieties from February 2017 to February 2020 at LAREC, Floridablanca, Pampanga under sandy soil condition using recommended cultural practices.

Cane tonnage (TC/Ha) and sugar yield (LKg/Ha) of Phil 2010-0107 decreased from first to third ratoon while sucrose content increased. On the average it produced 76.70 TC/Ha with a decrease of 69.92% and 153.30 LKg/Ha with a decrease of 65.70% while sucrose content was 2.08 LKg/TC with an average increase of 13.61%. Phil 75-44 and Phil 80-13 had a much higher average cane and sugar yield with lower percent decreases. On the average the control varieties produced 108.40 TC/Ha and 225.65 LKg/Ha. Sucrose content was 2.13 LKg/TC with an average increase of 15.23%. The decrease in sugar yield in Phil 2010- 0107 was brought about by the high decrease in tonnage due to decrease in number of millable stalks and weight which can be attributed largely on its genetic characteristic. Highest average ROI of 1.78 was obtained from Phil 75-44 and lowest of 1.11 from Phil 2010-0107. These results show that Phil 2010-0107

can still be profitable when planted up to the second ratoon and probably longer if replanting will be done. The two control varieties showed better ratooning ability as evidenced by their higher yield and profit. A study should be done to determine ratooning ability under varying soil conditions.

9. Growth, yield potential, and ratooning ability of ten SRA high yielding varieties J. Agsaoay, R. Locaba, MV. Serrano

Ratooning, or the growing of new plants or shoots from the stubbles of harvested sugarcane is a practice most sugarcane farmers undertake to maximize costs of inputs in the plant cane. Thus, a variety with good ratooning ability is desirable and much preferred. This study is undertaken to determine the growth, yield potential, and ratooning ability of 10 Phil sugarcane varieties. The study was laid-out at LAREC,

Floridablanca, Pampanga from February 2015 to February 2019 using randomized complete block design under sandy soil condition. Recommended cultural practices on sugarcane growing were undertaken.

Tonnage (TC/Ha) and sugar yield (LKg/Ha) of varieties decreased from first to third ratoon. Tonnage was generally comparable from plant cane to second ratoon while sugar yield was comparable in the first and second ratoon. Phil 75-44 had highest average yield of 132.88 TC/Ha and 273.75 LKg/Ha but Phil 00- 2155 and Phil 04-0081 has the lowest average decrease of 21.75% in tonnage and 15.06% in sugar yield, respectively. Sucrose content of the varieties generally increased and were comparable from plant cane to third ratoon. Phil 97-3933 had the highest average sucrose content of 2.20 LKg/TC but Phil 00-1419 had highest average increase of 20.39%. Number of millable stalks and stalk weight of all varieties decreased from first to third ratoon. Phil 99-1793 and Phil 75-44 had the highest average weight per stalk of 1.8 kg but Phil 00-2155 has the lowest average decrease of 10.88%. Phil 75-44 has the highest average millable stalks of 359 per plot but Phil 00-2155 has the lowest average decrease of 21.99%. Among the test varieties Phil 75-44 has shown superior performance by producing the highest average sugar yield due to heavier and more stalks which can be attributed to its inherent characteristics and adaptability to sandy soil condition. Average ROI ranged from 1.31 to 1.84 with the highest observed from Phil 75-44. All varieties are profitable to grow up to the third ratoon but higher profits can be realized using Phil 7544.