# Analysis of Factors Affecting Potato Gene Expression Levels Under

# **Multivariate Conditions**

By

Xiyou Lin B00871553

Supervised by Dr. Hong Gu

Dalhousie university Halifax, Canada April 22, 2024

#### Abstract

Potato is one of the world's leading non-cereal staple crops, known for its high nutritional value, and is an important food source in many countries. Given the importance of potato in the global diet, the present study attempted to find ways in which potato production could be maximized. This study hope to investigate how variables such as planting environment, fertilization strategy, and time affect the expression level of 63 genes during potato cultivation, and to obtain the most suitable planting method for potato growth. This study combined 15 growing environments (combinations of growing regions and potato varieties) and 11 fertilization strategies with two observations per potato plant at different times, utilizing longitudinal analyses, multiple linear regression models, and hierarchical cluster analysis.

The research revealed that the growing environment, potato variety, sampling days, and fertilization strategies, as well as the complex interplay between these factors, substantially influenced gene expression levels. Among these, genetic determinants were identified as the most impactful, closely followed by environmental and temporal considerations. Furthermore, this study, while maintaining the same total amount of fertilization, adjusted the proportions of the two fertilizations and discovered that secondary fertilization significantly enhances the expression levels of various genes in potatoes. This indicates that an appropriate strategy for secondary fertilization plays a crucial role in promoting gene expression in potato cultivation. And all 63 genes showed a strong positive growth trend when the fertilization strategy was 60:180.

#### Introduction

Potatoes, as one of the world's primary food crops, not only serve as an essential food source but also offer the nutritional benefits of both vegetables and fruits, playing a crucial role in the food security of numerous countries. Despite the relative ease of potato cultivation, maximizing yield necessitates ongoing research into variety selection, planting environments, and other influential factors. It is important that changes in gene expression in potatoes are closely linked to their yields, so some advice on growing potatoes can be obtained by studying changes in gene expression (Kabir 2004). For instance, it is known that the amount of fertilization impacts potato growth, but excessive fertilization in the initial application can lead to potato death, while too much in the second application can contaminate the soil. Thus, by observing the changes in potato gene expression level over time and fertilizer application, it is possible to find the most appropriate fertilization strategy to improve potato survival and yield. This underscores the importance of in-depth exploration into factors affecting gene expression.

This research is dedicated to analyzing various factors influencing potato gene expression levels, intending to offer a scientific foundation for potato cultivation. By examining potatoes from 15 different varieties and cultivation area combinations, this paper employs longitudinal analysis to map the trends of gene expression levels under varying fertilization methods over time. Data were then converted to a long format for analysis using a multivariate linear regression model, thoroughly examining how variables such as planting region, potato variety, fertilization amounts (including first and second applications), and sampling days, as well as their interactions, impact the expression of 63 different genes. The study concludes with an analysis of residuals to reaffirm the primary factors affecting potato gene expression levels.

#### Data

This dataset encompasses information such as potato identification numbers, varieties, planting locations, fertilization methods, timing, and the expression levels of 63 genes. During the data preprocessing stage, an initial data cleaning is conducted. Given that there are 15 different combinations of potato varieties and planting locations, these two variables were merged into a new variable, named 'syc' (All combinations of planting areas and potato varieties are shown in Table 1). Additionally, due to the presence of six distinct fertilization treatments (trt) and the absence of treatment data in some records, the datasets with a total fertilization amount of 106 were categorized as trt3, and those with a total of 200 were classified as trt4.

Considering that the combination of Charlottetown 2014 and Russet Burbank was only observed once on the 42nd day, with no further data available to explore changes in potato gene expression levels for this variety and land combination over time, this study will exclude this combination. Additionally, some potatoes were observed three times, with a short interval between the second and third observations. Given that such a brief interval is unlikely to result in significant changes in potato gene expression levels, this study will disregard parts of the data that include the third observation.

The research aims to investigate the impact of different fertilization methods and time

on gene expression levels. Considering that different treatments primarily differentiate based on the total amount of fertilizer used, ten distinct fertilization strategies were defined by combining the first and second fertilization applications, and these strategies were named 'fertilization\_Strategies'. To accommodate the study's need for longformat data, the dataset was converted into a long format for subsequent analysis.

	Russet	Jemseg	Shepody	Atlantic	Classic
	Burbank				Russet
Off-Carberry	24	0	0	0	0
2014					
On-Carberry	24	0	0	0	0
2014					
PŽribonka	0	0	0	0	24
2014					
Charlottetown	20	0	0	0	0
2014					
Fredericton	12	12	12	0	0
MAT2014					
Fredericton	20	0	20	20	0
GE2012					
Fredericton	8	0	4	0	0
PK2014					

Table 1: The combinations of planting regions and potato varieties

#### Mothed

#### Multi-linear regression

Multiple linear regression is a statistical technique that employs multiple explanatory variables to predict the outcome of a response variable. The objective of multiple linear regression is to model the linear relationship between the independent variables and the response variable. The formula is shown below.

$$Yi = \beta 0 + \beta 1x1 + \beta 2x2 + \dots + \beta nxn + \epsilon$$

Considering the influence of multiple variables in the dataset on gene expression levels, a multiple linear regression model is utilized for analysis. The analysis employs data transformed into a long format, with gene expression level as the dependent variable. Independent variables include the genes, treatments, block, syc, fertilization strategies (fertilization\_Strategies), days after leaf sampling (DAP\_for\_leaf\_sampling), and interaction terms between fertilization strategies and genes, as well as between genes and days after leaf sampling.

#### Longitudinal Analysis

Longitudinal studies involve repeatedly observing the same variables over a certain period, allowing researchers to continuously examine the same individuals to identify any changes that may occur over time. In this study, gene expression levels were observed at two distinct time points. Given that changes in gene expression are minimal over closely spaced intervals, the data processing categorized observation days into two groups: those less than 50 days were classified into one category, and those greater than 50 days into another. Considering the aim of this study is to explore the effects of fertilization and time on gene expression, a longitudinal analysis method was employed to examine the data.

# Agglomerative Hierarchical Clustering

Hierarchical clustering is an analytical method that groups objects based on similarity. In this method, different clusters form a hierarchical structure and can be visualized through dendrograms. Agglomerative hierarchical clustering employs a bottom-up approach. Initially, each object forms its own cluster, and then progressively, the most similar pairs of clusters are merged until all objects are consolidated into a predetermined number of clusters. In this study, the model's residual data were analyzed through hierarchical clustering. By calculating the distance matrix between genes and performing hierarchical clustering, a dendrogram is generated. By cutting the dendrogram, the clustering results for each gene are obtained. This study particularly focuses on the smaller clusters at the bottom of the clustering tree. Since residuals represent unobserved variability within the model, analyzing them in conjunction with the results of the model offers unique insights. If certain genes are grouped together in the residual clustering tree and exhibit similar coefficients or response patterns in the model output, this suggests that these genes have similar responses to various factors. This method reveals whether the patterns of gene expression response to different treatments or conditions are similar, thereby aiding in the assessment of how each gene performs under specific experimental conditions.

#### Analysis

This section will elaborate on how to analyze the data using the aforementioned methods and identify the significant factors affecting the variation in potato gene expression levels.

#### <u>Plot data</u>

Firstly, for the sake of facilitating data analysis, the data converted into a long format

is visualized. By plotting line graphs of various genes over time, a preliminary classification can be made. In these line graphs, the horizontal axis represents time, while the vertical axis indicates the gene expression levels, and different colored lines represent combinations of fertilization methods (trt) and areas (block), that is, an experimental unit (plot). In the first type of graph, all lines show a downward trend over time, indicating that regardless of the fertilization method, the expression levels of these genes decrease with time. The lines in the second type of graph all show an upward trend, suggesting that regardless of the fertilization method, the expression levels of these genes increase over time. The third type of graph shows lines without a clear trend, indicating that the expression levels of these genes fluctuate over time, without a clear pattern of increase or decrease. The image of gene St.LIP serves as an excellent example of the first category, while the image of gene St.Unk1 represents the second category. Such visualizations may indicate that time is a significant factor affecting the expression levels of these genes, whereas the impact of fertilization strategies on their expression levels might be minimal. Conversely, genes like St.MSRB, which are categorized under the third type of images, could suggest that different fertilization methods significantly affect their expression levels.



Figure 1: The plot of the data

## Fitting multi-linear regression model and create the ANOVA table.

Model 1:

Y (gene expression)  $\sim$  gene + syc + trt + block + fertilization\_Strategies +

# DAP\_for\_leaf\_sampling

This model uses gene expression levels as the dependent variable, with genes, syc (the combination of variety and planting location), trt (treatment), block, fertilization strategies, and days after leaf sampling (DAP\_for\_leaf\_sampling) as independent variables. The results show that time, all genes except for St.CHI and St.ClCh, the combination of variety and planting location, and the 240:0 fertilization strategy significantly affect changes in gene expression levels, as their p-values are all less than 0.05. Notably, the coefficient for time is negative, indicating that gene expression levels decrease over time. Furthermore, the fertilization strategy fertilization\_Strategies240:0 has a significant positive impact on gene expression, highlighting fertilization strategy

as a key factor.

By integrating the results from the ANOVA table with multiple linear regression (figure 5), a comprehensive understanding of the model and the impact of various variables on gene expression levels can be achieved. Thus, an ANOVA table for this model was created. Showing that gene, the combination of planting location and variety (syc), fertilization treatment (trt), fertilization strategies, and days after leaf sampling (DAP\_for\_leaf\_sampling) are significant factors affecting gene expression (p < 0.05). Notably, the gene variable has the largest sum of squares (Sum Sq), indicating that gene type is the primary factor influencing changes in gene expression levels, while the effects of fertilization treatment and days after leaf sampling are comparatively smaller.

Call:				geneSt.Kinase		-2822.179	170.805 -16	i.523 ·	< 2e-16 ***
<pre>lm(formula = expression ~ gene + syc</pre>	+ trt + bloc	k + fertilization_	Strategies +	geneSt.LIP		-2514.544	170.805 -14	i.722 ·	< 2e-16 ***
DAP_for_leaf_sampling, data = dat	ta)			geneSt.LOB38A		-2914.192	170.805 -17	.062 ·	< 2e-16 ***
				geneSt.LOB38B		-2825.901	170.805 -16	. 545 ه	< 2e-16 ***
Residuals:				geneSt.MIP		-2457.419	170.805 -14	1.387 ·	< 2e-16 ***
Min 10 Median 30 Max				geneSt.MSF5A		-1759.532	170.805 -10	).301 ·	< 2e-16 ***
-12355 -460 -37 233 90148				geneSt.MSF5B		-2538.006	170.805 -14	1.859 ·	< 2e-16 ***
				geneSt.MSRB		-2834.120	170.805 -16	i.593 ·	< 2e-16 ***
Coefficients: (1 not defined because	of singulari	ties)		geneSt.MtN21		-2662.427	170.805 -15	i.588 ·	< 2e-16 ***
	Estimate S	td. Error t value	Pr(> t )	geneSt.Nod		-2851.204	170.805 -16	i.693 ·	< 2e-16 ***
(Intercept)	2260.452	144.332 15.661	< 2e-16 ***	geneSt.NT		-2879.710	170.805 -16	. 860 ه.	< 2e-16 ***
geneSt_NT2	-2495.412	170.805 -14.610	< 2e-16 ***	geneSt.P109A		-2911.653	170.805 -17	.047 ·	< 2e-16 ***
geneSt., PP7A	-2878.602	170.805 -16.853	< 2e-16 ***	geneSt.PBenzR		-2114.740	170.805 -12	2.381 .	< 2e-16 ***
geneSt., PP7B	-2899.309	170.805 -16.974	< 2e-16 ***	geneSt.PDX		-2800.366	170.805 -16	i.395 -	< 2e-16 ***
geneSt.AAT1	-2198.380	170.805 -12.871	< 2e-16 ***	geneSt.PEPT		-2906.769	170.805 -17	.018 ·	< 2e-16 ***
geneSt.AAT2	-2852.354	170.805 -16.700	< 2e-16 ***	geneSt.PLD		-2918.132	170.805 -17	.085 ·	< 2e-16 ***
geneSt.A0X	-1827.734	170.805 -10.701	< 2e-16 ***	geneSt.PolyAP		-2888.996	170.805 -16	i.914 ·	< 2e-16 ***
geneSt.Apgse	-1843.063	170.805 -10.790	< 2e-16 ***	geneSt.PP2C		-2905.546	170.805 -17	.011 ·	< 2e-16 ***
geneSt.ATrfA	-2884.707	170.805 -16.889	< 2e-16 ***	geneSt.ProD		-2763.759	170.805 -16	i.181 ·	< 2e-16 ***
geneSt.ATrfB	-2447.532	170.805 -14.329	< 2e-16 ***	geneSt.ProH		-2903.149	170.805 -16	i.997 ·	< 2e-16 ***
geneSt.CatT	-2756.510	170.805 -16.138	< 2e-16 ***	geneSt.PyrK		-2050.328	170.805 -12	2.004 .	< 2e-16 ***
geneSt.CatTR	-1434.028	170.805 -8.396	< 2e-16 ***	geneSt.RPK		-2916.883	170.805 -17	.077 ·	< 2e-16 ***
geneSt.CGL	-2791.927	170.805 -16.346	< 2e-16 ***	geneSt.Sulfase		-2709.720	170.805 -15	.864 ·	< 2e-16 ***
geneSt.CHI	-52.643	170.805 -0.308	0.7579	geneSt.SulfT		-2544.725	170.805 -14	.898 .	< 2e-16 ***
geneSt.ClCh	-129,121	170,805 -0,756	0.4497	geneSt.SulfT2A		-2753.892	170.805 -16	۰ 123،	< 2e-16 ***
geneSt.CLH	-2705.404	170.805 -15.839	< 2e-16 ***	geneSt.SulfT2B		-2878.507	170.805 -16	i.853 ·	< 2e-16 ***
geneSt.CWP	8909.676	170.805 52.163	< 2e-16 ***	geneSt.SulfT2C		-2890.855	170.805 -16	i.925 ·	< 2e-16 ***
geneSt.CvsPI1	-2694.328	170.805 -15.774	< 2e-16 ***	geneSt.TRDX		-1197.144	170.805 -7	2.009 2	.47e-12 ***
geneSt.CvsT	-2862.506	170.805 -16.759	< 2e-16 ***	geneSt.UBIE		-1926.975	170.805 -11	. 282 •	< 2e-16 ***
geneSt. DUE506A	-1882.445	170.805 -11.021	< 2e-16 ***	geneSt.Unk1		-2772.514	170.805 -16	5.232 ·	< 2e-16 ***
geneSt.DUF506B	-2879.825	170.805 -16.860	< 2e-16 ***	geneSt.Unk2		-2609.799	170.805 -15	i.279 ·	< 2e-16 ***
geneSt.EPI	-2828.617	170.805 -16.561	< 2e-16 ***	geneSt.Unk3		-2913.900	170.805 -17	.060 ·	< 2e-16 ***
geneSt.FT	-2657.804	170.805 -15.560	< 2e-16 ***	geneSt.Unk4		-2853.492	170.805 -16	. 706 .	< 2e-16 ***
geneSt.GluAse	-2527.588	170.805 -14.798	< 2e-16 ***	geneSt.Unk5		-1951.301	170.805 -11	.424 .	< 2e-16 ***
geneSt.GluDC	-2268.162	170.805 -13.279	< 2e-16 ***	geneSt.Xyl		-2446.791	170.805 -14	1.325 ·	< 2e-16 ***
geneSt.GR3	-1781.151	170.805 -10.428	< 2e-16 ***	sycFredericton	GE2012_Atlantic	1162.604	83.184 13	3.976 -	< 2e-16 ***
geneSt.GST	-2665.768	170.805 -15.607	< 2e-16 ***	sycFredericton	GE2012_Russet Burbank	845.824	83.184 10	).168 ·	< 2e-16 ***
seneCt TreeD	1046 028	170 805 11 300	. 2. 16 ***	sycFredericton	GE2012 Shepody	887.020	83,261 10	.654	< 2e-16 ***

Figure 2: summary of model 1

Figure 3: summary of model 1

sycFredericton MAT2014_Jemseg	696.936	103.794	6.715	1.93e-11 **	
sycFredericton MAT2014_Russet Burbank	660.089	103.794	6.360	2.06e-10 **	
sycFredericton MAT2014_Shepody	798.598	103.794	7.694	1.48e-14 **	
sycFredericton PK2014_Russet Burbank	903.863	125.467	7.204	6.02e-13 **	
sycFredericton PK2014_Shepody	1297.900	147.950	8.773	< 2e-16 **	
sycOff-Carberry 2014_Russet Burbank	390.314	91.759	4.254	2.11e-05 **	
sycOn-Carberry 2014_Russet Burbank	543.540	91.444	5.944	2.82e-09 **	
sycPŽribonka 2014_Classic Russet	497.900	92.821	5.364	8.21e-08 **	
trt2	-123.600	348.696	-0.354	0.7230	
trt3	-37.032	255.347	-0.145	0.8847	
trt4	7.316	281.865	0.026	0.9793	
trt5	67.285	79.178	0.850	0.3954	
trt6	-208.307	286.506	-0.727	0.4672	
block2	-70.757	44.418	-1.593	0.1112	
block3	-60.469	44.103	-1.371	0.1704	
block4	-46.737	44.073	-1.060	0.2889	
fertilization_Strategies60.0	176.750	348.246	0.508	0.6118	
fertilization_Strategies106.0	142.255	265.414	0.536	0.5920	
fertilization_Strategies120.0	288.968	262.142	1.102	0.2703	Analysis of Vanianso Table
fertilization_Strategies180.0	321.968	282.513	1.140	0.2544	Analysis of Variance Table
fertilization_Strategies200.0	522.520	307.406	1.700	0.0892 .	
fertilization_Strategies240.0	613.421	99.867	6.142	8.26e-10 **	Response: expression
fertilization_Strategies60.60	115.305	263.163	0.438	0.6613	Df Sum Sq Mean Sq F value Pr(>F)
fertilization_Strategies60.120	68.787	282.052	0.244	0.8073	gene 62 5.8710e+10 946938879 171.2829 < 2.2e-16 ***
fertilization_Strategies0.180	167.920	255.347	0.658	0.5108	syc 11 2.7407e+09 249153242 45.0670 < 2.2e-16 ***
fertilization_Strategies60.180	NA	NA	NA	NA	trt 5 4 5307e+08 90613026 16 3901 3 499e-16 ***
DAP_for_leaf_sampling1	-218.748	36.770	-5.949	2.73e-09 **	
					DLOCK 51.559604-07 5151965 0.9285 0.426
Signif. codes: 0 '***' 0.001 '**' 0.0	ð1 '*' 0.05 '	·.' 0.1 ·	' 1		fertilization_Strategies 9 2.6813e+08 29792621 5.3889 2.097e-07 ***
					DAP_for_leaf_sampling 1 1.9566e+08 195664211 35.3919 2.734e-09 ***
Residual standard error: 2351 on 2378	5 degrees of	freedom			Residuals 23785 1.3150e+11 5528509
Multiple R-squared: 0.3218, Adjust	ted R-square	d: 0.3192			
F-statistic: 124 on 91 and 23785 DF	, p-value:	< 2.2e-16			Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Figure 4: summary of model 1.

Figure 5: ANOVA table of model 1

## Model 2:

Y (gene expression) ~ gene + syc + fertilization\_Strategies + DAP\_for\_leaf\_sampling + gene \* DAP\_for\_leaf\_sampling + gene \* fertilization\_Strategies

Given that the block variable did not show a significant impact on gene expression levels in model1, it was decided to exclude the block variable in the development of the new model, model2, and to incorporate interaction terms between variables. Considering that different fertilization strategies reflect the total amount of fertilization, the trt variable was also excluded in the new model. Additionally, since the interaction between trt and block did not significantly affect gene expression (figure 4), this interaction term was not considered in model2 (the full summary of the model 2 is shown in appendix). The analysis of model2 revealed that all genes had a highly significant impact, while the effects of the fertilization strategies 60:0, 120:0, 200:0, and 240:0 were not significant (figure 6), and other strategies significantly affected gene expression. It is important to note that under a p-value threshold of 0.05, only the interaction term of gene St.CWP with all the fertilization strategies reached the level of significance. Additionally, the interaction of genes St.CHI and St.TRDX with all the other fertilization strategies except the 200:0 fertilization strategy showed significance. This phenomenon did not occur in the interaction of other genes with fertilization strategies. Further investigation of the gene St.CWP shows that the coefficients for its interaction with all fertilization strategies involving a non-zero second application are positive. This suggests that these interactions have a positive effect on the dependent variable, meaning that the expression level of this gene increases when the second application of fertilizer is non-zero. These results highlight the potential effects of specific fertilization strategies on regulating the expression of this gene.

The newly generated ANOVA table further confirmed that genes, the combination of location and year, fertilization strategies, and sampling time significantly influence gene expression levels (figure 7). Particularly noteworthy is that the interactions between genes and sampling time, as well as between genes and fertilization strategies, have a significant impact on gene expression levels, highlighting the importance of considering such interactions in the experimental design phase.

fertilization_Strategies60.0	-380.74	379.11	-1.004 0.315234
fertilization_Strategies106.0	-1709.67	499.52	-3.423 0.000621 ***
fertilization_Strategies120.0	51.79	457.59	0.113 0.909889
fertilization_Strategies180.0	-1352.69	340.01	-3.978 6.96e-05 ***
fertilization_Strategies200.0	807.03	691.72	1.167 0.243343
fertilization_Strategies240.0	-278.48	469.46	-0.593 0.553064
fertilization_Strategies60.60	-2692.89	523.14	-5.148 2.66e-07 ***
fertilization_Strategies60.120	-2718.71	473.71	-5.739 9.63e-09 ***
fertilization_Strategies0.180	-3968.33	1531.60	-2.591 0.009577 **
fertilization_Strategies60.180	-2826.65	495.91	-5.700 1.21e-08 ***

Figure 6: The impact of fertilization strategies in the model Analysis of Variance Table

Response: expression						
	Df	Sum Sq	Mean Sq	F value	Pr(>F)	
gene	62	5.1907e+10	837204833	213.4574	< 2.2e-16	***
syc	10	2.2520e+09	225195729	57.4169	< 2.2e-16	***
fertilization_Strategies	9	6.6568e+08	73964939	18.8584	< 2.2e-16	***
DAP_for_leaf_sampling	1	1.9816e+08	198159310	50.5236	1.215e-12	***
gene:DAP_for_leaf_sampling	62	1.9114e+09	30828314	7.8601	< 2.2e-16	***
gene:fertilization_Strategies	620	2.2470e+10	36242233	9.2405	< 2.2e-16	***
Residuals	20844	8.1753e+10	3922118			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Figure 7: ANOVA table of model 2

#### Residuals vs Fitted and QQ plot

To strengthen the statistical foundation of the model, a logarithmic transformation was applied to the original data. The primary purpose of this transformation was to reduce the skewness of the data, thus bringing the distribution of residuals closer to a normal distribution, which is one of the key assumptions relied upon by most linear regression models. After the logarithmic transformation, residual vs. fitted value plots and QQ plots were drawn.

By evaluating the effects of the transformation, the heavy-tailed nature displayed by the QQ plot and the outliers observed in the residual plot complement each other, both suggesting the possible presence of anomalies or extreme values in the data (figure 8). However, the residual plot did not reveal any significant heteroscedasticity or non-linear trends, implying that although the data may not strictly adhere to a normal distribution, the use of a linear model is still an appropriate choice.

In the scatter plot of residuals versus fitted values, different genes are categorized by color, where each color represents a gene (figure 9). Points of different colors (i.e., different genes) are concentrated within specific ranges of fitted values. For example, most black points are primarily located on the right side of the plot, corresponding to fitted values between 6 and 10, while most blue points are on the left side, corresponding to fitted values between 0 and 2. This indicates that under certain environmental or experimental conditions, some genes exhibit higher expression levels (higher fitted values), while others show lower expression levels (lower fitted values). Moreover, these variations further demonstrate significant differences in the expression



levels of different genes under specific experimental conditions.

# Hierarchical Clustering

The model residuals were clustered to form a dendrogram, full dendrogram is presented in the appendix. In Model 2 results, the direct impacts of fertilization strategies 60.0, 120.0, 200.0, and 240.0 are not significant, however, the interactions of certain genes with these fertilization strategies are significant. Further analysis reveals that among the interactions with the 60:0 fertilization strategy, only St.CHI, St.Clch, St.CWP, and St.TRDX show significant interactions; notably, the interaction coefficients for St.CHI and St.ClCh are positive, and these two genes are grouped together in a small cluster at the bottom of the dendrogram (Figure 12). Similarly, St.CWP and St.TRDX are also categorized together in the same small cluster at the bottom of the dendrogram. When the number of clusters is set to 7, these four genes will be grouped into the same small cluster. This phenomenon is also observed in the interactions of genes with fertilization strategies 120:0 and 240:0. Analysis of the genes significantly interacting with the 120:0 and 240:0 fertilization strategies reveals that some of these genes are grouped into the same small cluster at the bottom of the clustering tree. For example, genes St.AAT1 and St.Apase, which significantly interact with the 240:0 fertilization strategy, have positive coefficients and are classified into the same small cluster (Figure 13). Similarly, genes St.DUF506A and St.Unk5 (Figure 11), St.GluDC, St.MSF5B and St.Pyrk (Figure 10), St.CWP, St.GR3 and St.TRDX also exhibit the same clustering pattern.

These genes exhibited consistent responses to environmental changes, with their residuals also being grouped into the same small cluster at the bottom of the dendrogram. This further suggests that these genes have similar response patterns to environmental variables, which typically implies that they may have related functions or participate in similar biological processes. Such findings help to deepen the understanding of their roles in cellular mechanisms and physiological responses.



St\_NT2 St\_NT2 St.Sulfase St.Sulfase St.Unk5 St.PP2C St.DUF506A St.Unk4 St.Unk4 St.Unk4

Figure 10: Small cluster of genes St.GluDC, St.MSF5B and St.Pyrk



Figure 11: Small cluster of genes St.DUF506A and St.Unk5



Figure 12: Small cluster of genes St.CHI and St.Clch

Figure 13: Small cluster of genes St.AAT1 and St.Apase

# Conclusion

In this study, various factors affecting gene expression levels were analyzed in depth using multiple linear regression models. Preliminary statistical tests, including QQ plots, plots of residuals and fitted values, verified the applicability of the model and the normal distribution of the residuals, ensuring the accuracy of the subsequent analysis. In addition, by clustering the model residuals, this study successfully revealed potential population patterns in gene expression. The similar response patterns of genes under specific environmental conditions were indicated by the analysis of small clusters at the bottom of the clustered dendrogram, which provided new insights into the environmental sensitivity of gene expression.

Overall, the planting environment, fertilization strategies, sampling days, and their

interactions (gene and fertilization strategies, gene and sampling days), significantly affect the variation in gene expression levels. In this model, the coefficient for time (DAP\_for\_leaf\_sampling) is positive, but the coefficients for the interaction between time and individual genes are negative. This indicates that although there is a general trend of increasing gene expression levels over time when no fertilization is applied, this growth trend does not apply to all genes. Specifically, the expression levels of most genes actually decrease over time. From the analysis of planting regions and potato varieties, although all combinations positively influence gene expression, the Shepody variety planted in the Fredericton PK2014 area shows the most significant positive impact. Following closely is the Atlantic variety planted in the Fredericton GE2012 area, which also exhibits a strong positive effect.

Further investigation of fertilization strategies reveals that in scenarios of a single application, fertilization amounts of 106 and 180 significantly impact gene expression levels, with all genes except St.ClCh showing positive coefficients in interaction with these fertilization strategies. This implies that if only one fertilization can be applied, keeping the total amount at 106 or 180 might maximize growth indicators in potatoes. If applying fertilization twice, the first application should be kept at 60, with total amounts controlled at 120, 180, or 240, to maximize positive expression across all genes. Notably, when the fertilization strategies are set at 60:60 and 60:180, the interaction coefficients for all genes, including St.ClCh, are positive, indicating that these two fertilization methods should be prioritized in the potato cultivation process. From another perspective, by comparing the effects of single and multiple

fertilizations, this study also provides some practical recommendations for potato fertilization strategies. St.CWP, which stands for Cell Wall Protein, plays a crucial role in plant growth and development (Parenteau 2020). Research indicates that St.CWP is not only involved in the formation of cell walls and the elongation of cells but also significantly impacts resilience to adverse conditions. Specifically, this gene inhibits cell elongation, thereby reducing stem internode length and plant height, which enhances the plant's lodging resistance. Additionally, it promotes the synthesis of cellulose and the thickening of secondary walls. The increased thickness of cell walls and higher cellulose content further enhance the plant's resistance to diseases and pests, potentially leading to increased seed and biomass yields (Fan 2018). This study found that although the interaction coefficient of this gene with the fertilization strategy of 120:0 is negative, it is positive with the 60:60 strategy. This indicates that, given the same total amount of fertilization, a second application significantly boosts the expression level of this gene. A similar effect was observed in other genes such as St.AOX, St.CLH, St NT2, St.FT, St.LIP, and St.MtN21. These genes are Primary amine oxidase, Chlorophyllase, Low-affinity nitrate transporter, Flowering locus T protein, Chloroplast lipocalin, and Nodulin MtN21 family protein. The increased expression levels of these genes play a positive role in the growth process of potatoes (Parenteau 2020). In these cases, interaction coefficients with strategies involving a nonzero second fertilization are positive, while those with a zero second application are negative, demonstrating that compared to a single application, a second fertilization positively influences the growth and health of potatoes. Therefore, the

fertilization strategy most recommended by this study is 60:60, followed by 60:180. Both of these fertilization methods can significantly enhance the gene expression levels in potatoes. Meanwhile, the use of a 200:0 fertilization strategy is not recommended, as this approach leads to a significant decrease in the expression of most genes.

To further investigate, these methods can be used to explore the relationships between fertilization methods, planting environments, and potato varieties. Instead of simply combining planting regions and potato varieties, a more comprehensive model could be fitted to determine the most suitable planting regions and fertilization methods for each potato variety.

#### Reference

- Fan C. F., Wang Y. T., Peng L. C., & Feng S. Q. (2018). Plant extensins function and their potential genetic manipulation in crops. Plant Physiology Journal, 54(8), 9. <u>https://d.wanfangdata.com.cn/periodical/zwslxtx201808004</u>
- Hastie, Trevor, Tibshirani, Robert, Friedman, & Jerome. (2008). THE ELEMENTS OF STATISTICAL LEARNING: DATA MINING, INFERENCE, AND PREDICTION, SECOND EDITION (SPRING. World Book Publishing Company.
- Kabir, M. H., Alam, M. K., Hossain, M. A., Hossain, M. M., & Hossain, M. J. . (2004). Yield performance of whole-tuber and cut-piece planting of potato.

Tropical Science. https://onlinelibrary.wiley.com/doi/abs/10.1002/ts.124

Parenteau, M. T., Gu, H., Zebarth, B. J., Cambouris, A. N., & Tai, H. H...
(2020). Data mining nitrogen-responsive gene expression for source–sink
relations and indicators of n status in potato. Agronomy, 10(10), 1617.

https://www.mdpi.com/2073-4395/10/10/1617

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). An introduction to statistical learning. Springer New York.

https://www.semanticscholar.org/paper/An-Introduction-to-Statistical-

Learning%3A-with-in-R-Witten/b5e5a7eee59dd740897c0c3d1ada96c2e2a7e0a7

I would like to express my profound gratitude to Professor Gu Hong for her guidance and support throughout the year on the honors project and this thesis.

# Appendix

## <u>R code</u>

Since some of the data cleaning was not done in R Studio, the data was imported directly from the pre-processed 'data\_clean' dataset. Additionally, this code can also be applied to other response variables with only minor modifications required. Therefore, the detailed steps for fitting model 1 are not shown below. If necessary, only the code for fitting model 2 needs to be adjusted.

I. Convert data formats and data cleaning:
```{r}
library(tidyr)

```
library(dplyr)
data <- read.csv('~/Desktop/data clean.csv', header =</pre>
   TRUE)
gene cols <- grep("^St[. ]", names(data), value = TRUE)</pre>
data long <- pivot longer(data,</pre>
                       cols = all of(gene cols),
                       names to = "gene",
                       values to = "expression")
data long <- data long %>%
 select(gene, everything()) %>%
 arrange(gene, sample.ID)
data long <- data long %>%
 select(gene, expression, everything())
#Export the data converted to long format
write.csv(data long,
   "/Users/linxiyou/Documents/datalong.csv", row.names =
   FALSE)
. . .
```

# 2. <u>Preprocess variables and build the model:</u>

```
```{r}
# Import the data converted to long format
data <-
   read.csv("/Users/linxiyou/Documents/datalong.csv",
   header = TRUE)
# Preprocess each variable
data$syc <- paste(data$Site.year, data$cultivar, sep =</pre>
   "")
data$syc <- as.factor(data$syc)</pre>
data$first <- as.factor(data$N.source.at.planting.kg.ha)</pre>
data$second <- as.factor(data$N.source.2nd.appl..kg.ha)</pre>
data$fertilization Strategies <- interaction(data$first,</pre>
   data$second)
data$DAP for leaf sampling <-</pre>
   ifelse(data$DAP.for.leaf.sampling < 50, "0", "1")</pre>
data$DAP for leaf sampling <-</pre>
   as.factor(data$DAP for leaf sampling)
```

```
data$gene <- as.factor(data$gene)</pre>
data$trt <- as.factor(data$trt..)</pre>
data$block <- as.factor(data$block)</pre>
#Since the interaction between trt and block was not
   significant, the new model omitted these two
   variables.
model <- lm(expression ~ gene + syc +
   fertilization Strategies + DAP for leaf sampling +
            gene * DAP for leaf sampling + gene *
   fertilization Strategies, data = data)
# Due to the length of the output, the model fitting
   results were saved into a txt document.
sink("model.txt")
print(model)
sink()
#create the ANOVA table of the model 1
model anova <- anova(model)</pre>
print(model anova)
```

```
3. Create the Residuals vs Fitted plot and QQ plot
```

```
```{r}
# Perform logarithmic transformation on the original data
data$expression log <- log(data$expression)</pre>
model log <- lm(expression log ~ gene + syc +
fertilization_Strategies + DAP for leaf sampling
gene*DAP for leaf sampling+gene*fertilization Strategies,
data = data)
model log anova<-anova(model log)</pre>
print(model log anova)
#plot of the residual
par(mar=c(4, 4, 2, 2))
plot(resid(model log))
#Residuals vs Fitted plot and Use different colors for the
scatter points to distinguish between genes.
plot(fitted(model log), resid(model log), col=data$gene,
                                      ylab="Standardized
    main="Residuals
                    VS.
                            Fitted",
Residuals", xlab="Fitted Values", pch=19)
```

```
abline(h=0, col="red")
#qq plot
qqnorm(resid(model log))
qqline(resid(model log))
4. Cluster
library(pheatmap)
library(reshape2)
gene counts <- table(data$gene, data$DAP for leaf sampling)</pre>
residuals data <- resid(model)</pre>
n <- nrow(gene counts)</pre>
time points <-2
summary(residuals data)
#Add the residual of the model to the data
data$residuals = residuals data
aggregate residuals <- aggregate (residuals ~ gene +
DAP for leaf sampling, data, mean)
# Calculate distance between genes
residuals wide <- dcast(aggregate residuals,
  qene ~
DAP for leaf sampling, value.var = "residuals")
residuals dist <- dist(as.matrix(residuals wide[,-1]))</pre>
hc <- hclust(residuals dist)</pre>
plot(hc, hang=-1)
#Assume that the number of clusters is set to 3 and view
the output
k <- 3
clusters <- cutree(hc, k)</pre>
residuals wide$cluster <- clusters
cat("Number of genes in each cluster:\n")
print(table(residuals wide$cluster))
cat("\nGenes in each cluster:\n")
for (i in 1:k) {
 cat(sprintf("Cluster %d:\n", i))
 print(residuals wide$gene[residuals wide$cluster == i])
}
         labels=residuals wide$gene, cex=0.6, hang=-1,
plot(hc,
main="Cluster Dendrogram")
```

# <u>Output</u>

# 1. <u>The full output of the model 2</u>

Call:						
lm(formula = expression ~ aene + syc + ferti	lization Strategies +		geneSt.LOB38B	-3180.12	398.45	-7.981 1.52e-15 ***
DAP for leaf sampling + gene * DAP for 1	eaf sampling + gene *		geneSt MTP	-2868.24	398.45	-7.199 6.27e-13 ***
fertilization Strategies data = data)	cur_sumpring r gene		geneSt.MSF5A	-2594.09	398.45	-6.510 7.64e-11 ***
fer erritzation_ber acogres, aata = aatay			geneSt.MSF5B	-3087.17	398.45	-7.748 9.72e-15 ***
Residuals:			geneSt.MSRB	-3172.11	398.45	-7.961 1.78e-15 ***
Min 10 Median 30 Max			geneSt.MtN21	-2890.33	398.45	-7.254 4.17e-13 ***
-29277 -266 -33 160 70713			geneSt.Nod	-3156.44	398.45	-7.922 2.44e-15 ***
			geneSt.NT	-3180.85	398.45	-7.983 1.49e-15 ***
Coefficients			geneSt.P109A	-3223.44	398.45	-8.090 6.26e-16 ***
	Estimate Std. Error t va	lue Pr(> t )	geneSt.PBenzR	-2980.68	398.45	-7.481 7.65e-14 ***
(Intercept)	2632.31 287.81 9.	146 < 2e-16 ***	geneSt.PDX	-3154.50	398.45	-7.917 2.54e-15 ***
geneSt NT2	-2659.49 398.45 -6.0	675 2.53e-11 ***	geneSt.PEPT	-3224.31	398.45	-8.092 6.15e-16 ***
geneSt. PP7A	-3217.74 398.45 -8.0	076 7.03e-16 ***	geneSt.PLD	-3227.87	398.45	-8.101 5.71e-16 ***
geneSt PP7R	-3221.76 398.45 -8.0	086 6 48e-16 ***	geneSt.PolyAP	-3187.32	398.45	-7.999 1.31e-15 ***
geneSt AAT1	-2760.96 398.45 -6.9	929 4.34e-12 ***	geneSt.PP2C	-3201.24	398.45	-8.034 9.86e-16 ***
genest AAT2	-3187 76 398 45 -8	000 1 30e-15 ***	geneSt.ProD	-2958.64	398.45	-7.425 1.16e-13 ***
geneSt A0X	-1346.90 398.45 -3	380 0.000725 ***	geneSt.ProH	-3218.95	398.45	-8.079 6.86e-16 ***
geneSt Angse	-2579 88 398 45 -6	475 9 68e-11 ***	geneSt.PyrK	-2602.22	398.45	-6.531 6.67e-11 ***
geneSt ATrfA	-3211 62 398 45 -81	060 7 97e-16 ***	geneSt.RPK	-3225.98	398.45	-8.096 5.94e-16 ***
geneSt ATrfR	-2923 62 398 45 -7	338 2 250-13 ***	geneSt.Sulfase	-3023.03	398.45	-7.587 3.40e-14 ***
geneSt CatT	-3077 47 398 45 -7	724 1 18e-14 ***	geneSt.SulfT	-2990.55	398.45	-7.506 6.34e-14 ***
geneSt CatTR	-1978 99 398 45 -4	967 6 86e-07 ***	geneSt.SulfT2A	-3148.80	398.45	-7.903 2.85e-15 ***
geneSt CG	-3067 09 398 45 -7	698 1 440-14 ***	geneSt.SulfT2B	-3210.23	398.45	-8.057 8.20e-16 ***
geneSt CHT	-1340 83 398 45 -3	365 0 000766 ***	geneSt.SulfT2C	-3198.41	398.45	-8.027 1.04e-15 ***
geneSt (1)	-1383 16 398 45 -3	471 0 000510 ***	geneSt.TRDX	-2146.84	398.45	-5.388 7.19e-08 ***
geneSt CLH	-2946 69 398 45 -7	395 1 460-13 ***	geneSt.UBIE	-2165.79	398.45	-5.436 5.52e-08 ***
geneSt CWD	9623 29 398 45 24	152 20-16 ***	genest.Unk1	-3132.75	398.45	-7.862 3.93e-15 ***
geneSt.Cur	-2005 67 308 45 -7	518 5 750-14 ***	geneSt.Unk2	-3026.98	398.45	-7.597 3.15e-14 ***
geneSt.CysFII	-3191 36 398 45 -81	009 1 210-15 ***	genest.Unks	-3227.15	398.45	-8.099 5.80e-16 ***
geneSt DUE506A	-2408 51 398 45 -6	045 1 520-09 ***	genest.unk4	-3193.07	200.45	7 10F 1 24- 12 ***
geneSt_DUE506B	_3199 20 398 45 _8	070 1 030-15 ***	geneSt.UnkS	-2050.07	208 45	7 441 1 020 12 ***
geneSt EPT	-3154 62 398 45 -7	917 2 540-15 ***	sycEnedenicton GE2012 Atlantic	-2903.03	75 63	15 370 - 20-16 ***
geneSt ET	-2889.66 398.45 -7	252 4 230-13 ***	sycFredericton GE2012_Actuatic	846.37	75.63	11 101 < 20-16 ***
geneSt GluAce	-2005.00 598.45 -7.	734 1 090-14 ***	sycFredericton GE2012_Russet building	888 53	75.70	11 737 < 20-16 ***
geneSt. GluDC	-2862.00 308.45 -7	183 7 030-13 ***	sycFredericton MAT2014 Jamsen	712 56	94 15	7 568 3 930-14 ***
geneSt CP3	-2589 39 398 45 -6	499 8 276-11 ***	sycFredericton MAT2014 Russet Burbank	675 72	94 15	7 177 7 36e-13 ***
geneSt GST	-2923 87 398 45 -7	338 2 240-13 ***	sycFredericton MAT2014 Shepody	814.23	94.15	8.648 < 2e-16 ***
genest. the	-2660 77 398 45 -6	678 2 480-11 ***	sycFredericton PK2014 Russet Burbank	875.23	112.45	7.783 7.38e-15 ***
geneSt Kingse	-3190 59 398 45 -81	008 1 22e-15 ***	sycFredericton PK2014_Shepody	1269.15	133.13	9.533 < 2e-16 ***
geneSt ITP	-2718 69 398 45 -6	823 9 120-12 ***	sycOff-Carberry 2014 Russet Burbank	320,60	79.15	4.050 5.13e-05 ***
geneSt LOB38A	-3225.09 398.45 -8	094 6 05e-16 ***	sycOn-Carberry 2014_Russet Burbank	474.96	79.17	6.000 2.01e-09 ***

# Figure 14: Summary of the model 2 (1)

farmer farmer in a second				<pre>geneSt.LOB38B:DAP_for_leaf_sampling1</pre>	-1137.82	335.94	-3.387 0.000708 ***
sycPZribonka 2014_Classic Russet	426.34	80.03	5.327 1.01e-07 ***	geneSt.MIP:DAP_for_leaf_sampling1	-1130.02	335.94	-3.364 0.000770 ***
fertilization_Strategies60.0	-380.74	379.11	-1.004 0.315234	geneSt.MSF5A:DAP_for_leaf_sampling1	-1752.11	335.94	-5.216 1.85e-07 ***
fertilization_Strategies106.0	-1709.67	499.52	-3.423 0.000621 ***	geneSt.MSF5B:DAP_for_leaf_sampling1	-1267.56	335.94	-3.773 0.000162 ***
fertilization_Strategies120.0	51.79	457.59	0.113 0.909889	geneSt.MSRB:DAP_for_leaf_sampling1	-1178.19	335.94	-3.507 0.000454 ***
fertilization_Strategies180.0	-1352.69	340.01	-3.978 6.96e-05 ***	geneSt.MtN21:DAP_for_leaf_sampling1	-1065.78	335.94	-3.173 0.001513 **
fertilization_Strategies200.0	807.03	691.72	1.167 0.243343	geneSt.Nod:DAP_for_leaf_sampling1	-1125.41	335.94	-3.350 0.000809 ***
fertilization_Strategies240.0	-278.48	469.46	-0.593 0.553064	geneSt.NT:DAP_for_leaf_sampling1	-1154.47	335.94	-3.437 0.000590 ***
fertilization_Strategies60.60	-2692.89	523.14	-5.148 2.66e-07 ***	aeneSt.P109A:DAP_for_leaf_sampling1	-1156.13	335.94	-3.441 0.000580 ***
fertilization_Strategies60.120	-2718.71	473.71	-5.739 9.63e-09 ***	<pre>geneSt.PBenzR:DAP_for_leaf_sampling1</pre>	-1408.39	335.94	-4.192 2.77e-05 ***
fertilization_Strategies0.180	-3968.33	1531.60	-2.591 0.009577 **	geneSt.PDX:DAP for leaf sampling1	-1160.01	335.94	-3.453 0.000555 ***
fertilization_Strategies60.180	-2826.65	495.91	-5.700 1.21e-08 ***	geneSt_PEPT:DAP_for_leaf_sampling1	-1157.52	335.94	-3.446 0.000571 ***
DAP_for_leaf_sampling1	997.98	238.01	4.193 2.76e-05 ***	geneSt PLD:DAP for leaf sampling1	-1157 51	335 94	-3 446 0 000571 ***
geneSt_NT2:DAP_for_leaf_sampling1	-1111.34	335.94	-3.308 0.000941 ***	geneSt PolyAP:DAP for leaf sampling1	-1135 39	335 94	-3 380 0 000727 ***
geneStPP7A:DAP_for_leaf_sampling1	-1147.00	335.94	-3.414 0.000641 ***	geneSt PP2C:DAP for leaf sampling1	-1165 41	335 94	-3 469 0 000523 ***
<pre>geneStPP7B:DAP_for_leaf_sampling1</pre>	-1154.43	335.94	-3.436 0.000591 ***	const BroD:DAD for loaf campling1	-1090.47	225 04	-2 242 0 001194 **
geneSt.AAT1:DAP_for_leaf_sampling1	-1367.50	335.94	-4.071 4.70e-05 ***	genest. Prob. DAP_for_leaf_sampling1	-1009.47	335.94	2 460 0 000541 ***
geneSt.AAT2:DAP_for_leaf_sampling1	-1185.22	335.94	-3.528 0.000419 ***	genest.Proh.DAP_tor_leat_sampling1	-1102.40	225.04	-3.400 0.000341 ***
geneSt.AOX:DAP_for_leaf_sampling1	-1172.81	335.94	-3.491 0.000482 ***	genest.pyrk:DAP_for_leat_sampling1	-1145.00	335.94	-3.404 0.000004
geneSt.Apase:DAP_for_leaf_sampling1	-1869.50	335.94	-5.565 2.65e-08 ***	genest.KPK:DAP_tor_leat_sampling1	-1156.99	335.94	-3.444 0.000574 ***
geneSt.ATrfA:DAP_for_leaf_sampling1	-1154.89	335.94	-3.438 0.000588 ***	geneSt.Sulfase:DAP_for_leat_sampling1	-1149.86	335.94	-3.423 0.000621 ***
geneSt.ATrfB:DAP_for_leaf_sampling1	-1183.57	335.94	-3.523 0.000427 ***	geneSt.SulfI:DAP_for_leat_sampling1	-1168.86	335.94	-3.479 0.000504 ***
geneSt.CatT:DAP_for_leaf_sampling1	-1123.88	335.94	-3.345 0.000823 ***	geneSt.SulfIZA:DAP_for_leaf_sampling1	-1169.67	335.94	-3.482 0.000499 ***
geneSt.CatTR:DAP_for_leaf_sampling1	-1364.76	335.94	-4.063 4.87e-05 ***	geneSt.SulfT2B:DAP_for_leaf_sampling1	-1163.07	335.94	-3.462 0.000537 ***
geneSt.CGL:DAP_for_leaf_sampling1	-1193.02	335.94	-3.551 0.000384 ***	geneSt.SulfT2C:DAP_for_leaf_sampling1	-1142.60	335.94	-3.401 0.000672 ***
geneSt.CHI:DAP_for_leaf_sampling1	-2858.22	335.94	-8.508 < 2e-16 ***	geneSt.TRDX:DAP_for_leaf_sampling1	-2100.27	335.94	-6.252 4.13e-10 ***
geneSt.ClCh:DAP_for_leaf_sampling1	1371.75	335.94	4.083 4.46e-05 ***	geneSt.UBIE:DAP_for_leaf_sampling1	-902.01	335.94	-2.685 0.007258 **
geneSt.CLH:DAP_for_leaf_sampling1	-1183.70	335.94	-3.524 0.000427 ***	geneSt.Unk1:DAP_for_leaf_sampling1	-1232.41	335.94	-3.669 0.000245 ***
geneSt.CWP:DAP_for_leaf_sampling1	-1453.92	335.94	-4.328 1.51e-05 ***	geneSt.Unk2:DAP_for_leaf_sampling1	-1235.93	335.94	-3.679 0.000235 ***
geneSt.CysPI1:DAP_for_leaf_sampling1	-1367.22	335.94	-4.070 4.72e-05 ***	geneSt.Unk3:DAP_for_leaf_sampling1	-1156.97	335.94	-3.444 0.000574 ***
geneSt.CysT:DAP_for_leaf_sampling1	-1163.86	335.94	-3.464 0.000532 ***	geneSt.Unk4:DAP_for_leaf_sampling1	-1189.89	335.94	-3.542 0.000398 ***
geneSt.DUF506A:DAP_for_leaf_sampling1	-2126.44	335.94	-6.330 2.50e-10 ***	geneSt.Unk5:DAP_for_leaf_sampling1	-1199.59	335.94	-3.571 0.000357 ***
aeneSt.DUF506B:DAP_for_leaf_sampling1	-1184.21	335.94	-3.525 0.000424 ***	geneSt.Xyl:DAP_for_leaf_sampling1	-1249.44	335.94	-3.719 0.000200 ***
geneSt.EPI:DAP_for_leaf_sampling1	-1133.67	335.94	-3.375 0.000740 ***	geneSt_NT2:fertilization_Strategies60.0	195.92	535.51	0.366 0.714471
aeneSt.FT:DAP_for_leaf_sampling1	-1102.80	335,94	-3.283 0.001030 **	geneStPP7A:fertilization_Strategies60.0	424.07	535.51	0.792 0.428425
<pre>geneSt.GluAse:DAP_for_leaf_sampling1</pre>	-1138.09	335.94	-3.388 0.000706 ***	geneStPP7B:fertilization_Strategies60.0	422.35	535.51	0.789 0.430304
aeneSt.GluDC:DAP_for_leaf_sampling1	-1389.87	335,94	-4.137 3.53e-05 ***	<pre>aeneSt.AAT1:fertilization Strategies60.0</pre>	632.55	535.51	1.181 0.237528
geneSt.GR3:DAP_for_leaf_sampling1	-1930.14	335.94	-5.745 9.28e-09 ***	geneSt.AAT2:fertilization Strategies60.0	429.69	535.51	0.802 0.422332
geneSt.GST:DAP for leaf sampling1	-1181.37	335.94	-3.517 0.000438 ***	geneSt AOX:fertilization Strategies60 0	-347.17	535.51	-0.648 0.516790
geneSt.InosD:DAP_for_leaf_sampling1	-1683.84	335.94	-5.012 5.42e-07 ***	geneSt Angse:fertilization Strategies60 0	1012.52	535.51	1 891 0 058667
geneSt.Kingse:DAP_for_leaf_sampling1	-1187.34	335.94	-3.534 0.000410 ***	geneSt ATrfA: fertilization Strategies60.0	424.63	535.51	0.793 0.427812
geneSt.LIP:DAP for leaf sampling1	-1058.67	335.94	-3.151 0.001627 **	geneSt ATrfR fertilization Strategies60 0	292 90	535 51	0 547 0 584406
aeneSt.LOB38A:DAP_for_leaf_sampling1	-1157.68	335,94	-3,446 0,000570 ***	geneSt CatT fertilization Strategies60.0	404 08	535.51	0 755 0 450512
				denegerederiner er er en el el al al al al el el esterederes de la el el el estere el el el el estere el el el estere el el el estere el el estere			0.133 0.730316

Figure 15: Summary of the model 2 (2)

genest. CL: fertilization_Strategies60.0 481.34 535.51 0.899 0.369739 genest. CL: fertilization_Strategies60.0 130.7 for tilization_Strategies60.0 130.7 for tilization_Strategies60.0 420.6 535.51 0.790 0.424087 genest. CL: fertilization_Strategies60.0 420.7 55.51 0.780 0.45027 genest. CL: fertilization_Strategies60.0 433.7 55.51 0.780 0.42502 genest. L: LI: fertilization_Strategies60.0 433.7 55.51 0.780 0.43037 genest. CL: fertilization_Strategies60.0 433.7 55.51 0.780 0.43037 genest. LI: LI: fertilization_Strategies60.0 433.7 55.51 0.830 0.42172 genest. LI: LI: fertilization_Strategies60.0 433.6 55.51 0.820 0.57066 genest. LI: LI: fertilization_Strategies60.0 433.6 55.51 0.820 0.57066 genest. LI: LI: fertilization_Strategies60.0 433.6 55.51 0.820 0.5279 genest. LI:	geneSt.CatTR:fertilization_Strategies60.0	131.85	535.51	0.246 0.805518	appost Sulface: fortilization Strategies60.0	220 52	525 51	0 615 0 529226
genest. (L1:fertilization_Strategies60.0 1347.9 0.335.1 0.72 0.000242 *** genest. Sul723: fertilization_Strategies60.0 428.06 535.1 0.730 0.44027 genest. (L1:fertilization_Strategies60.0 433.07 535.1 0.735 1. 0.735 5. 1 0.735 5. 1 0.735 5. 1 0.735 5. 1 0.737 0.44027 genest. (L1:fertilization_Strategies60.0 433.07 535.1 0.937 0.3377 1 genest. (L1:fertilization_Strategies60.0 433.07 535.1 0.937 0.33781 genest. (L1:fertilization_Strategies60.0 433.07 535.1 0.157 0.4308 0.4272) genest. (LUE:fertilization_Strategies60.0 433.5 55.1 0.730 0.44224 genest. (LUE:fertilization_Strategies60.0 433.5 55.1 0.730 0.44225 genest. (LUE:fertilization_Strategies60.0 433.6 535.1 1.738 0.72115 genest. (LUE:fertilization_Strategies60.0 437.2 535.1 1.330 0.126270 genest. (LUE:fertilization_Strategies60.0 437.2 535.1 0.822 0.60036 genest. (LUE:fertilization_Strategies60.0 437.3 535.1 0.822 0.60036 genest. (LUE:fertilization_Strategies60.0 437.3 535.1 0.822 0.600	geneSt.CGL:fertilization_Strategies60.0	481.34	535.51	0.899 0.368739	geneSt.Sulfuse:Tertilization_Strategies60.0	529.52	535.51	1 022 0 206502
genest. (Lif-fertilization_Strategies60.         3347.99         535.51         6.222 4.12e-10         genest. (Lif-fertilization_Strategies60.         402.0         535.51         0.790 4.42423           genest. (Lif-fertilization_Strategies60.         439.76         535.51         0.518.0.53644         454017           genest. (Lyf-fritilization_Strategies60.         439.76         535.51         0.790 4.32642         988.51.0017/26.7611120100_Strategies60.         430.75         555.51         0.780 4.84243           genest. (Lyf-fertilization_Strategies60.         837.75         535.51         0.803 0.42172         genest.1005/66.17611122100_Strategies60.         430.75         535.51         0.803 0.42172           genest. (Lyf-fertilization_Strategies60.0         843.75         535.51         0.803 0.42172         genest. Luki-fertilization_Strategies60.0         431.9         436224           genest. (Lyf-fertilization_Strategies60.0         432.66         535.51         0.770 0.441224         genest. Luki-fertilization_Strategies60.0         433.55         535.51         0.770 0.44124           genest. (Luki-fertilization_Strategies60.0         432.67         4380.67         535.51         0.770 0.44124           genest. (Luki-fertilization_Strategies60.0         744.48         535.51         1.374 0.4812.74         648.33         535.51         1.379 0.47212	geneSt.CHI:fertilization_Strategies60.0	1965.75	535.51	3.671 0.000242 ***	genest.SulfT2A:fortilization_Strategies60.0	510 17	535.51	0.053 0.300302
genest. (LH: fertilization_Strategies60.0       331.04       535.51       0.618       0.536464       genest. (DH: fertilization_Strategies60.0       4007.76       535.51       0.728       <2e.1	geneSt.ClCh:fertilization_Strategies60.0	3347.99	535.51	6.252 4.12e-10 ***	geneSt. SulfT2R. fertilization_Strategies60.0	428.06	535.51	0.333 0.340733
genest. UMP: fertilization. Strategies60. e 4957.76 355.51 9.258 <2000 4097 0.1378.1 genest. UMP: Intellication Strategies60.0 133.8 555.52 0.280 097 0.1378 genest. UMP: Intellication Strategies60.0 133.8 555.51 0.280 0.297 0.1378 genest. UMP: Intellication. Strategies60.0 130.62 535.51 0.980 0.42172 genest. UMP: Intellication. Strategies60.0 433.55 0.57606 0.997 0.1378 genest. UMP: Intellication. Strategies60.0 432.57 0.57606 0.997 0.1378 genest. UMP: Intellication. Strategies60.0 432.57 0.57606 0.997 0.1378 genest. UMP: Intellication. Strategies60.0 432.57 0.5780 0.49253 genest. UMP: Intellication. Strategies60.0 432.57 0.5780 0.49253 genest. UMP: Intellication. Strategies60.0 432.57 0.5780 0.49253 genest. UMP: Intellication. Strategies60.0 435.57 0.6780 0.49253 genest. UMP: Intellication. Strategies60.0 714.45 535.51 0.827 0.40807 genest. UMP: Intellication. Strategies60.0 794.38 535.51 1.378 0.17840 genest. UMP: Intellication. Strategies60.0 794.38 535.51 1.378 0.17840 genest. UMP: Intellication. Strategies60.0 794.38 535.51 1.378 0.17840 genest. UMP: Intellication. Strategies60.0 794.38 535.51 0.827 0.40807 genest. UMP: Intellication. Strategies60.0 437.7 748.0 0.1322 genest. UMP: Intellication. Strategies60.0 437.7 748.0 0.1322 genest. UMP: Intellication. Strategies60.0 437.7 748.0 0.1322 genest. UMP: Intellication. Strategies60.0 437.7 73 535.51 0.522 0.4042 genest. UMP: Intellication. Strategies60.0 437.7 355.51 0.522 0.4042 genest. UMP: Intellication. Strategies60.0 437.7 355.51 0.827 0.4042 genest. UMP: Intellication. Strategies60.0 437.7 0.578 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602 0.578 0.602	geneSt.CLH:fertilization_Strategies60.0	331.04	535.51	0.618 0.536464	geneSt SulfT2C: fortilization Strategies60.0	428.00	535.51	0.755 0.424087
genest. (JysPII:fertilization_Strategies60.0 533.89 335.51 0.997 0.318781 genest. (JWS) (Hilliand Strategies60.0 242.53 55.51 0.803 0.42712 genest. (JWS) (Hilliand Strategies60.0 242.53 55.51 0.930 0.36742 genest. JWS) (Hilliand Strategies60.0 242.59 535.51 0.950 0.34330 genest. JWS) (Hilliand Strategies60.0 242.59 535.51 0.950 0.34330 genest. JWS) (Hilliand Strategies60.0 242.59 535.51 0.950 0.34330 genest. JWS) (Hilliand Strategies60.0 242.59 535.51 0.810 0.41325 genest. JWS) (Hilliand Strategies60.0 242.59 535.51 0.810 0.41325 genest. JWS) (Hilliand Strategies60.0 242.59 535.51 0.813 0.41326 genest. JWS) (Hilliand Strategies60.0 276.60 535.51 1.315 0.1748 0.43256 genest. JWS) (Hilliand Strategies60.0 1731.47 1448 535.51 1.338 0.12224 genest. JWS) (Hilliand Strategies60.0 1731.47 1448 535.51 1.338 0.12234 genest. JWS) (Hilliand Strategies60.0 1731.47 1448 535.51 1.338 0.12234 genest. JWS) (Hilliand Strategies60.0 1731.47 1448 535.51 1.338 0.12234 genest. JWS) (Hilliand Strategies60.0 1731.47 1448 535.51 1.533 0.12234 genest. JWS) (Hilliand Strategies60.0 1731.47 1448 1223 1110 0.257033 genest. JWS) (Hilliand Strategies60.0 1731.47 14840 genest. JWS) (Hilliand Strategies60.0 1731.47 148.6 12324 genest. JWS) (Hilliand Strategies60.0 1731.77 1535.51 0.812 0.41377 genest. JWS) (Hilliand Strategies60.0 1731.77 148.8 12324 genest. JWS) (Hilliand Strategies60.0 1731.77 148.8 1235 110 0.00714 genest. JWS) (Hilliand Strategies60.0 1731.77 148.8 1235 11.48 148 genest. JWS) (Hilliand	geneSt.CWP:fertilization_Strategies60.0	-4957.76	535.51	-9.258 < 2e-16 ***	geneSt TEDY fertilization Strategies60.0	1139 38	535.51	2 128 0 033375 *
genest. LySG:fertilization_Strategies60.0 430.26 535.51 0.803 0.42712 genest. Luki:fertilization_Strategies60.0 510.62 535.51 0.930 0.366742 genest. LUFSG6:fertilization_Strategies60.0 431.35 53.51 0.930 0.366742 genest. LUFSG6:fertilization_Strategies60.0 431.55 51 0.930 0.366742 genest. LUFSG6:fertilization_Strategies60.0 431.55 51 0.930 0.43023 genest. FI:fertilization_Strategies60.0 431.57 535.51 0.930 0.43023 genest. FI:fertilization_Strategies60.0 435.27 535.51 0.830 0.43023 genest. GiuxG:fertilization_Strategies60.0 594.38 535.51 1.334 0.182148 genest. GiuxG:fertilization_Strategies60.0 594.38 535.51 1.300 0.10944 to 0.267033 genest. GiuxG:fertilization_Strategies60.0 1730.4 70 74.80 2.455 0.010947 to genest. GiuxG:fertilization_Strategies60.0 437.77 1.335.51 0.947 0.613460 genest. LNP76:fertilization_Strategies160.0 1730.4 70 74.80 2.455 0.010947 to genest. Inso:fertilization_Strategies60.0 437.71 533.51 0.947 0.613460 genest. LNP76:fertilization_Strategies160.0 1730.4 70 74.80 2.455 0.013862 genest. LNP76:fertilization_Strategies160.0 1730.4 70 74.80 2.455 0.013862 genest. LNP76:fertilization_Strategies160.0 1730.4 70 44.80 2.478 0.013822 to genest. LNP76:fertilization_Strategies160.0 1730.7 70 44.80 2.478 0.013282 to genest. LNP76:fertilization_Strategies160.0 1731.7 70 44.80 2.478 0.013282 to genest. LNP76:fertilization_Strategies160.0 1731.7 70 44.80 2.467 0.013862 genest. LNP76:fertilization_Strategies160.0 1731.7 70 44.80 2.325 0.02086 to genest. LNP76:fertilization_Strategies160.0 1231.7 70 44.80 2.325 0.02086 to genest. MNF36:fertilization_Strategies160.0 422.3 535.51 0.780	<pre>geneSt.CysPI1:fertilization_Strategies60.0</pre>	533.89	535.51	0.997 0.318781	coneSt URTE: fortilization Strategies60.0	208 72	525 51	0 558 0 576966
genest. JUD5966: Fertilization_Strategies60.0 433.5 i 1.615 0.166355 genest. JuR2: Fertilization_Strategies60.0 422.3 535.5 0.029 0.440320 genest. JUR2: Fertilization_Strategies60.0 422.3 535.5 0.0290 0.440320 genest. JUR2: Fertilization_Strategies60.0 422.3 535.5 0.0290 0.440320 genest. JUR2: Fertilization_Strategies60.0 422.3 535.5 0.0290 0.440320 genest. JUR2: Fertilization_Strategies60.0 726.60 535.5 1.0370 0.440320 genest. JUR2: Fertilization_Strategies60.0 726.60 535.5 1.0370 0.440320 genest. JUR2: Fertilization_Strategies60.0 726.60 535.5 1.0370 0.146256 genest. JUR2: Fertilization_Strategies60.0 726.60 535.5 1.0370 0.146256 genest. JUR2: Fertilization_Strategies60.0 728.4 9.0 0.267033 genest. GUIDE: Fertilization_Strategies60.0 728.4 9.0 0.267033 genest. JUR2: Fertilization_Strategies60.0 1734.7 74.89 2.545 0.014997 genest. JUR2: Fertilization_Strategies106.0 1734.7 74.89 2.545 0.014997 genest. JUR2: Fertilization_Strategies106.0 1734.7 74.89 2.450 0.01494 genest. JUR2: Fertilization_Strategies106.0 1734.7 74.89 2.450 0.01492 genest. JUR2: Fertilization_Strategies106.0 1734.7 74.89 2.450 0.01323 genest. JUR2: Fertilization_Strategies106.0 1734.7 74.89 2.450 0.00353 genest. JUR2: Fertilization_Strategies106.0 1931.7 704.89 2.450 0.00353 g	geneSt.CysT:fertilization_Strategies60.0	430.26	535.51	0.803 0.421712	geneSt Unk1:fertilization Strategies60.0	483 35	535.51	0.903 0.366742
genest. DUFS068: fertilization_Strategies60.0 433.50 435.51 0.810 0.418224 genest. Lnk3: fertilization_Strategies60.0 422.39 535.51 0.730 0.43023 genest. FT: fertilization_Strategies60.0 435.27 535.51 0.730 0.43023 genest. Lnk3: fertilization_Strategies60.0 435.27 535.51 0.730 0.43023 genest. FT: fertilization_Strategies60.0 435.27 535.51 0.730 0.43023 genest. Lnk3: fertilization_Strategies60.0 435.27 535.51 0.730 0.43023 genest. Lnk3: fertilization_Strategies60.0 435.27 535.51 0.730 0.43023 genest. Lnk3: fertilization_Strategies60.0 594.38 535.51 1.337 0.174&40 genest. Guixo: fertilization_Strategies60.0 594.38 535.51 0.130 0.10944 genest. Guixo: fertilization_Strategies60.0 594.38 535.51 0.01094 for genest. Guixo: fertilization_Strategies60.0 730.49 704.80 2.455 0.010947 genest. Lnk3: fertilization_Strategies60.0 730.49 704.80 2.455 0.010947 genest. Lnk3: fertilization_Strategies160.0 1730.49 704.80 2.455 0.010947 genest. Lnk3: fertilization_Strategies160.0 1730.47 70 44.80 2.478 0.013862 genest. Lnk3: fertilization_Strategies160.0 1730.47 70 44.80 2.478 0.013862 genest. Lnk3: fertilization_Strategies160.0 1730.79 704.80 2.478 0.013862 genest. Lnk3: fertilization_Strategies10.0 423.35 535.51 0.971 40.2917 genest. ANI: fertilization_Strategies10.0 1230.77 704.80 2.478 0.01223 genest. Lnk3: fertilization_Strategies10.0 423.35 535.51 0.972 0.40042 genest. Lnk3: fertilization_Strategies60.0 422.35 535.51 0.972 0.40042 genest. ANI: fertilization_Strategies10.0 1163.8 704.80 2.478 0.012082 genest. MR3: fertilization_Strategies10.0 423.35 50 0.02008 genest. MR3: fertilization_Strategies10.0 420.33 535.51 0.978 0.42023 59 genest. MR3: fertilization_Strategies10.0 420.33 535.51 0.978 0.42023 59 genest. MR3: fertilization_Strategies10.0 420.33 53.51 0.978 0.42024 genest. Mr1: fertilization_Strategies1	<pre>geneSt.DUF506A:fertilization_Strategies60.0</pre>	864.77	535.51	1.615 0.106355	geneSt Unk2:fertilization Strategies60.0	510 62	535 51	0 954 0 340330
genest. FPI:fertilization_Strategies60.0 412.40 535.51 0.770 0.441245 genest. Link:fertilization_Strategies60.0 455.27 535.51 0.8120 0.416326 genest. Link:fertilization_Strategies60.0 726.60 535.51 1.137 0.416326 genest. Link:fertilization_Strategies60.0 726.60 535.51 1.137 0.416326 genest. Giuks:fertilization_Strategies60.0 726.60 535.51 1.137 0.416326 genest. Giuks:fertilization_Strategies60.0 726.60 535.51 1.137 0.416326 genest. Giuks:fertilization_Strategies60.0 729.74 704.80 2.545 0.010944 • genest. Giuks:fertilization_Strategies60.0 729.74 704.80 2.545 0.010944 • genest. Giuks:fertilization_Strategies60.0 729.74 704.80 2.545 0.010944 • genest. Giuks:fertilization_Strategies106.0 1734.77 704.80 2.545 0.010944 • genest. Giuks:fertilization_Strategies106.0 1734.77 704.80 2.456 0.010826 • genest. Giuks:fertilization_Strategies106.0 1734.77 704.80 2.456 0.010826 • genest. Links:fertilization_Strategies106.0 1739.79 704.80 2.456 0.01328 • genest. Links:fertilization_Strategies60.0 279.73 535.51 0.522 0.601422 genest. ATI:fertilization_Strategies106.0 1739.79 704.80 2.466 0.01338 • genest. Lin8:fertilization_Strategies60.0 423.38 535.51 0.522 0.601422 genest. ATI:fertilization_Strategies106.0 1180.38 704.80 0.092377 genest. Lin8:fertilization_Strategies60.0 420.23 535.51 0.822 0.41026 genest. ATF:fertilization_Strategies106.0 1180.38 704.80 2.456 0.01242 e genest. MTP:fertilization_Strategies60.0 420.23 535.51 0.822 0.41066 genest. Adoes:fertilization_Strategies106.0 1193.71 704.80 2.456 0.00249 • genest. MSB:fertilization_Strategies60.0 434.33 535.51 0.823 0.41066 genest. CaTR:fertilization_Strategies106.0 139.21 704.80 2.711 0.006719 • genest. MSB:fertilization_Strategies60.0 434.33 535.51 0.820 0.42282 genest. CaTR:fertilization_Strategies106.0 139.21 704.80 2.457 0.00248 • genest. MSB:fertilization_Strategies106.0 139.21 704.80 2.457 0.00248 • genest. MSB:fertilization_Strategies106.0 139.21 704.80 2.457 0.00248 • genest. MSB:fertilization_Strategies106.0 139.21 704.80 2.457 0.00248 • genest. CaTR:fertilizat	geneSt.DUF506B:fertilization_Strategies60.0	433.50	535.51	0.810 0.418224	geneSt Unk3:fertilization Strategies60.0	422 39	535 51	0 789 0 430253
genest. f. Fr. fertilization_Strategies60.0 433.61 535.51 0.527 0.408050 genest. Luks fertilization_Strategies60.0 535.51 1.357 0.174400 genest. GLUBC: fertilization_Strategies60.0 535.51 1.36 0.827 0.408050 genest. KLUBS: fertilization_Strategies60.0 535.51 1.36 0.2703.0 408050 genest. GLUBC: fertilization_Strategies60.0 535.51 0.137 0.174400 genest. GLUBC: fertilization_Strategies60.0 535.51 0.137 0.174400 genest. GLUBC: fertilization_Strategies60.0 535.51 0.137 0.1270.0 207033 genest. GLUBC: fertilization_Strategies60.0 535.51 0.137 0.1270.0 207033 genest. GLUBC: fertilization_Strategies60.0 535.51 0.137 0.1270.0 207033 genest. GLUBC: fertilization_Strategies106.0 1730.4 7 704.89 2.455 0.010947 genest. GLUBC: fortilization_Strategies60.0 279.7 3 535.51 0.137 0.413717 genest. AATI: fertilization_Strategies106.0 1730.4 7 704.89 2.455 0.010947 genest. Kinas: fertilization_Strategies60.0 279.7 3 535.51 0.522 0.60142 genest. AATI: fertilization_Strategies106.0 1746.6 704.89 2.478 0.013282 genest. GLUBSA: fertilization_Strategies60.0 423.8 535.51 0.522 0.60142 genest. AAX: fertilization_Strategies106.0 1126.3 704.89 2.478 0.013282 genest. GLUBSA: fertilization_Strategies60.0 423.8 535.51 0.522 0.60142 genest. AAX: fertilization_Strategies106.0 1136.3 704.8 2.457 0.014028 genest. GLUBSA: fertilization_Strategies60.0 423.8 535.51 0.820 0.40240 genest. AATFA: fertilization_Strategies106.0 1130.7 7 04.8 2.457 0.014028 genest. MFS: fertilization_Strategies60.0 534.8 1 535.51 1.340 0.40237 genest. AATFA: fertilization_Strategies106.0 1130.7 7 04.8 2.325 0.020056 genest. MFS: fertilization_Strategies60.0 534.8 1 535.51 0.820 0.40236 genest. CAT: fertilization_Strategies106.0 1133.1 704.8 2.325 0.020056 genest. MFS: fertilization_Strategies60.0 534.8 1 535.51 0.820 0.40308 genest. CAT: fertilization_Strategies106.0 1633.1 704.8 2.325 0.020058 genest. MG: fertilization_Strategies60.0 534.8 1 535.51 0.820 0.42036 genest. CAT: fertilization_Strategies106.0 1633.1 704.8 2.450 0.020058 genest. MG: fertilization_Strategies106.0	geneSt.EPI:fertilization_Strategies60.0	412.40	535.51	0.770 0.441245	geneSt Unk4:fertilization Strategies60.0	435 27	535 51	0 813 0 416326
genest. Gluxse:fertilization_Strategies60.0 744.48 535.51 0.827 0.408050 genest. AU:fertilization_Strategies60.0 544.38 535.51 1.108 0.670033 genest. G3:fertilization_Strategies60.0 744.48 535.51 1.334 0.182148 genest. AU:fertilization_Strategies60.0 1793.74 704.89 2.545 0.014094 * genest. G3:fertilization_Strategies60.0 1734.74 704.89 2.545 0.014094 * genest. G3:fertilization_Strategies60.0 1734.74 704.89 2.545 0.014094 * genest. G3:fertilization_Strategies106.0 1734.74 704.89 2.545 0.014094 * genest. InD:S:fertilization_Strategies106.0 1734.74 704.89 2.456 0.014097 * genest. InD:S:fertilization_Strategies106.0 1734.77 704.89 2.468 0.01322 * genest. InD:S:fertilization_Strategies106.0 1734.79 704.89 2.468 0.01322 * genest. InD:Fritilization_Strategies106.0 1739.79 704.89 2.468 0.01322 * genest. InD:S:fertilization_Strategies106.0 1739.79 704.89 2.468 0.01323 * genest. InD:S:fertilization_Strategies00.0 279.73 535.51 0.522 0.601422 * genest. ANI:fertilization_Strategies106.0 1730.79 704.89 2.468 0.01323 * genest. InD:S:fertilization_Strategies00.0 423.38 535.51 0.522 0.601422 * genest. ANI:fertilization_Strategies106.0 1180.38 704.89 2.568 0.010274 * genest. InD:S:fertilization_Strategies00.0 429.33 535.51 0.822 0.41066 genest. Anf:f:fertilization_Strategies106.0 11910.75 704.89 2.574 0.04082 * genest. MD:fertilization_Strategies106.0 1503.21 704.89 2.5748 0.005997 * genest. MSFS:fertilization_Strategies00.0 435.41 535.51 0.832 0.41066 genest. ANF:f:fertilization_Strategies106.0 153.21 704.89 2.374 0.005997 * genest. MSFS:fertilization_Strategies00.0 435.41 535.51 0.832 0.41066 genest. Call:fertilization_Strategies106.0 153.21 704.89 2.374 0.005997 * genest. MSFS:fertilization_Strategies00.0 435.41 535.51 0.837 0.41039 genest. Call:fertilization_Strategies106.0 153.21 704.89 2.376 0.005997 * genest. MSFS:fertilization_Strategies00.0 435.41 535.51 0.837 0.4202 genest. Call:fertilization_Strategies106.0 153.21 704.89 2.476 0.005997 * genest. MSFS:fertilization_Strategies00.0 435.41 535.51 0.837 0.4202 genest. Cal	geneSt.FT:fertilization_Strategies60.0	338.61	535.51	0.632 0.527190	geneSt Unk5:fertilization Strategies60.0	726 60	535 51	1 357 0 174840
genest. GLUDC: fertilization_Strategies60.0 941.448 535.51 1.334 0.182148 genest. HT2: fertilization_Strategies106.0 1793.74 704.89 2.545 0.010404 + genest. GST: fertilization_Strategies106.0 1793.74 704.89 2.545 0.014097 + genest. GST: fertilization_Strategies106.0 1734.74 704.89 2.545 0.014097 + genest. HID: fertilization_Strategies106.0 1734.74 704.89 2.456 0.01386 + genest. HID: fertilization_Strategies106.0 1734.74 704.89 2.478 0.013223 + genest. HID: fertilization_Strategies106.0 1736.79 77 764.89 2.478 0.01328 + genest. HID: fertilization_Strategies106.0 1737.79 73 75 55.51 0.522 0.60142 genest. AXI: fertilization_Strategies106.0 1186.38 704.89 1.0633 0.002377 . genest. HO386: fertilization_Strategies106.0 1186.38 704.89 1.0637 0.00267 + genest. HID: fertilization_Strategies106.0 1136.3 704.89 2.457 0.014028 + genest. HID: fertilization_Strategies106.0 1391.75 704.89 2.457 0.014028 + genest. HTF: fertilization_Strategies106.0 1391.75 704.89 2.457 0.014028 + genest. HTF: fertilization_Strategies106.0 1539.17 704.89 2.325 0.00050 + genest. HID: fertilization_Strategies106.0 534.81 535.51 0.826 0.80189 genest. CdT: fertilization_Strategies106.0 1539.17 704.89 2.326 0.00058 + genest. HID: fertilization_Strategies106.0 1539.18 704.89 2.346 0.000597 + genest. HID: fertilization_Str	<pre>geneSt.GluAse:fertilization_Strategies60.0</pre>	443.05	535.51	0.827 0.408050	geneSt Xvl fertilization Strategies60.0	594 38	535.51	1 110 0 267033
genest. GR3: fertilization_Strategies60.0 953.09 953.51 1.730.80.072115 . genest. GR3: fertilization_Strategies60.0 279.73 535.51 0.479 6.19486 genestp773: fertilization_Strategies160.0 1734.74 704.89 2.455 0.013625 genest. InsoD: fertilization_Strategies60.0 477.17 535.51 0.817 0.413717 genestp773: fertilization_Strategies160.0 1734.74 704.89 2.456 0.013223 genest. LD1: fertilization_Strategies60.0 477.17 535.51 0.817 0.413717 genest. AnI1: fertilization_Strategies160.0 1739.79 704.89 2.466 0.013263 genest. LD1: fertilization_Strategies60.0 477.17 535.51 0.827 0.61422 genest. ANI2: fertilization_Strategies160.0 1731.79 704.89 2.468 0.013263 genest. LO3384 fertilization_Strategies60.0 440.85 535.51 0.822 0.601422 genest. ANI2: fertilization_Strategies160.0 1810.84 704.89 2.568 0.01224 genest. LO3384 fertilization_Strategies60.0 440.85 535.51 0.822 0.601422 genest. AAI: fertilization_Strategies160.0 1910.75 704.89 2.476 0.01428 genest. MSFS8: fertilization_Strategies60.0 454.81 535.51 0.822 0.61466 genest. ArF: fertilization_Strategies160.0 1910.75 704.89 2.718 0.020056 genest. MSFS8: fertilization_Strategies60.0 454.81 535.51 1.368 0.300189 genest. AGI: fertilization_Strategies106.0 1937.19 704.89 2.748 0.020056 genest. MSFS8: fertilization_Strategies60.0 354.81 535.51 0.827 0.41202 genest. CdTF: fertilization_Strategies106.0 153.21 704.89 2.748 0.020056 genest. MSFS8: fertilization_Strategies60.0 354.81 535.51 0.827 0.41202 genest. CdTF: fertilization_Strategies106.0 153.21 704.89 2.748 0.020056 genest. MSFS8: fertilization_Strategies60.0 354.81 535.51 0.827 0.41202 genest. CdTF: fertilization_Strategies106.0 153.21 704.89 2.429 0.015139 genest. MSFS8: fertilization_Strategies60.0 354.81 535.51 0.827 0.41202 genest. CdTF: fertilization_Strategies106.0 1721.34 704.89 2.429 0.015139 genest. MSFS8: fertilization_Strategies60.0 452.47 535.51 0.827 0.42243 genest. CdF: fertilization_Strategies106.0 1721.34 704.89 2.426 0.0020854 genest. MSFS8: fertilization_Strategies60.0 452.47 535	<pre>geneSt.GluDC:fertilization_Strategies60.0</pre>	714.48	535.51	1.334 0.182148	geneSt NT2:fertilization Strategies106.0	1793.74	704.89	2.545 0.010944 *
genest. GST: fertilization_Strategies60. 0 265.92 535.51 0.497 0.619466 genest. hP70: fertilization_Strategies160.0 1748.74 704.89 2.465 0.013262 * genest. Kinase: fertilization_Strategies60.0 437.71 535.51 0.817 0.413717 genest. AMI: fertilization_Strategies160.0 1748.74 704.89 2.465 0.013282 * genest. Kinase: fertilization_Strategies60.0 437.71 535.51 0.817 0.413717 genest. AMI: fertilization_Strategies160.0 1749.79 744.89 2.465 0.013282 * genest. AMI: fertilization_Strategies160.0 1749.79 744.89 2.478 0.013282 * genest. AMI: fertilization_Strategies160.0 1749.79 744.89 2.478 0.013282 * genest. AMI: fertilization_Strategies160.0 1749.79 744.89 2.478 0.013282 * genest. AMI: fertilization_Strategies160.0 1749.79 744.89 2.468 0.01358 * 744.89 1.683 0.092397 . genest. AMI: fertilization_Strategies160.0 1166.38 764.89 1.683 0.092397 . genest. AMI: fertilization_Strategies160.0 1166.38 764.89 2.457 0.014028 * genest. AMI: fertilization_Strategies160.0 1130.79 764.89 2.457 0.014028 * genest. AMF: fertilization_Strategies160.0 1391.79 764.89 2.457 0.014028 * genest. AMF: fertilization_Strategies160.0 1391.79 764.89 2.457 0.014028 * genest. MF: fertilization_Strategies160.0 1391.19 764.89 2.325 0.00806 * genest. MF: fertilization_Strategies160.0 1391.19 764.89 2.325 0.02086 * genest. MF: fertilization_Strategies160.0 1391.19 764.89 2.325 0.02086 * genest. MF: fertilization_Strategies160.0 1391.19 744.89 2.325 0.02086 * genest. MG: fertilization_Strategies160.0 1321.1 744.89 2.435 0.020854 * genest. MG: fertilization_Strategies160.0 1321.31 764.89 2.316 0.020854 * genest. MG: fertilization_Strategies60.0 432.49 535.51 0.827 0.42936 genest. (CL: fertilization_Strategies160.0 1223.1 764.89 2.427 0.008518 *** genest. MG: fertilization_Strategies60.0 432.44 535.51 0.827 0.42936 genest. (CL: fertilization_Strategies160.0 1223.1 764.89 2.428 0.020854 * genest. MG: fertilization_Strategies60.0 432.49 4355.51 0.827 0.42936 genest. (CL: fertilization_Strategies160.0 1223.1 764.89 2.428 0.008597 * genest. MG: fertilization_Strat	geneSt.GR3:fertilization_Strategies60.0	963.09	535.51	1.798 0.072115 .	geneSt_PP7A:fertilization_Strategies106.0	1730 49	704 89	2 455 0 014097 *
gene5t.Inos0:fertilization_Strategies60.0 432.04 535.51 0.335 0.125237 gene5t.AMT1:fertilization_Strategies106.0 1740.55 704.89 2.478 0.013233 * gene5t.LDP:fertilization_Strategies106.0 1740.75 704.89 2.478 0.013233 * gene5t.LDP:fertilization_Strategies106.0 1740.75 704.89 2.478 0.013233 * gene5t.LDP:fertilization_Strategies106.0 1730.75 704.89 2.478 0.013233 * gene5t.LDP:fertilization_Strategies106.0 1730.75 704.89 2.468 0.01358 * gene5t.LDP:fertilization_Strategies106.0 1810.04 704.89 2.568 0.002247 * gene5t.LDP:fertilization_Strategies106.0 1810.04 704.89 2.568 0.002247 * gene5t.MDP:fertilization_Strategies106.0 1910.75 704.89 2.568 0.012424 * gene5t.MTF1:fertilization_Strategies106.0 1910.75 704.89 2.578 0.014028 * gene5t.MF51:fertilization_Strategies106.0 1910.75 704.89 2.718 0.002067 * gene5t.MF51:fertilization_Strategies106.0 1931.19 704.89 2.748 0.020056 * gene5t.MF51:fertilization_Strategies106.0 1932.11 704.89 2.748 0.020056 * gene5t.MF51:fertilization_Strategies106.0 1052.11 704.89 2.748 0.020056 * gene5t.MF1:fertilization_Strategies106.0 1052.11 704.89 2.748 0.020056 * gene5t.MF1:fertilization_Strategies106.0 1052.11 704.89 2.429 0.015139 * gene5t.MF1:fertilization_Strategies106.0 1052.11 704.89 2.429 0.015139 * gene5t.MF1:fertilization_Strategies106.0 1053.18 704.89 2.429 0.005138 ** gene5t.MF1:fertilization_Strategies106.0 1053.18 704.89 2.428 0.005038 ** gene5t.MF1:fertilization_Strategies106.0 173.51 704.89 2.428 0.005038 ** gene5t.MF1:fertilization_Strategies106.0 1735.51 0.020058 ** ge	geneSt.GST:fertilization_Strategies60.0	265.92	535.51	0.497 0.619486	geneSt. PP7B: fertilization Strategies106.0	1734.74	704.89	2.461 0.013862 *
gene5t. Kinose:fertilization_Strategies60.0 437.71 535.51 0.817 0.413717 gene5t. AM72:fertilization_Strategies106.0 1730.79 704.80 2.468 0.01358 + gene5t. LOB38A:fertilization_Strategies106.0 1186.38 704.89 1.633 0.092377 . gene5t. LOB38A:fertilization_Strategies106.0 1186.38 704.89 2.568 0.010240 gene5t. LOB38A:fertilization_Strategies106.0 1180.04 704.89 2.568 0.010240 gene5t. LOB38A:fertilization_Strategies106.0 1181.04 704.89 2.457 0.014028 * gene5t. ATFA:fertilization_Strategies106.0 1130.77 748.89 2.457 0.014028 * gene5t. ATFA:fertilization_Strategies106.0 1539.21 704.89 2.457 0.014028 * gene5t. ATFA:fertilization_Strategies106.0 1539.21 704.89 2.457 0.014028 * gene5t. ATFA:fertilization_Strategies106.0 1539.21 704.89 2.355 0.002005 * gene5t. MCS:fertilization_Strategies106.0 1539.12 704.89 2.325 0.020056 * gene5t. MCS:fertilization_Strategies106.0 1532.13 704.89 2.325 0.020056 * gene5t. MCS:fertilization_Strategies106.0 1532.13 704.89 2.326 0.002598 * gene5t. MCS:fertilization_Strategies106.0 1532.13 704.89 2.326 0.020584 * gene5t. MCS:fertilization_Strategies106.0 1531.8 704.89 2.426 0.020058 * gene5t. MCS:fertilization_Strategies106.0 1531.8 704.89 2.427 0.005518 ***********************************	geneSt.InosD:fertilization_Strategies60.0	821.04	535.51	1.533 0.125237	geneSt AAT1:fertilization Strategies106.0	1746 65	704 89	2 478 0 013223 *
genest.L1P:fertilization_Strategies60.0 279.73 535.51 0.722 0.601422 genest.A0X:fertilization_Strategies106.0 1186.38 704.89 1.633 0.002377 . genest.L0388.fertilization_Strategies60.0 423.8 535.51 0.720 0.42287 genest.A0X:fertilization_Strategies106.0 1810.04 704.89 2.568 0.012240 * genest.L0388.fertilization_Strategies60.0 429.23 535.51 0.822 0.42282 genest.A0X:fertilization_Strategies106.0 1810.04 704.89 2.568 0.01242 * genest.MS78:fertilization_Strategies60.0 440.58 535.51 0.822 0.42282 genest.ArF6:fertilization_Strategies106.0 1910.75 704.80 2.718 0.04208 * genest.MS78:fertilization_Strategies60.0 534.81 535.51 0.820 0.42282 genest.ArF6:fertilization_Strategies106.0 1937.17 704.80 2.748 0.022087 * genest.MS78:fertilization_Strategies60.0 435.41 535.51 0.813 0.416179 genest.CatTF:fertilization_Strategies106.0 1937.17 704.80 2.748 0.022087 * genest.MS78:fertilization_Strategies60.0 334.83 535.51 0.826 0.503180 genest.CatTF:fertilization_Strategies106.0 1632.31 704.80 2.249 0.00513 * genest.MS78:fertilization_Strategies60.0 337.65 535.51 0.867 0.49236 genest.CHI:fertilization_Strategies106.0 1632.31 704.89 2.429 0.00513 * genest.MS78:fertilization_Strategies60.0 355.51 0.870 0.49236 genest.CHI:fertilization_Strategies106.0 1639.18 704.89 2.325 0.020056 * genest.P10Ftrilization_Strategies60.0 651.78 535.51 0.870 0.49284 genest.CHI:fertilization_Strategies106.0 16351.88 704.89 2.325 0.020058 * genest.P10Ftrilization_Strategies60.0 651.78 535.51 0.792 0.42243 genest.CHI:fertilization_Strategies106.0 16351.88 704.89 2.423 0.013218 * genest.P10Ftrilization_Strategies60.0 651.78 535.51 0.794 0.42949 genest.CHI:fertilization_Strategies106.0 1735.51 0.0387 4 * genest.P10Fartilization_Strategies60.0 420.85 535.51 0.786 0.43249 genest.CHI:fertilization_Strategies106.0 1736.51 704.89 2.426 0.013638 * genest.P01/Fertilization_Strategies60.0 420.85 535.51 0.786 0.43249 genest.CHI:fertilization_Strategies106.0 1736.51 704.89 2.438 0.013734 * genest.PD1/Fertilization_Strategies60.0 420.85 535.51 0.786 0.43249 g	<pre>geneSt.Kinase:fertilization_Strategies60.0</pre>	437.71	535.51	0.817 0.413717	geneSt. AAT2: fertilization Strategies106.0	1739.79	704.89	2.468 0.013588 *
geneSt.10838A;fertilization_Strategies60.0       423.38       535.51       0.791.0.429170       geneSt.40286;fertilization_Strategies166.0       1810.04       704.89       2.568       0.012740         geneSt.10838A;fertilization_Strategies60.0       440.85       535.51       0.8220       4.106668       geneSt.47F6;fertilization_Strategies166.0       1910.75       704.89       2.568       0.012740         geneSt.MPF.fertilization_Strategies60.0       429.23       535.51       0.8220       4.02824       geneSt.ATF6;fertilization_Strategies166.0       1910.75       704.89       2.375       0.04028         geneSt.MSFS:fertilization_Strategies60.0       554.81       535.51       1.744.0       0.80149       geneSt.CHT;fertilization_Strategies166.0       1531.21       704.89       2.375       0.00597         geneSt.MSFS:fertilization_Strategies60.0       354.81       535.51       0.625       0.51802       geneSt.(CH; fertilization_Strategies66.0       1532.31       704.89       2.346       0.020584         geneSt.MSFS:fertilization_Strategies60.0       342.44       535.51       0.627       0.51802       geneSt.(CH; fertilization_Strategies66.0       123.18       704.89       2.347       0.005183       ***         geneSt.MSFS:fertilization_Strategies60.0       432.44       535.51       0.870       0.422433       ge	geneSt.LIP:fertilization_Strategies60.0	279.73	535.51	0.522 0.601422	geneSt.AOX:fertilization Strategies106.0	1186.38	704.89	1.683 0.092377 .
genest. MSRB:fertilization_Strotegies60.0 440.58 535.51 0.822 0.410668 genest. Afr6:fertilization_Strotegies106.0 1731.73 704.89 2.457 0.014028 + genest. MSFSA:fertilization_Strotegies60.0 429.23 535.51 0.802 0.422824 genest. Afr6:fertilization_Strotegies106.0 1539.21 704.89 2.457 0.014028 + genest. MSFSA:fertilization_Strotegies60.0 534.81 535.51 1.744 0.081142 genest. Afr6:fertilization_Strotegies106.0 1539.21 704.89 2.325 0.00505 + genest. MSFSA:fertilization_Strotegies60.0 534.81 535.51 0.136 0.0300189 genest. AGTF:fertilization_Strotegies106.0 1537.19 704.89 2.325 0.02056 + genest. MSBB:fertilization_Strotegies60.0 334.83 535.51 0.625 0.531082 genest. AGTF:fertilization_Strotegies106.0 1523.31 704.89 2.316 0.00593 + genest. MSBB:fertilization_Strotegies60.0 334.83 535.51 0.625 0.531082 genest. CGL:fertilization_Strotegies106.0 1523.31 704.89 2.316 0.00593 + genest. MSB:fertilization_Strotegies60.0 432.04 535.51 0.625 0.531082 genest. CIL:fertilization_Strotegies106.0 1523.31 704.89 2.427 0.005183 + genest. MSB:fertilization_Strotegies60.0 432.04 535.51 0.807 0.402363 genest. CIL:fertilization_Strotegies106.0 1551.88 704.89 2.427 0.005183 + genest. P109A:fertilization_Strotegies60.0 432.04 535.51 0.807 0.402364 genest. CIL:fertilization_Strotegies106.0 1551.88 704.89 2.427 0.002058 + genest. PI09A:fertilization_Strotegies60.0 432.04 535.51 0.807 0.40249 genest. CIL:fertilization_Strotegies106.0 1551.88 704.89 2.427 0.00218 + genest. PI07.fertilization_Strotegies60.0 423.68 535.51 0.730 0.790 0.42949 genest. CJS:fertilization_Strotegies106.0 1574.57 704.89 2.478 0.013218 + genest.PDX:fertilization_Strotegies60.0 426.56 535.51 0.780 0.432649 genest.CDV5966.fertilization_Strotegies106.0 1746.75 704.89 2.478 0.01328 + genest.PDX:fertilization_Strotegies60.0 420.26 535.51 0.780 0.432649 genest.CDV5966.fertilization_Strotegies106.0 1746.89 744.89 2.453 0.013678 + genest.PDX:fertilization_Strotegies60.0 420.25 535.51 0.780 0.432649 genest.CDV5966.fertilization_Strotegies106.0 1774.83 744.89 2.453 0.01	<pre>geneSt.LOB38A:fertilization_Strategies60.0</pre>	423.38	535.51	0.791 0.429170	geneSt.Apase:fertilization_Strategies106.0	1810.04	704.89	2.568 0.010240 *
gene5t. MP: fertilization_Strategies60.0       429.23       535.51       0.802 0.42224       gene5t. MF: fertilization_Strategies166.0       1910.75       704.89       2.711 0.906719 ••         gene5t. MF: fertilization_Strategies60.0       534.81       535.51       1.744 0.801142       gene5t. AFF: fertilization_Strategies166.0       1939.71       704.89       2.711 0.906719 ••         gene5t. MF:SR: fertilization_Strategies60.0       554.81       535.51       1.836 0.300189       gene5t. Call: fertilization_Strategies166.0       1532.31       704.89       2.748 0.00597 ••         gene5t. MR: fretilization_Strategies60.0       354.43       535.51       0.832 0.41019       gene5t. Call: fertilization_Strategies60.0       1532.31       704.89       2.748 0.00597 ••         gene5t. MR: fretilization_Strategies60.0       354.43       535.51       0.687 0.419801       gene5t. Cli: fertilization_Strategies60.0       -2447.06       704.89       2.478 0.00593 ••         gene5t. MR: fertilization_Strategies60.0       452.04       535.51       0.897 0.419801       gene5t. Cli: fertilization_Strategies60.0       1551.88       704.89       2.478 0.005818 •••         gene5t. PRE: fertilization_Strategies60.0       452.04       535.51       0.392 0.428433       gene5t. CMP: fertilization_Strategies160.0       1746.75       704.89       2.478 0.002085 ••         gene5t. PRE: fertili	<pre>geneSt.LOB38B:fertilization_Strategies60.0</pre>	440.58	535.51	0.823 0.410668	geneSt.ATrfA:fertilization Strategies106.0	1731.73	704.89	2,457 0,014028 *
genest. MSFS: fertilization_Strotegies60.0 534.8 535.51 1.744 0.081242 . genest. CdT: fertilization_Strotegies106.0 1539.21 704.89 2.325 0.020056 + genest. MSRS: fertilization_Strotegies60.0 554.81 535.51 0.136 0.0300189 genest. CdT: fertilization_Strotegies106.0 1532.31 704.89 2.325 0.020056 + genest. MSRS: fertilization_Strotegies60.0 534.83 535.51 0.831 0.416179 genest. CdT: fertilization_Strotegies106.0 1532.31 704.89 2.316 0.02058 + genest. MSRS: fertilization_Strotegies60.0 334.83 535.51 0.625 0.5310802 genest. CdT: fertilization_Strotegies106.0 1532.31 704.89 2.316 0.02058 + genest. Mod: fertilization_Strotegies60.0 432.04 535.51 0.625 0.5310802 genest. CdT: fertilization_Strotegies106.0 1722.34 704.89 2.325 0.020058 + genest. MSRS: fertilization_Strotegies60.0 432.04 535.51 0.627 0.5310802 genest. ClL: fertilization_Strotegies106.0 1746.75 704.89 2.325 0.020058 + genest. PL09A: fertilization_Strotegies60.0 651.88 704.89 3.542 0.02058 + genest. PL09A: fertilization_Strotegies60.0 651.88 704.89 3.542 0.02058 + genest. PL05.fertilization_Strotegies60.0 651.88 704.89 1.227 0.22354 genest. CMP: fertilization_Strotegies106.0 1746.75 704.89 2.478 0.013218 + genest. PLD: fertilization_Strotegies60.0 423.86 535.51 0.730 4.040249 genest. CMP: fertilization_Strotegies106.0 1746.75 704.89 2.478 0.013218 + genest. PLD: fertilization_Strotegies60.0 420.85 535.51 0.730 4.73049 genest. CMP: fertilization_Strotegies106.0 1746.87 704.89 2.478 0.013218 + genest. PLD: fertilization_Strotegies60.0 420.85 535.51 0.735 0.47645 genest. DUP5606: fertilization_Strotegies106.0 1746.87 704.89 2.478 0.013278 + genest. PLD: fertilization_Strotegies60.0 420.52 535.51 0.735 0.47264 genest. PLP: fertilization_Strotegies106.0 1748.17 704.89 2.453 0.013678 + genest. PD: fertilization_Strotegies60.0 420.52 535.51 0.735 0.47264 genest. PLP: fertilization_Strotegies106.0 1771.81 704.89 2.453 0.01472 + genest. Pr0J: fertilization_Strotegies60.0 420.52 535.51 0.735 0.47264 genest. FLP: fertilization_Strotegies106.0 1771.81 704.8	geneSt.MIP:fertilization_Strategies60.0	429.23	535.51	0.802 0.422824	geneSt.ATrfB:fertilization_Strategies106.0	1910.75	704.89	2.711 0.006719 **
genest. MSFS8: fertilization_Strategies60.0       554.81       535.51       1.036.0       9.00189       genest. CaTR: fertilization_Strategies106.0       1937.19       704.89       2.748.0       0.005997 **         genest. MMS21: fertilization_Strategies60.0       435.41       535.51       0.812.0       6.16179       genest. CdI: fertilization_Strategies106.0       153.11       704.89       2.429.0       0.020584         genest. MMS21: fertilization_Strategies60.0       347.48       535.51       0.627.0       6.870.42023       genest. CdI: fertilization_Strategies106.0       1712.34       704.89       2.429.0       0.015139 *         genest. MMS21: fertilization_Strategies60.0       432.04       535.51       0.877.0       4.28031       genest. CMI: fertilization_Strategies106.0       1551.88       704.89       3.472.0       0.000518 ***         genest. PLOS: fertilization_Strategies60.0       452.04       535.51       0.772.0       4.28043       genest. CMI: fertilization_Strategies106.0       1551.88       704.89       3.472.0       0.002085 ***         genest. PLOS: fertilization_Strategies60.0       424.06       535.51       0.720.42843       genest. CMP: fertilization_Strategies106.0       1726.75       704.89       2.463.0       0.01329 **         genest. PDX: fertilization_Strategies60.0       423.08       535.51       0.720.42	geneSt.MSF5A:fertilization_Strategies60.0	934.02	535.51	1.744 0.081142 .	geneSt.CatT:fertilization_Strategies106.0	1639.21	704.89	2.325 0.020056 *
gene5t. MSRB:fertilization_Strategies60.0 334.8 355.51 0.813 0.41679 gene5t. CGL:fertilization_Strategies106.0 1632.31 704.89 2.316 0.20584 • gene5t. MSRB:fertilization_Strategies60.0 334.8 555.51 0.625 0.5310802 gene5t. (CL:fertilization_Strategies106.0 -2447.06 704.89 2.426 0.015139 • gene5t. MSRB:fertilization_Strategies60.0 432.04 535.51 0.627 0.5310802 gene5t. (CL:fertilization_Strategies106.0 -2447.06 704.89 2.426 0.000058 • gene5t. PL05.fertilization_Strategies60.0 432.04 535.51 0.807 0.419201 gene5t. (CL:fertilization_Strategies106.0 1763.18 704.89 2.426 0.020058 • gene5t. PL05.fertilization_Strategies60.0 432.04 535.51 0.807 0.419201 gene5t. (CL:fertilization_Strategies106.0 1765.08 704.89 2.478 0.020058 • gene5t. PL05.fertilization_Strategies60.0 452.04 535.51 0.728 0.42249 gene5t. (CL:fertilization_Strategies106.0 1765.08 704.89 2.478 0.013274 • gene5t. PDX:fertilization_Strategies60.0 423.88 535.51 0.739 0.42249 gene5t. (CD:fertilization_Strategies106.0 1765.08 704.89 2.478 0.013274 • gene5t. PDI:fertilization_Strategies60.0 423.86 535.51 0.739 0.42249 gene5t. (CD:fertilization_Strategies106.0 1745.09 704.89 2.478 0.013274 • gene5t. PDI:fertilization_Strategies60.0 420.25 535.51 0.739 0.42249 gene5t. (D):5660.fertilization_Strategies106.0 1745.10 704.89 2.478 0.013678 • gene5t. PDI:fertilization_Strategies60.0 420.52 535.51 0.735 0.47465 gene5t. PDI:fertilization_Strategies106.0 1771.81 704.89 2.453 0.01478 • gene5t. PDI:fertilization_Strategies106.0 420.52 535.51 0.735 0.47204 gene5t. PI:fertilization_Strategies106.0 1771.81 704.89 2.453 0.01478 • gene5t. PDI:fertilization_Strategies60.0 423.57 535.51 0.745 0.42204 gene5t.FI:fertilization_Strategies106.0 1771.81 704.89 2.453 0.01478 • gene5t.PDI:fertilization_Strategies60.0 425.7 535.51 0.745 0.432304 gene5t.FI:fertilization_Strategies106.0 1771.81 704.89 2.453 0.01477 • gene5t.PDI:fertilization_Strategies60.0 425.7 535.51 0.745 0.432304 gene5t.FI:fertilization_Strategies106.0 1771.81 704.89 2.453 0.01479 • gene5t.PDI:fertilization_Strategies60.0 4	geneSt.MSF5B:fertilization_Strategies60.0	554.81	535.51	1.036 0.300189	geneSt.CatTR:fertilization_Strategies106.0	1937.19	704.89	2,748 0,005997 **
genest. MMX21: fertilization. Strategies60.0 334.83 535.51 0.627 0.531802 genest. CM1: fertilization. Strategies106.0 1712.34 704.89 2.429 0.015139 + genest. CM1: fertilization. Strategies106.0 370.68 53.551 0.687 0.492363 genest. CM1: fertilization. Strategies106.0 1639.18 704.89 3.472 0.000518 + genest. PCI: fertilization. Strategies106.0 1639.18 704.89 2.325 0.020058 + genest. PCI: fertilization. Strategies106.0 1639.18 704.89 2.325 0.020058 + genest. PCI: fertilization. Strategies106.0 1639.18 704.89 2.325 0.020058 + genest. PCI: fertilization. Strategies106.0 1639.18 704.89 2.325 0.020058 + genest. PCI: fertilization. Strategies106.0 1639.18 704.89 2.325 0.020058 + genest. PCI: fertilization. Strategies106.0 1736.51 0.89 704.89 2.428 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.001318 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.013218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218 + 0.001218	geneSt.MSRB:fertilization_Strategies60.0	435.41	535.51	0.813 0.416179	geneSt.CGL:fertilization_Strategies106.0	1632.31	704.89	2.316 0.020584 *
genest.Nod:fertilization_Strategies60.0 357.56 355.51 0.767 0.492363 genest.ClCh:fertilization_Strategies60.0 -2447.06 704.89 -3.472 0.000518 *** genest.P109A:fertilization_Strategies60.0 432.04 535.51 0.797 0.428433 genest.ClP:fertilization_Strategies60.0 10551.88 704.89 .2.250 0.020058 ** genest.P109A:fertilization_Strategies60.0 451.78 535.51 0.797 0.428433 genest.CNP:fertilization_Strategies60.0 10551.88 704.89 .2.458 0.03208 ** genest.PDX:fertilization_Strategies60.0 452.04 535.51 0.797 0.422499 genest.CNP:fertilization_Strategies106.0 1736.00 704.89 .2.458 0.03208 ** genest.PDX:fertilization_Strategies60.0 423.88 535.51 0.798 0.422499 genest.Cyp11:fertilization_Strategies106.0 1736.10 704.89 .2.458 0.01368 ** genest.PDI:fertilization_Strategies60.0 420.86 535.51 0.789 0.432649 genest.Cyp11:fertilization_Strategies106.0 1941.80 704.89 .2.458 0.01368 ** genest.PDI:fertilization_Strategies60.0 420.25 535.51 0.785 0.432649 genest.PDI:50680:fertilization_Strategies106.0 1735.51 704.89 .2.458 0.01368 ** genest.PDI:fertilization_Strategies60.0 420.52 535.51 0.715 0.474645 genest.PDI:50680:fertilization_Strategies106.0 1773.51 704.89 .2.458 0.013683 ** genest.PDI:fertilization_Strategies60.0 420.52 535.51 0.785 0.43204 genest.FDI:fertilization_Strategies106.0 1771.81 704.89 .2.453 0.01479 ** genest.PDI:fertilization_Strategies60.0 423.57 535.51 0.758 0.43204 genest.FDI:fertilization_Strategies106.0 1771.81 704.89 .2.453 0.01479 ** genest.PDI:fertilization_Strategies60.0 425.77 535.51 0.758 0.43204 genest.Glux6:fertilization_Strategies106.0 1771.81 704.89 .2.453 0.01479 ** genest.PDI:fertilization_Strategies60.0 425.77 535.51 0.758 0.43204 genest.Glux6:fertilization_Strategies106.0 1771.81 704.89 .2.453 0.01479 ** genest.PDI:fertilization_Strategies60.0 425.77 535.51 0.758 0.43204 genest.Glux6:fertilization_Strategies106.0 1771.81 704.89 .2.513 0.01197 * genest.PDI:fertilization_Strategies60.0 427.74.80 0.6400 genest.Glux6:fertilization_Strategies106.0 1771.43 704.89 .2.513 0.01197 * genest.PDI:fertilization_Strat	geneSt.MtN21:fertilization_Strategies60.0	334.83	535.51	0.625 0.531802	geneSt.CHI:fertilization_Strategies106.0	1712.34	704.89	2,429 0,015139 *
genest. Nr:fertilization_Strategies60.0 432.04 535.51 0.807 0.419801 genest. CLH:fertilization_Strategies106.0 1639.18 704.89 2.325 0.200858 + genest. Frifertilization_Strategies106.0 1639.18 704.89 2.325 0.200858 + genest. CHP:fertilization_Strategies106.0 10551.88 704.89 2.478 0.013218 + genest. CHP:fertilization_Strategies106.0 1746.75 704.89 2.478 0.013218 + genest. CysPI:fertilization_Strategies106.0 1749.89 2.468 0.013603 + genest. PLD:fertilization_Strategies106.0 1749.51 704.89 2.468 0.01478 + genest. CysPI:fertilization_Strategies106.0 1748.71 704.89 2.438 0.01478 + genest. CysPI:fertilization_Strategies106.0 1771.43 704.89 2.438 0.01478 + genest. CysPI:fertilization_St	geneSt.Nod:fertilization_Strategies60.0	367.66	535.51	0.687 0.492363	geneSt.ClCh:fertilization_Strategies106.0	-2447.06	704.89	-3.472 0.000518 ***
$genest. P199A: fertilization_Strategies60.0 424.06 535.51 0.72° 0.428433 genest. CMP: fertilization_Strategies106.0 10551.88 704.89 14.969 < 2e-16 *** genest. P192A: fertilization_Strategies106.0 517.74 555.51 0.75 0.755.51 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.757 0.$	geneSt.NT:fertilization_Strategies60.0	432.04	535.51	0.807 0.419801	geneSt.CLH:fertilization_Strategies106.0	1639.18	704.89	2.325 0.020058 *
genest., PR:Fritlization_Strategies60.0         451.78         535.51         1.217 0.223564         genest., CysPI1:fertilization_Strategies106.0         1746.75         704.89         2.478 0.013218 •           genest., PR:Fritlization_Strategies60.0         446.65         535.51         0.834 0.404249         genest., CysPI1:fertilization_Strategies106.0         1746.75         704.89         2.478 0.013218 •           genest., PR:Fritlization_Strategies60.0         423.08         535.51         0.780 0.422499         genest. CysFI1:fertilization_Strategies106.0         1941.80         704.89         2.463 0.01379 •           genest., PD: fertilization_Strategies60.0         420.20         535.51         0.780 0.432649         genest. UDF5066.ifertilization_Strategies106.0         1739.51         704.89         2.468 0.013603 •           genest., PD: fertilization_Strategies60.0         420.20         535.51         0.785 0.432649         genest. IPI:fertilization_Strategies106.0         1729.15         704.89         2.468 0.01468 •           genestPP2: fertilization_Strategies60.0         420.20         535.51         0.785 0.432649         genest.Fr.Fiftertilization_Strategies106.0         1724.18         704.89         2.478 0.01478 •           genestPP2: fertilization_Strategies60.0         420.20         535.51         0.786 0.432649         genest.GLase: fertilization_Strategies106.0         1724.83	geneSt.P109A:fertilization_Strategies60.0	424.06	535.51	0.792 0.428433	geneSt.CWP:fertilization_Strategies106.0	10551.88	704.89	14.969 < 2e-16 ***
gene5t. PDX: fortilization_Strategies60.0         446.65         535.51         0.834 0.404249         gene5t. (PX: fortilization_Strategies60.0         1736.00         704.89         2.463 0.013794 +           gene5t. PDX: fortilization_Strategies60.0         420.85         535.51         0.790 0.429499         gene5t. (PX: fortilization_Strategies160.0         1736.00         704.89         2.463 0.013794 +           gene5t. PLD: fortilization_Strategies60.0         420.26         535.51         0.780 0.429499         gene5t. DUI566A: fortilization_Strategies160.0         1739.51         704.89         2.463 0.013794 +           gene5t. PLD: fortilization_Strategies60.0         322.85         535.51         0.780 0.429499         gene5t. DUI566A: fortilization_Strategies160.0         1729.15         704.89         2.463 0.014789 +           gene5t. PP2C: fortilization_Strategies60.0         420.22         535.51         0.780 0.42304         gene5t. FT: fortilization_Strategies160.0         1771.43         704.89         2.453 0.014789 +           gene5t. PP2C: fortilization_Strategies60.0         425.37         535.51         0.780 4.427010         gene5t. Glu36e: fortilization_Strategies160.0         1771.43         704.89         2.513 0.011976 +           gene5t. PPX: fortilization_Strategies60.0         425.37         535.51         0.794 4.427010         gene5t. (RG3: fortilization_Strategies160.0         1771.43	geneSt.PBenzR:fertilization_Strategies60.0	651.78	535.51	1.217 0.223564	geneSt.CysPI1:fertilization_Strategies106.0	1746.75	704.89	2.478 0.013218 *
genest.PP:F:fertilization_Strategies60.0         423.08         535.51         0.790         0.429499         genest.pDir5664:fertilization_Strategies106.0         1941.80         704.89         2.755         0.09578*           genest.PP:Fertilization_Strategies60.0         420.02         535.51         0.715         0.432649         genest.DUr5060:fertilization_Strategies106.0         1941.80         704.89         2.755         0.00578*           genest.PD:Fertilization_Strategies60.0         382.86         535.51         0.715         0.474645         genest.PD:Fertilization_Strategies106.0         1729.15         704.89         2.468         0.01472           genest.PP2C:Fertilization_Strategies60.0         222.6         535.51         0.785         0.43204         genest.Frifertilization_Strategies106.0         1728.31         704.89         2.438         0.01472           genest.PP0:Fertilization_Strategies60.0         232.65         535.51         0.780         0.4340.664003         genest.Frifertilization_Strategies106.0         1771.43         704.89         2.438         0.01976           genest.PP0:Fertilization_Strategies60.0         425.37         535.51         0.780         0.4340.664003         genest.Glubc:fertilization_Strategies106.0         1664.01         704.89         2.361         0.01975           genest.PP0:Fertilization_Strategies10	geneSt.PDX:fertilization_Strategies60.0	446.65	535.51	0.834 0.404249	geneSt.CysT:fertilization_Strategies106.0	1736.00	704.89	2.463 0.013794 *
genešt. P.D: fertilization_Strategies60. 420.20 535.51 0.785 0.432649 genešt. DUF5066:Fertilization_Strategies106.0 1739.51 704.89 2.468 0.013603 * genešt. P.D: fertilization_Strategies60.0 382.6 535.51 0.715 0.474645 genešt. PT: fertilization_Strategies106.0 1774.51 704.89 2.438 0.01472 * genešt. PP2C: fertilization_Strategies60.0 420.52 535.51 0.736 0.4324.066403 genešt. GLUG: Fertilization_Strategies106.0 1774.3 704.89 2.438 0.01472 * genešt. ProV: fertilization_Strategies60.0 425.37 535.51 0.740 4.427010 genešt. GLUG: Fertilization_Strategies106.0 1764.89 2.513 0.01325 * genešt. ProV: fertilization_Strategies60.0 425.37 535.51 0.794 0.427010 genešt. GLUG: Fertilization_Strategies106.0 1664.01 704.89 2.513 0.01325 * genešt. Frovi: Fertilization_Strategies60.0 417.46 535.51 1.093 0.274268 genešt. GLUG: Fertilization_Strategies106.0 1731.0 704.89 2.601 0.01251 * genešt. Fritization_Strategies60.0 417.46 535.51 0.780 4.435658 genešt. GR3: Fertilization_Strategies106.0 1731.0 704.89 2.601 0.00125 *	geneSt.PEPT:fertilization_Strategies60.0	423.08	535.51	0.790 0.429499	geneSt.DUF506A:fertilization_Strategies106.0	1941.80	704.89	2.755 0.005878 **
gene5t. Pol:Fertilization_Strategies60.0         382.86         535.51         0.715 0.474645         gene5t. FPI:Fertilization_Strategies106.0         1729.15         704.89         2.453 0.01472*           gene5t. PP2:Fertilization_Strategies60.0         420.52         535.51         0.785 0.43234         gene5t. FT:Fertilization_Strategies106.0         1718.31         704.89         2.453 0.01472*           gene5t. Pr0:Fertilization_Strategies60.0         232.62         535.51         0.785 0.43204         gene5t. FT:Fertilization_Strategies106.0         1714.31         704.89         2.438 0.01478*           gene5t. Pr0:Fertilization_Strategies60.0         232.62         535.51         0.784 0.427010         gene5t. GlubC:Fertilization_Strategies106.0         1664.01         704.89         2.361 0.012851*           gene5t. Pr0:Fertilization_Strategies60.0         585.48         535.51         1.093 0.272424         gene5t.GlubC:Fertilization_Strategies106.0         1664.01         704.89         2.361 0.01251**           gene5t.RW:Fertilization_Strategies60.0         417.46         535.51         0.780 0.435658         gene5t.GST:Fertilization_Strategies106.0         1897.01         704.89         2.691 0.007125**	geneSt.PLD:fertilization_Strategies60.0	420.20	535.51	0.785 0.432649	geneSt.DUF506B:fertilization_Strategies106.0	1739.51	704.89	2.468 0.013603 *
genešt. PP2: fertilization_Strategiese6.0 420.52 535.51 0.785 0.432304 genešt. FT: fertilization_Strategiese106.0 1718.31 704.89 2.438 0.014789 * genešt. Prol: fertilization_Strategiese60.0 232. 62 535.51 0.749 0.427010 genešt. FT: fertilization_Strategiese106.0 1764.89 2.513 0.011976 * genešt. Prol: fertilization_Strategiese60.0 455.37 535.51 0.749 0.427010 genešt. GLuDC: fertilization_Strategiese106.0 1664.01 704.89 2.361 0.018251 * genešt. Prol: fertilization_Strategiese106.0 1664.01 704.89 2.691 0.001255 ** genešt. R%: fertilization_Strategiese60.0 417.46 535.51 0.780 0.435658 genešt. GR3: fertilization_Strategies106.0 1733.10 704.89 2.691 0.001255 **	geneSt.PolyAP:fertilization_Strategies60.0	382.86	535.51	0.715 0.474645	geneSt.EPI:fertilization_Strategies106.0	1729.15	704.89	2.453 0.014172 *
gene5t.Pr00:fertilization_Strategies60.0         232.62         535.51         0.34 0.664003         gene5t.GluAse:fertilization_Strategies106.0         1771.43         704.89         2.513 0.011976 •           gene5t.Pr00:fertilization_Strategies60.0         425.37         535.51         0.794 0.427010         genest.GluAse:fertilization_Strategies106.0         1664.01         704.89         2.361 0.012871 •           gene5t.Pr01:fertilization_Strategies60.0         585.48         535.51         0.794 0.427010         genest.GluAse:fertilization_Strategies106.0         1664.01         704.89         2.361 0.012871 •           gene5t.Pr01:fertilization_Strategies60.0         417.46         535.51         0.780 0.435658         gene5t.GST:fertilization_Strategies106.0         1733.10         704.89         2.451 0.007125 •	geneSt.PP2C:fertilization_Strategies60.0	420.52	535.51	0.785 0.432304	geneSt.FT:fertilization_Strategies106.0	1718.31	704.89	2.438 0.014789 *
gene5t.PrWH:fertilization_Strategies60.0 425.37 535.51 0.794 0.427010 gene5t.GNUC:fertilization_Strategies106.0 1664.01 704.89 2.361 0.01251 + gene5t.PrWH:fertilization_Strategies60.0 585.48 535.51 0.798 0.435658 gene5t.GNE:fertilization_Strategies106.0 1897.01 704.89 2.691 0.007125 ** gene5t.RWE:fertilization_Strategies06.0 417.46 535.51 0.780 0.435658 gene5t.GNE:fertilization_Strategies106.0 1733.10 704.89 2.459 0.013953 **	geneSt.ProD:fertilization_Strategies60.0	232.62	535.51	0.434 0.664003	geneSt.GluAse:fertilization_Strategies106.0	1771.43	704.89	2.513 0.011976 *
geneSt.PyrK:fertilization_Strategies60.0 585.48 535.51 1.093 0.274264 geneSt.GR3:fertilization_Strategies106.0 1897.01 704.89 2.691 0.007125 ** geneSt.RPK:fertilization_Strategies20.0 417.46 535.51 0.780 0.435658 geneSt.GST:fertilization_Strategies20.0 1733.10 704.89 2.459 0.013953 *	geneSt.ProH:fertilization_Strategies60.0	425.37	535.51	0.794 0.427010	geneSt.GluDC:fertilization_Strategies106.0	1664.01	704.89	2.361 0.018251 *
geneSt.RPK:fertilization_Strategies60.0 417.46 535.51 0.780 0.435658 geneSt.GST:fertilization_Strategies106.0 1733.10 704.89 2.459 0.013953 *	geneSt.PyrK:fertilization_Strategies60.0	585.48	535.51	1.093 0.274264	geneSt.GR3:fertilization_Strategies106.0	1897.01	704.89	2.691 0.007125 **
	geneSt.RPK:fertilization_Strategies60.0	417.46	535.51	0.780 0.435658	<pre>geneSt.GST:fertilization_Strategies106.0</pre>	1733.10	704.89	2.459 0.013953 *

Figure 15: Summary of the model 2 (3)

<pre>geneSt.InosD:fertilization_Strategies106.0</pre>	2099.37	704.89	2.978 0.002902 **	<pre>geneSt.AAT1:fertilization_Strategies120.0</pre>	1039.73	645.94 1.610 0.107490	
<pre>geneSt.Kinase:fertilization_Strategies106.0</pre>	1742.62	704.89	2.472 0.013437 *	<pre>geneSt.AAT2:fertilization_Strategies120.0</pre>	-95.74	645.94 -0.148 0.882170	
<pre>geneSt.LIP:fertilization_Strategies106.0</pre>	1587.86	704.89	2.253 0.024292 *	<pre>geneSt.AOX:fertilization_Strategies120.0</pre>	-1227.34	645.94 -1.900 0.057434 .	
<pre>geneSt.LOB38A:fertilization_Strategies106.0</pre>	1729.73	704.89	2.454 0.014140 *	<pre>geneSt.Apase:fertilization_Strategies120.0</pre>	2535.28	645.94 3.925 8.70e-05 **	**
<pre>geneSt.LOB38B:fertilization_Strategies106.0</pre>	1748.33	704.89	2.480 0.013135 *	<pre>geneSt.ATrfA:fertilization_Strategies120.0</pre>	-194.64	645.94 -0.301 0.763166	
geneSt.MIP:fertilization_Strategies106.0	1623.29	704.89	2.303 0.021294 *	<pre>geneSt.ATrfB:fertilization_Strategies120.0</pre>	-194.49	645.94 -0.301 0.763348	
<pre>geneSt.MSF5A:fertilization_Strategies106.0</pre>	1928.16	704.89	2.735 0.006235 **	<pre>geneSt.CatT:fertilization_Strategies120.0</pre>	-94.70	645.94 -0.147 0.883446	
<pre>geneSt.MSF5B:fertilization_Strategies106.0</pre>	1775.75	704.89	2.519 0.011770 *	<pre>geneSt.CatTR:fertilization_Strategies120.0</pre>	-122.40	645.94 -0.189 0.849712	
geneSt.MSRB:fertilization_Strategies106.0	1778.24	704.89	2.523 0.011652 *	<pre>geneSt.CGL:fertilization_Strategies120.0</pre>	-115.76	645.94 -0.179 0.857770	
<pre>geneSt.MtN21:fertilization_Strategies106.0</pre>	1657.84	704.89	2.352 0.018687 *	geneSt.CHI:fertilization_Strategies120.0	7425.82	645.94 11.496 < 2e-16 **	**
<pre>geneSt.Nod:fertilization_Strategies106.0</pre>	1753.28	704.89	2.487 0.012879 *	<pre>geneSt.ClCh:fertilization_Strategies120.0</pre>	2368.55	645.94 3.667 0.000246 **	**
<pre>geneSt.NT:fertilization_Strategies106.0</pre>	1689.32	704.89	2.397 0.016558 *	geneSt.CLH:fertilization_Strategies120.0	-425.41	645.94 -0.659 0.510162	
<pre>geneSt.P109A:fertilization_Strategies106.0</pre>	1730.32	704.89	2.455 0.014107 *	<pre>geneSt.CWP:fertilization_Strategies120.0</pre>	-11326.79	645.94 -17.535 < 2e-16 **	**
<pre>geneSt.PBenzR:fertilization_Strategies106.0</pre>	1786.44	704.89	2.534 0.011273 *	<pre>geneSt.CysPI1:fertilization_Strategies120.0</pre>	-264.26	645.94 -0.409 0.682463	
<pre>geneSt.PDX:fertilization_Strategies106.0</pre>	1773.71	704.89	2.516 0.011867 *	<pre>geneSt.CysT:fertilization_Strategies120.0</pre>	-138.59	645.94 -0.215 0.830111	
<pre>geneSt.PEPT:fertilization_Strategies106.0</pre>	1735.53	704.89	2.462 0.013820 *	<pre>geneSt.DUF506A:fertilization_Strategies120.0</pre>	2275.34	645.94 3.523 0.000428 **	**
<pre>geneSt.PLD:fertilization_Strategies106.0</pre>	1734.83	704.89	2.461 0.013858 *	geneSt.DUF506B:fertilization_Strategies120.0	-136.32	645.94 -0.211 0.832854	
<pre>geneSt.PolyAP:fertilization_Strategies106.0</pre>	1735.80	704.89	2.463 0.013804 *	<pre>geneSt.EPI:fertilization_Strategies120.0</pre>	-193.13	645.94 -0.299 0.764946	
<pre>geneSt.PP2C:fertilization_Strategies106.0</pre>	1717.23	704.89	2.436 0.014852 *	geneSt.FT:fertilization_Strategies120.0	-362.53	645.94 -0.561 0.574632	
geneSt.ProD:fertilization_Strategies106.0	1701.49	704.89	2.414 0.015794 *	<pre>geneSt.GluAse:fertilization_Strategies120.0</pre>	68.44	645.94 0.106 0.915618	
<pre>geneSt.ProH:fertilization_Strategies106.0</pre>	1730.03	704.89	2.454 0.014123 *	<pre>geneSt.GluDC:fertilization_Strategies120.0</pre>	1000.69	645.94 1.549 0.121346	
<pre>geneSt.PyrK:fertilization_Strategies106.0</pre>	1642.94	704.89	2.331 0.019774 *	<pre>geneSt.GR3:fertilization_Strategies120.0</pre>	2956.44	645.94 4.577 4.74e-06 **	**
<pre>geneSt.RPK:fertilization_Strategies106.0</pre>	1733.27	704.89	2.459 0.013943 *	<pre>geneSt.GST:fertilization_Strategies120.0</pre>	-354.50	645.94 -0.549 0.583141	
<pre>geneSt.Sulfase:fertilization_Strategies106.0</pre>	1762.08	704.89	2.500 0.012434 *	<pre>geneSt.InosD:fertilization_Strategies120.0</pre>	1822.99	645.94 2.822 0.004773 **	•
<pre>geneSt.SulfT:fertilization_Strategies106.0</pre>	1682.51	704.89	2.387 0.016999 *	<pre>geneSt.Kinase:fertilization_Strategies120.0</pre>	-22.86	645.94 -0.035 0.971765	
<pre>geneSt.SulfT2A:fertilization_Strategies106.0</pre>	1670.11	704.89	2.369 0.017830 *	<pre>geneSt.LIP:fertilization_Strategies120.0</pre>	-356.45	645.94 -0.552 0.581071	
<pre>geneSt.SulfT2B:fertilization_Strategies106.0</pre>	1731.99	704.89	2.457 0.014014 *	<pre>geneSt.LOB38A:fertilization_Strategies120.0</pre>	-201.45	645.94 -0.312 0.755147	
<pre>geneSt.SulfT2C:fertilization_Strategies106.0</pre>	1719.53	704.89	2.439 0.014718 *	<pre>geneSt.LOB38B:fertilization_Strategies120.0</pre>	-144.69	645.94 -0.224 0.822759	
<pre>geneSt.TRDX:fertilization_Strategies106.0</pre>	1845.47	704.89	2.618 0.008848 **	<pre>geneSt.MIP:fertilization_Strategies120.0</pre>	178.69	645.94 0.277 0.782057	
<pre>geneSt.UBIE:fertilization_Strategies106.0</pre>	1473.55	704.89	2.090 0.036588 *	<pre>geneSt.MSF5A:fertilization_Strategies120.0</pre>	2510.37	645.94 3.886 0.000102 **	**
<pre>geneSt.Unk1:fertilization_Strategies106.0</pre>	1723.64	704.89	2.445 0.014483 *	<pre>geneSt.MSF5B:fertilization_Strategies120.0</pre>	705.90	645.94 1.093 0.274483	
<pre>geneSt.Unk2:fertilization_Strategies106.0</pre>	1759.97	704.89	2.497 0.012540 *	<pre>geneSt.MSRB:fertilization_Strategies120.0</pre>	-83.45	645.94 -0.129 0.897211	
<pre>geneSt.Unk3:fertilization_Strategies106.0</pre>	1731.12	704.89	2.456 0.014062 *	<pre>geneSt.MtN21:fertilization_Strategies120.0</pre>	-359.15	645.94 -0.556 0.578209	
<pre>geneSt.Unk4:fertilization_Strategies106.0</pre>	1740.66	704.89	2.469 0.013541 *	<pre>geneSt.Nod:fertilization_Strategies120.0</pre>	-254.00	645.94 -0.393 0.694159	
<pre>geneSt.Unk5:fertilization_Strategies106.0</pre>	1812.43	704.89	2.571 0.010141 *	<pre>geneSt.NT:fertilization_Strategies120.0</pre>	-202.09	645.94 -0.313 0.754392	
<pre>geneSt.Xyl:fertilization_Strategies106.0</pre>	1773.48	704.89	2.516 0.011878 *	<pre>geneSt.P109A:fertilization_Strategies120.0</pre>	-200.67	645.94 -0.311 0.756064	
<pre>geneSt_NT2:fertilization_Strategies120.0</pre>	-494.35	645.94	-0.765 0.444089	<pre>geneSt.PBenzR:fertilization_Strategies120.0</pre>	1767.22	645.94 2.736 0.006226 **	*
<pre>geneStPP7A:fertilization_Strategies120.0</pre>	-140.78	645.94	-0.218 0.827477	<pre>geneSt.PDX:fertilization_Strategies120.0</pre>	-144.36	645.94 -0.223 0.823160	
<pre>geneStPP7B:fertilization_Strategies120.0</pre>	-179.35	645.94	-0.278 0.781274	<pre>geneSt.PEPT:fertilization_Strategies120.0</pre>	-191.94	645.94 -0.297 0.766351	

Figure 15: Summary of the model 2 (4)

geneSt.PLD:fertilization Strategies120.0	-215.10	645.94	-0.333 0.739135	geneSt.DUF506B:fertilization Strategies180.0	1416.05	480.54	2.947 0.003214 **
aeneSt.PolvAP:fertilization Strategies120.0	-255.94	645.94	-0.396 0.691939	geneSt.EPI:fertilization_Strategies180.0	1380.25	480.54	2.872 0.004079 **
aeneSt.PP2C:fertilization_Strategies120.0	-217.08	645.94	-0.336 0.736818	geneSt.FT:fertilization_Strategies180.0	1217.50	480.54	2.534 0.011296 *
geneSt.ProD:fertilization_Strategies120.0	-441.32	645.94	-0.683 0.494472	geneSt.GluAse:fertilization_Strategies180.0	1724.70	480.54	3.589 0.000333 ***
geneSt.ProH:fertilization Strategies120.0	-186.49	645.94	-0.289 0.772805	<pre>geneSt.GluDC:fertilization_Strategies180.0</pre>	2153.09	480.54	4.481 7.48e-06 ***
<pre>geneSt.PyrK:fertilization_Strategies120.0</pre>	541.89	645.94	0.839 0.401523	geneSt.GR3:fertilization_Strategies180.0	2914.82	480.54	6.066 1.33e-09 ***
geneSt.RPK:fertilization_Strategies120.0	-216.46	645.94	-0.335 0.737543	geneSt.GST:fertilization_Strategies180.0	1305.37	480.54	2.716 0.006604 **
aeneSt.Sulfase:fertilization_Strategies120.0	-353.86	645.94	-0.548 0.583814	geneSt.InosD:fertilization_Strategies180.0	2606.77	480.54	5.425 5.87e-08 ***
geneSt.SulfT:fertilization_Strategies120.0	388.93	645.94	0.602 0.547104	geneSt.Kinase:fertilization_Strategies180.0	1500.60	480.54	3.123 0.001794 **
geneSt.SulfT2A:fertilization_Strategies120.0	176.30	645.94	0.273 0.784902	geneSt.LIP:fertilization_Strategies180.0	1144.99	480.54	2.383 0.017194 *
geneSt.SulfT2B:fertilization_Strategies120.0	-124.99	645.94	-0.193 0.846571	geneSt.LOB38A:fertilization_Strategies180.0	1376.15	480.54	2.864 0.004191 **
geneSt.SulfT2C:fertilization_Strategies120.0	-224.73	645.94	-0.348 0.727907	geneSt.LOB38B:fertilization_Strategies180.0	1437.56	480.54	2.992 0.002779 **
geneSt.TRDX:fertilization_Strategies120.0	3229.93	645.94	5.000 5.76e-07 ***	geneSt.MIP:fertilization_Strategies180.0	1529.76	480.54	3.183 0.001457 **
geneSt.UBIE:fertilization_Strategies120.0	-239.76	645.94	-0.371 0.710503	geneSt.MSF5A:fertilization_Strategies180.0	2732.66	480.54	5.687 1.31e-08 ***
geneSt.Unk1:fertilization_Strategies120.0	-108.33	645.94	-0.168 0.866813	geneSt.MSF5B:fertilization_Strategies180.0	1845.65	480.54	3.841 0.000123 ***
geneSt.Unk2:fertilization_Strategies120.0	203.10	645.94	0.314 0.753203	geneSt.MSRB:fertilization_Strategies180.0	1444.65	480.54	3.006 0.002647 **
geneSt.Unk3:fertilization_Strategies120.0	-202.73	645.94	-0.314 0.753632	geneSt.MtN21:fertilization_Strategies180.0	1185.86	480.54	2.468 0.013604 *
geneSt.Unk4:fertilization_Strategies120.0	-84.04	645.94	-0.130 0.896481	geneSt.Nod:fertilization_Strategies180.0	1348.50	480.54	2.806 0.005017 **
geneSt.Unk5:fertilization_Strategies120.0	950.48	645.94	1.471 0.141177	geneSt.NT:fertilization_Strategies180.0	1356.09	480.54	2.822 0.004777 **
geneSt.Xyl:fertilization_Strategies120.0	334.84	645.94	0.518 0.604204	geneSt.P109A:fertilization_Strategies180.0	1376.10	480.54	2.864 0.004192 **
geneSt_NT2:fertilization_Strategies180.0	1169.46	480.54	2.434 0.014957 *	geneSt.PBenzR:fertilization_Strategies180.0	2492.22	480.54	5.186 2.16e-07 ***
geneStPP7A:fertilization_Strategies180.0	1415.71	480.54	2.946 0.003222 **	geneSt.PDX:fertilization_Strategies180.0	1458.69	480.54	3.035 0.002404 **
geneStPP7B:fertilization_Strategies180.0	1394.41	480.54	2.902 0.003715 **	geneSt.PEPT:fertilization_Strategies180.0	1390.15	480.54	2.893 0.003821 **
<pre>geneSt.AAT1:fertilization_Strategies180.0</pre>	1919.62	480.54	3.995 6.50e-05 ***	geneSt.PLD:fertilization_Strategies180.0	1375.50	480.54	2.862 0.004209 **
geneSt.AAT2:fertilization_Strategies180.0	1436.19	480.54	2.989 0.002805 **	geneSt.PolyAP:fertilization_Strategies180.0	1342.45	480.54	2.794 0.005217 **
geneSt.AOX:fertilization_Strategies180.0	273.67	480.54	0.569 0.569024	geneSt.PP2C:fertilization_Strategies180.0	1359.66	480.54	2.829 0.004667 **
<pre>geneSt.Apase:fertilization_Strategies180.0</pre>	2730.62	480.54	5.682 1.34e-08 ***	geneSt.ProD:fertilization_Strategies180.0	1179.97	480.54	2.455 0.014077 *
<pre>geneSt.ATrfA:fertilization_Strategies180.0</pre>	1399.83	480.54	2.913 0.003583 **	geneSt.ProH:fertilization_Strategies180.0	1387.48	480.54	2.887 0.003889 **
<pre>geneSt.ATrfB:fertilization_Strategies180.0</pre>	1581.90	480.54	3.292 0.000997 ***	geneSt.PyrK:fertilization_Strategies180.0	1771.39	480.54	3.686 0.000228 ***
<pre>geneSt.CatT:fertilization_Strategies180.0</pre>	1375.99	480.54	2.863 0.004195 **	geneSt.RPK:fertilization_Strategies180.0	1373.63	480.54	2.858 0.004260 **
<pre>geneSt.CatTR:fertilization_Strategies180.0</pre>	1812.17	480.54	3.771 0.000163 ***	geneSt.Sulfase:fertilization_Strategies180.0	1363.27	480.54	2.837 0.004559 **
<pre>geneSt.CGL:fertilization_Strategies180.0</pre>	1334.31	480.54	2.777 0.005496 **	geneSt.SulfT:fertilization_Strategies180.0	1625.23	480.54	3.382 0.000721 ***
geneSt.CHI:fertilization_Strategies180.0	4529.12	480.54	9.425 < 2e-16 ***	geneSt.SulfT2A:fertilization_Strategies180.0	1517.33	480.54	3.158 0.001593 **
<pre>geneSt.ClCh:fertilization_Strategies180.0</pre>	-249.53	480.54	-0.519 0.603583	geneSt.SulfT2B:fertilization_Strategies180.0	1414.12	480.54	2.943 0.003256 **
geneSt.CLH:fertilization_Strategies180.0	1293.80	480.54	2.692 0.007100 **	geneSt.SulfT2C:fertilization_Strategies180.0	1363.50	480.54	2.837 0.004552 **
geneSt.CWP:fertilization_Strategies180.0	2996.98	480.54	6.237 4.55e-10 ***	geneSt.TRDX:fertilization_Strategies180.0	3272.55	480.54	6.810 9.99e-12 ***
<pre>geneSt.CysPI1:fertilization_Strategies180.0</pre>	1538.00	480.54	3.201 0.001374 **	<pre>geneSt.UBIE:fertilization_Strategies180.0</pre>	1103.52	480.54	2.296 0.021662 *
geneSt.CysT:fertilization_Strategies180.0	1412.00	480.54	2.938 0.003303 **	geneSt.Unk1:fertilization_Strategies180.0	1559.58	480.54	3.245 0.001174 **
<pre>geneSt.DUF506A:fertilization_Strategies180.0</pre>	2618.37	480.54	5.449 5.12e-08 ***	geneSt.Unk2:fertilization_Strategies180.0	1592.48	480.54	3.314 0.000921 ***

Figure 15: Summary of the model 2 (5)

geneSt.Unk3:fertilization_Strategies180.0	1379.72	480.54	2.871 0.004093 **	<pre>geneSt.MtN21:fertilization_Strategies200.0</pre>	-1102.43	973.17	-1.133 0.257298
geneSt.Unk4:fertilization_Strategies180.0	1449.06	480.54	3.015 0.002569 **	<pre>geneSt.Nod:fertilization_Strategies200.0</pre>	-954.68	973.17	-0.981 0.326601
geneSt.Unk5:fertilization_Strategies180.0	2357.09	480.54	4.905 9.40e-07 ***	geneSt.NT:fertilization_Strategies200.0	-1094.92	973.17	-1.125 0.260557
geneSt.Xvl:fertilization_Strategies180.0	1755.89	480.54	3.654 0.000259 ***	geneSt.P109A:fertilization_Strategies200.0	-1102.85	973.17	-1.133 0.257120
geneSt NT2: fertilization Strategies200.0	-711.89	973.17	-0.732 0.464469	geneSt.PBenzR:fertilization_Strategies200.0	-107.40	973.17	-0.110 0.912126
geneSt. PP7A: fertilization Strategies200.0	-1053.05	973.17	-1.082 0.279225	geneSt.PDX:fertilization_Strategies200.0	-879.37	973.17	-0.904 0.366207
geneSt_PP7R:fertilization_Strategies200_0	-1072.78	973.17	-1 102 0 270316	geneSt.PEPT:fertilization_Strategies200.0	-1096.37	973.17	-1.127 0.259924
geneSt AAT1:fertilization Strategies200.0	626 15	973 17	0 643 0 519962	geneSt.PLD:fertilization_Strategies200.0	-1101.03	973.17	-1.131 0.257906
geneSt AAT2:fertilization Strategies200.0	-977 39	973 17	-1 004 0 315226	<pre>geneSt.PolyAP:fertilization_Strategies200.0</pre>	-1060.10	973.17	-1.089 0.276022
geneSt AOY:fertilization Strategies200.0	-1201 49	973 17	-1 235 0 216984	geneSt.PP2C:fertilization_Strategies200.0	-1100.59	973.17	-1.131 0.258095
geneSt Angre: fertilization Strategies200.0	-1010 02	973 17	-1 030 0 208012	geneSt.ProD:fertilization_Strategies200.0	-1159.36	973.17	-1.191 0.233539
geneSt ATrfA: fertilization Strategies200.0	-1010.52	973 17	-0.076.0.328000	geneSt.ProH:fertilization_Strategies200.0	-1076.48	973.17	-1.106 0.268668
geneSt ATrfP: fortilization Strategies200.0	1050.17	972 17	2 004 0 045004 *	geneSt.PyrK:fertilization_Strategies200.0	-222.34	973.17	-0.228 0.819287
genest CatT: fortilization Strategies200.0	-1023 67	973.17	-1 052 0 202858	geneSt.RPK:fertilization_Strategies200.0	-1084.66	973.17	-1.115 0.265047
geneSt. CatTP: fortilization Strategies200.0	-1023.07	072 17	7 002 1 46- 12 ***	geneSt.Sulfase:fertilization_Strategies200.0	-351.69	973.17	-0.361 0.717812
genest.Cutik.rertilization_strategies200.0	1006 12	973.17	1 126 0 260020	<pre>geneSt.SulfT:fertilization_Strategies200.0</pre>	-890.55	973.17	-0.915 0.360145
genest.CdL.Tertilization_Strategies200.0	-1030.13	072 17	-1.120 0.200030 -0.190 0.950077	geneSt.SulfT2A:fertilization_Strategies200.0	-1078.50	973.17	-1.108 0.267772
genest (1(h:fortilization Strategies200.0	-4864 30	973.17	-4.008 5.820-07 ***	geneSt.SulfT2B:fertilization_Strategies200.0	-1057.39	973.17	-1.087 0.277251
genest.Clch.rertilization_strategies200.0	-4604.30	973.17	-4.996 5.626-67	geneSt.SulfT2C:fertilization_Strategies200.0	-1068.80	973.17	-1.098 0.272098
genest.CLH.Tertilization_Strategies200.0	19277 61	072 17	19 792 - 20 16 ***	<pre>geneSt.TRDX:fertilization_Strategies200.0</pre>	1099.49	973.17	1,130 0,258572
genest. Cwp.Tertilization_Strategies200.0	225 10	072 17	0 848 0 206480	geneSt.UBIE: fertilization Strategies200.0	-928.43	973.17	-0.954 0.340081
genest.CysPil:Tertilization_strategies200.0	-025.19	973.17	1 024 0 200062	aeneSt.Unk1:fertilization Strategies200.0	-1057.21	973.17	-1.086 0.277333
genest.cys1:rertilization_strategies200.0	-1000.04	973.17	-1.034 0.300903	geneSt Unk2:fertilization Strategies200 0	-434.11	973.17	-0 446 0 655548
genest.DUF506A:Tertilization_Strategies200.0	-240.33	973.17	1 097 0 276945	geneSt. Unk3: fertilization_Strategies200.0	-1100.05	973.17	-1.130 0.258329
genest.borsdob.rertilization_strategies200.0	-1056.26	973.17	-1.087 0.276845	geneSt Unk4:fertilization_Strategies200_0	-926.03	973 17	-0 952 0 341331
genest.EP1:fertilization_strategies200.0	-974.08	973.17	-1.001 0.3168/0	geneSt Unk5:fertilization Strategies200.0	533.08	973 17	0 548 0 583848
genest.FI:Fertilization_strategies200.0	-947.37	975.17	-0.975 0.550520	geneSt Yvl fertilization Strategies200.0	-194 33	973 17	-0 200 0 841730
genest.GluAse:fertilization_Strategies200.0	1003.90	973.17	1.032 0.302283	geneSt NT2:fertilization Strategies240.0	12 87	662 78	0 010 0 084510
genest.GlubC:Tertilization_Strategies200.0	-1078.45	973.17	-1.108 0.267795	genest_NP2.Tertilization_Strategies240.0	449 51	662.78	0.678 0.497642
genest.GK3:fertilization_Strategies200.0	-836.11	973.17	-0.859 0.390258	genest	376 32	662.78	0.078 0.457042
genest.GST:fertilization_Strategies200.0	-80.27	973.17	-0.082 0.934265	genest AT1 fortilization Stategies240.0	1961 15	662.78	2 909 0 004099 **
geneSt.InosD:fertilization_Strategies200.0	355.05	973.17	0.365 0.715239	genest.AAT1:Tertilization_Strategies240.0	1001.13	662.78	0 207 0 410422
<pre>geneSt.Kinase:fertilization_Strategies200.0</pre>	-1026.22	973.17	-1.055 0.291658	genest.AA12:Tertilization_Strategies240.0	555.09	662.78	0.807 0.419482
geneSt.LIP:fertilization_Strategies200.0	-758.97	973.17	-0.780 0.435463	genest.Aux:rertilization_strategies240.0	-891.95	662.78	-1.546 0.178591
geneSt.LOB38A:fertilization_Strategies200.0	-1096.36	973.17	-1.127 0.259931	genest.Apase:Tertilization_Strategies240.0	4564.91	662.78	0.887 5.828-12
<pre>geneSt.LOB38B:fertilization_Strategies200.0</pre>	-991.31	973.17	-1.019 0.308384	genest.AIrtA:tertilization_Strategies240.0	353.76	662.78	0.534 0.593523
geneSt.MIP:fertilization_Strategies200.0	-18.39	973.17	-0.019 0.984919	genest.AITTB:Tertilization_Strategies240.0	429.69	662.78	0.048 0.516786
<pre>geneSt.MSF5A:fertilization_Strategies200.0</pre>	1545.67	973.17	1.588 0.112235	genest.cati:fertilization_Strategies240.0	480.69	662.78	0.725 0.468296
<pre>geneSt.MSF5B:fertilization_Strategies200.0</pre>	-490.70	973.17	-0.504 0.614103	geneSt.CatIR:fertilization_Strategies240.0	191.54	662.78	0.289 0.772585
geneSt.MSRB:fertilization_Strategies200.0	-998.73	973.17	-1.026 0.304775	geneSt.CGL:fertilization_Strategies240.0	343.29	662.78	0.518 0.604500

Figure 15: Summary of the model 2 (6)

				geneSt.SulfT2A:fertilization_Strategies240.0	824.77	662.78	1.244 0.213366
geneSt.CHI:fertilization_Strategies240.0	9946.35	662.78	15.007 < 2e-16 ***	geneSt.SulfT2B:fertilization_Strategies240.0	464.21	662.78	0.700 0.483686
geneSt.ClCh:fertilization_Strategies240.0	1680.98	662.78	2.536 0.011211 *	geneSt.SulfT2C:fertilization_Strategies240.0	311.60	662.78	0.470 0.638263
geneSt.CLH:fertilization_Strategies240.0	172.93	662.78	0.261 0.794159	geneSt.TRDX:fertilization_Strategies240.0	5780.62	662.78	8.722 < 2e-16 ***
geneSt.CWP:fertilization_Strategies240.0	-10013.56	662.78	-15.108 < 2e-16 ***	geneSt.UBIE:fertilization_Strategies240.0	281.53	662.78	0.425 0.671007
geneSt.CysPI1:fertilization_Strategies240.0	381.72	662.78	0.576 0.564667	geneSt.Unk1:fertilization_Strategies240.0	586.46	662.78	0.885 0.376247
geneSt.CysT:fertilization_Strategies240.0	423.51	662.78	0.639 0.522833	geneSt.Unk2:fertilization_Strategies240.0	845.88	662.78	1.276 0.201877
<pre>geneSt.DUF506A:fertilization_Strategies240.0</pre>	4050.78	662.78	6.112 1.00e-09 ***	geneSt.Unk3:fertilization Strategies240.0	340.37	662.78	0.514 0.607572
<pre>geneSt.DUF506B:fertilization_Strategies240.0</pre>	432.89	662.78	0.653 0.513669	geneSt.Unk4:fertilization Strategies240.0	530.42	662.78	0.800 0.423547
geneSt.EPI:fertilization_Strategies240.0	358.92	662.78	0.542 0.588143	geneSt Unk5:fertilization Strategies240.0	2100.30	662.78	3,169 0,001532 **
geneSt.FT:fertilization_Strategies240.0	136.41	662.78	0.206 0.836940	geneSt Xvl:fertilization Strategies240 0	1023.79	662.78	1 545 0 122435
geneSt.GluAse:fertilization_Strategies240.0	753.98	662.78	1.138 0.255300	geneSt NT2:fertilization_Strategies60.60	2588 34	738 62	3 504 0 000459 ***
geneSt.GluDC:fertilization_Strategies240.0	2764.72	662.78	4.171 3.04e-05 ***	geneStPD7A:fertilization_Strategies60.60	2946.05	738 62	3 989 6 670-05 ***
geneSt.GR3:fertilization_Strategies240.0	4814.29	662.78	7.264 3.88e-13 ***	geneSt PP7R:fertilization Strategies60.60	2948 42	738 62	3 992 6 580-05 ***
geneSt.GST:fertilization_Strategies240.0	214.47	662.78	0.324 0.746250	geneSt AAT1: fertilization Strategies60.60	2875 00	738.62	3 892 9 950-05 ***
geneSt.InosD:fertilization_Strategies240.0	3240.34	662.78	4.889 1.02e-06 ***	coneSt AAT2: fortilization Strategies60.60	20/0.00	738.02	3 993 6 550-05 ***
geneSt.Kinase:fertilization_Strategies240.0	634.69	662.78	0.958 0.338265	const ANY: fortilization Strategies60.00	1602 08	738.02	2 172 0 020807 *
geneSt.LIP:fertilization_Strategies240.0	144.61	662.78	0.218 0.827284	genest. Aox. refittization_strategies60.00	2077 55	738.02	2 906 0 91- 05 ***
geneSt.LOB38A:fertilization_Strategies240.0	325.26	662.78	0.491 0.623607	genest.Apase: rentilization_strategies00.00	2011.33	738.02	3.896 9.81e-05
<pre>geneSt.LOB38B:fertilization_Strategies240.0</pre>	422.81	662.78	0.638 0.523528	genest.AIrtA:Tertilization_Strategies60.60	2900.47	738.62	4.008 6.14e-05
geneSt.MIP:fertilization_Strategies240.0	957.44	662.78	1.445 0.148592	geneSt.AIrtB:Tertilization_Strategies60.60	3233.00	738.62	4.377 1.21e-05 ***
geneSt.MSF5A:fertilization_Strategies240.0	3834.52	662.78	5.785 7.32e-09 ***	geneSt.Catl:fertilization_Strategies60.60	2835.27	738.62	3.839 0.000124 ***
geneSt.MSF5B:fertilization_Strategies240.0	1674.25	662.78	2.526 0.011541 *	genest.Catik:Tertilization_Strategies60.60	3501.97	738.62	4.741 2.14e-06 ***
<pre>geneSt.MSRB:fertilization_Strategies240.0</pre>	486.61	662.78	0.734 0.462837	geneSt.CGL:fertilization_Strategies60.60	2884.27	738.62	3.905 9.45e-05 ***
geneSt.MtN21:fertilization_Strategies240.0	105.37	662.78	0.159 0.873685	geneSt.CHI:fertilization_Strategies60.60	2071.18	738.62	2.804 0.005050 **
geneSt.Nod:fertilization_Strategies240.0	299.51	662.78	0.452 0.651344	geneSt.ClCh:fertilization_Strategies60.60	20.50	738.62	0.028 0.977855
geneSt.NT:fertilization_Strategies240.0	312.01	662.78	0.471 0.637816	<pre>geneSt.CLH:fertilization_Strategies60.60</pre>	2990.53	738.62	4.049 5.17e-05 ***
geneSt.P109A:fertilization_Strategies240.0	324.89	662.78	0.490 0.623999	geneSt.CWP:fertilization_Strategies60.60	4307.84	738.62	5.832 5.54e-09 ***
geneSt.PBenzR:fertilization_Strategies240.0	3557.86	662.78	5.368 8.04e-08 ***	geneSt.CysPI1:fertilization_Strategies60.60	3266.05	738.62	4.422 9.83e-06 ***
geneSt.PDX:fertilization_Strategies240.0	422.59	662.78	0.638 0.523743	geneSt.CysT:fertilization_Strategies60.60	2941.81	738.62	3.983 6.83e-05 ***
geneSt.PEPT:fertilization_Strategies240.0	354.04	662.78	0.534 0.593224	geneSt.DUF506A:fertilization_Strategies60.60	2824.79	738.62	3.824 0.000131 ***
geneSt.PLD:fertilization_Strategies240.0	315.91	662.78	0.477 0.633620	geneSt.DUF506B:fertilization_Strategies60.60	2949.93	738.62	3.994 6.52e-05 ***
geneSt.PolyAP:fertilization_Strategies240.0	274.96	662.78	0.415 0.678250	geneSt.EPI:fertilization_Strategies60.60	2921.97	738.62	3.956 7.65e-05 ***
geneSt.PP2C:fertilization_Strategies240.0	306.11	662.78	0.462 0.644191	geneSt.FT:fertilization_Strategies60.60	2708.60	738.62	3.667 0.000246 ***
geneSt.ProD:fertilization_Strategies240.0	87.94	662.78	0.133 0.894444	geneSt.GluAse:fertilization_Strategies60.60	3213.34	738.62	4.350 1.36e-05 ***
geneSt.ProH:fertilization_Strategies240.0	362.62	662.78	0.547 0.584308	geneSt.GluDC:fertilization_Strategies60.60	2743.06	738.62	3.714 0.000205 ***
<pre>geneSt.PyrK:fertilization_Strategies240.0</pre>	1393.33	662.78	2.102 0.035543 *	<pre>geneSt.GR3:fertilization_Strategies60.60</pre>	2882.30	738.62	3.902 9.56e-05 ***
geneSt.RPK:fertilization_Strategies240.0	314.97	662.78	0.475 0.634628	<pre>geneSt.GST:fertilization_Strategies60.60</pre>	2881.62	738.62	3.901 9.59e-05 ***
geneSt.Sulfase:fertilization_Strategies240.0	165.92	662.78	0.250 0.802324	geneSt.InosD:fertilization_Strategies60.60	2892.07	738.62	3.915 9.05e-05 ***
<pre>geneSt.SulfT:fertilization_Strategies240.0</pre>	1043.54	662.78	1.574 0.115389	geneSt.Kinase:fertilization_Strategies60.60	2988.66	738.62	4.046 5.22e-05 ***

Figure 15: Summary of the model 2 (7)

	2572.45	720.62	2 404 0 000405 ***	<pre>geneSt.AOX:fertilization_Strategies60.120</pre>	1701.44	668.57	2.545 0.010938 *
geneSt.LIP:fertilization_Strategies60.60	2573.45	738.62	3.484 0.000495 ***	<pre>geneSt.Apase:fertilization_Strategies60.120</pre>	2809.24	668.57	4.202 2.66e-05 ***
genest.LUB38A:Tertilization_Strategies60.60	2949.25	738.62	5.995 6.55e-05	<pre>geneSt.ATrfA:fertilization_Strategies60.120</pre>	3006.01	668.57	4.496 6.95e-06 ***
geneSt.LUB38B:Tertilization_Strategles60.60	2955.11	738.62	4.001 6.338-05	<pre>geneSt.ATrfB:fertilization_Strategies60.120</pre>	3194.64	668.57	4.778 1.78e-06 ***
geneSt.MIP:fertilization_Strategiesb0.60	2/18.11	738.62	3.680 0.000234	<pre>geneSt.CatT:fertilization_Strategies60.120</pre>	2873.21	668.57	4.298 1.73e-05 ***
geneSt.MSF5A:fertilization_Strategies60.60	2880.54	738.62	3.900 9.65e-05 ***	geneSt.CatTR:fertilization_Strategies60.120	3222.18	668.57	4.820 1.45e-06 ***
<pre>geneSt.MSF5B:fertilization_Strategies60.60</pre>	2971.74	738.62	4.023 5.76e-05 ***	geneSt.CGL:fertilization_Strategies60.120	2892.30	668.57	4.326 1.52e-05 ***
<pre>geneSt.MSRB:fertilization_Strategies60.60</pre>	2937.36	738.62	3.977 7.01e-05 ***	geneSt.CHI:fertilization_Strategies60.120	2151.91	668.57	3.219 0.001290 **
geneSt.MtN21:fertilization_Strategies60.60	2686.01	738.62	3.637 0.000277 ***	geneSt.ClCh:fertilization Strategies60.120	-36.37	668.57	-0.054 0.956614
<pre>geneSt.Nod:fertilization_Strategies60.60</pre>	2893.23	738.62	3.917 8.99e-05 ***	geneSt.CLH: fertilization_Strategies60.120	2994.53	668.57	4.479 7.53e-06 ***
geneSt.NT:fertilization_Strategies60.60	2922.73	738.62	3.957 7.61e-05 ***	geneSt.CWP:fertilization_Strategies60.120	3163.05	668.57	4.731 2.25e-06 ***
geneSt.P109A:fertilization_Strategies60.60	2950.33	738.62	3.994 6.51e-05 ***	geneSt (vsPI1:fertilization Strategies60 120	3301 09	668.57	4 938 7 97e-07 ***
<pre>geneSt.PBenzR:fertilization_Strategies60.60</pre>	3102.59	738.62	4.200 2.67e-05 ***	geneSt (vsT:fertilization Strategies60 120	2985 07	668 57	4 465 8 05e-06 ***
geneSt.PDX:fertilization_Strategies60.60	2982.25	738.62	4.038 5.42e-05 ***	geneSt DUE506A: fartilization Strategies60 120	2037 36	668 57	4 303 1 120-05 ***
<pre>geneSt.PEPT:fertilization_Strategies60.60</pre>	2952.23	738.62	3.997 6.44e-05 ***	genest. DUEE06P: fortilization_Strategies60.120	2007.00	669 57	4 492 7 400 06 ***
<pre>geneSt.PLD:fertilization_Strategies60.60</pre>	2953.70	738.62	3.999 6.38e-05 ***	genest. DDF SOOB. Tertilization_Strategies60.120	2957.00	668.57	4.403 7.408-00
<pre>geneSt.PolyAP:fertilization_Strategies60.60</pre>	2913.78	738.62	3.945 8.01e-05 ***	genest.EP1:Tertilization_Strategies00.120	2969.20	008.57	4.441 8.998-00 ***
<pre>geneSt.PP2C:fertilization_Strategies60.60</pre>	2931.50	738.62	3.969 7.24e-05 ***	genest.FI:fertilization_strategies60.120	2751.78	668.57	4.116 5.87e-05 ***
geneSt.ProD:fertilization_Strategies60.60	2682.17	738.62	3.631 0.000283 ***	geneSt.GluAse:fertilization_Strategies60.120	3180.79	668.57	4.758 1.97e-06 ***
<pre>geneSt.ProH:fertilization_Strategies60.60</pre>	2952.75	738.62	3.998 6.42e-05 ***	genest.GlubC:Tertilization_Strategies60.120	2793.14	668.57	4.178 2.95e-05 ***
geneSt.PyrK:fertilization_Strategies60.60	2847.11	738.62	3.855 0.000116 ***	geneSt.GR3:fertilization_Strategies60.120	2942.99	668.57	4.402 1.08e-05 ***
geneSt.RPK:fertilization_Strategies60.60	2952.19	738.62	3.997 6.44e-05 ***	<pre>geneSt.GST:fertilization_Strategies60.120</pre>	2892.25	668.57	4.326 1.52e-05 ***
geneSt.Sulfase:fertilization_Strategies60.60	3051.46	738.62	4.131 3.62e-05 ***	<pre>geneSt.InosD:fertilization_Strategies60.120</pre>	2899.32	668.57	4.337 1.45e-05 ***
geneSt.SulfT:fertilization_Strategies60.60	2822.78	738.62	3.822 0.000133 ***	<pre>geneSt.Kinase:fertilization_Strategies60.120</pre>	3042.53	668.57	4.551 5.37e-06 ***
geneSt.SulfT2A:fertilization_Strategies60.60	2889.29	738.62	3.912 9.19e-05 ***	<pre>geneSt.LIP:fertilization_Strategies60.120</pre>	2595.31	668.57	3.882 0.000104 ***
geneSt.SulfT2B:fertilization_Strategies60.60	2941.88	738.62	3.983 6.83e-05 ***	<pre>geneSt.LOB38A:fertilization_Strategies60.120</pre>	2994.59	668.57	4.479 7.53e-06 ***
geneSt.SulfT2C:fertilization_Strategies60.60	2930.53	738.62	3.968 7.28e-05 ***	<pre>geneSt.LOB38B:fertilization_Strategies60.120</pre>	3003.66	668.57	4.493 7.07e-06 ***
geneSt.TRDX:fertilization Strategies60.60	2918.55	738.62	3.951 7.79e-05 ***	<pre>geneSt.MIP:fertilization_Strategies60.120</pre>	2738.06	668.57	4.095 4.23e-05 ***
geneSt.UBIE: fertilization Strategies60.60	2289.46	738.62	3,100 0,001940 **	geneSt.MSF5A:fertilization_Strategies60.120	2898.42	668.57	4.335 1.46e-05 ***
geneSt Unk1:fertilization Strategies60.60	3069.28	738.62	4.155 3.26e-05 ***	geneSt.MSF5B:fertilization_Strategies60.120	3005.35	668.57	4.495 6.98e-06 ***
geneSt.Unk2:fertilization_Strategies60.60	3013.01	738.62	4.079 4.53e-05 ***	geneSt.MSRB:fertilization_Strategies60.120	2976.60	668.57	4.452 8.54e-06 ***
geneSt Unk3:fertilization Strategies60.60	2950.99	738 62	3 995 6 48e-05 ***	geneSt.MtN21:fertilization_Strategies60.120	2712.24	668.57	4.057 4.99e-05 ***
geneSt Unk4:fertilization Strategies60.60	2971.33	738.62	4 023 5 77e-05 ***	geneSt.Nod:fertilization_Strategies60.120	2937.23	668.57	4.393 1.12e-05 ***
geneSt Unk5:fertilization Strategies60.60	3455 72	738 62	4 679 2 900-06 ***	geneSt.NT: fertilization Strategies60.120	2965.67	668.57	4,436 9,21e-06 ***
geneSt Yvl:fertilization Strategies60.60	3167 95	738 62	4 289 1 800-05 ***	geneSt.P109A:fertilization Strategies60.120	2994.54	668.57	4.479 7.53e-06 ***
geneSt NT2:fortilization Strategies60.00	2640 64	668 57	3 950 7 850-05 ***	geneSt PRenzR:fertilization Strategies60 120	3118 25	668 57	4 664 3 12e-06 ***
geneSt_DD7A:fertilization_Strategies60.120	2087 64	668 57	4 469 7 910-06 ***	geneSt_PDX:fertilization_Strategies60.120	3012.99	668.57	4.507 6.62e-06 ***
genest	2003 26	668 57	4 477 7 600-06 ***	geneSt PEPT:fertilization Strategies60 120	2998 20	668 57	4 484 7 340-06 ***
genest	2995.20	669 57	4 202 1 600 05 ***	geneSt. PLD: fertilization Strategies60 120	2000 20	668 57	4 486 7 290-06 ***
genest. AAT2.fortilization_StrategleS60.120	2007.04	669 57	4.303 1.098-03 ***	genest PolyAP: fortilization Strategies60.120	2056 44	669 57	4 422 0 820-06 ***
genest.AAT2.Terttizacion_Strategies60.120	2331.34	000.37	4.404 7.308-00	geneselloryminererrization_strategresoe.ize	2550.44	000.37	4.4LL 5.826-00

Figure 15: Summary of the model 2 (8)

apport DD2C: fortilization Strategies60 120	2077 00	669 57	4 452 8 520 06 ***	<pre>geneSt.FT:fertilization_Strategies0.180</pre>	4086.72	2164.96	1.888 0.059083 .
geneSt.Przc.Tertilization_Strategies60.120	2772 21	668 57	4.455 8.528-00	geneSt.GluAse:fertilization_Strategies0.180	4141.04	2164.96	1.913 0.055791 .
geneSt. Problematilization_Strategies60.120	2007 19	669 57	4 492 7 400 06 ***	geneSt.GluDC:fertilization_Strategies0.180	4201.28	2164.96	1.941 0.052321 .
geneSt.Pron.Tertilization_Strategies00.120	2997.10	669 57	4.403 7.408-00	geneSt.GR3:fertilization_Strategies0.180	4452.59	2164.96	2.057 0.039730 *
genest.Fyrk.Tertilization_Strategies60.120	2006.00	668 57	4.254 1.708-05	geneSt.GST:fertilization_Strategies0.180	4312.79	2164.96	1.992 0.046373 *
geneSt.KPK:Fertilization_Strategies60.120	2990.90	669 57	4.403 7.410-00 ***	geneSt.InosD:fertilization_Strategies0.180	4282.38	2164.96	1.978 0.047935 *
genest. Sulfase: rentilization_Strategieso0.120	3042.30	668.57	4.551 5.588-00	geneSt.Kingse:fertilization Strategies0.180	4301.60	2164.96	1.987 0.046943 *
genest. SulfT21. fertilization_Strategres00.120	2034.70	668.57	4.270 1.908-03	geneSt.LIP:fertilization Strategies0.180	3808.80	2164.96	1.759 0.078541 .
genest.SulfI2A:Tertilization_Strategies60.120	2935.17	668 57	4.590 1.14e-05 ***	geneSt.LOB38A: fertilization Strategies0.180	4295.28	2164.96	1.984 0.047267 *
genest.SulfI2B:Fertilization_Strategies60.120	2987.00	668.57	4.468 7.948-06	geneSt LOB38B:fertilization Strategies0 180	4248 43	2164 96	1 962 0 049733 *
genest.SulfizC:fertilization_Strategies60.120	2974.08	008.57	4.448 8.698-06 ***	geneSt_MIP:fertilization_Strategies0.180	3952.70	2164.96	1.826 0.067899
genest.IRDX:fertilization_strategies00.120	2910.37	008.57	4.302 1.298-03 ***	geneSt_MSE5A:fertilization_Strategies0.180	4259.79	2164.96	1.968 0.049125 *
genest.uBle:rertilization_strategies60.120	2294.40	668.57	3.432 0.000001 +++	geneSt MSESB:fertilization_Strategies0 180	4268 41	2164 96	1 972 0 048668 *
geneSt.Unk1:fertilization_Strategies60.120	3091.18	668.57	4.624 3.79e-06 ***	geneSt MSRB:fertilization Strategies0 180	4275 79	2164 96	1 975 0 048280 *
genest.Unk2:Tertilization_Strategies60.120	3020.07	668.57	4.517 6.30e-06 +++	geneSt MtN21:fertilization Strategies0.100	3882 54	2164.96	1 703 0 077020
geneSt.Unk3:fertilization_Strategies60.120	2996.53	668.57	4.482 7.438-06 ***	geneSt Nod: fertilization Strategies0.180	4202 75	2164.96	1 941 0 052238
geneSt.Unk4:fertilization_Strategies60.120	3013.56	668.57	4.507 6.598-06 ***	geneSt.Nou.Tertilization_Strategies0.100	4252 42	2164.96	1 065 0 040465 *
geneSt.UnkS:fertilization_Strategies60.120	3441.98	668.57	5.148 2.65e-07 ***	geneSt.NI.Tertilization_Strategies0.100	4233.42	2164.90	1 082 0 047225 *
geneSt.Xyl:fertilization_Strategies60.120	3197.25	668.57	4.782 1.74e-06 ***	genest. FlosA. Tertilization_Strategies0.100	4293.90	2104.90	2 020 0 042405 *
geneSt_NT2:fertilization_Strategies0.180	3779.57	2164.96	1.746 0.080860 .	geneSt.PBenZK:Tertilization_Strategies0.100	4392.10	2164.96	2.029 0.042495 *
geneStPP7A:fertilization_Strategies0.180	4279.76	2164.96	1.977 0.048072 *	geneSt.PDA:Tertilization_Strategies0.100	4207.10	2164.96	1.971 0.040757 *
<pre>geneStPP7B:fertilization_Strategies0.180</pre>	4289.14	2164.96	1.981 0.047584 *	genest.PEPT:fertilization_strategies0.180	4298.03	2164.96	1.985 0.047126 *
<pre>geneSt.AAT1:fertilization_Strategies0.180</pre>	4064.32	2164.96	1.877 0.060487 .	geneSt.PLD:Tertilization_Strategies0.180	4297.89	2164.96	1.985 0.047133 *
<pre>geneSt.AAT2:fertilization_Strategies0.180</pre>	4294.86	2164.96	1.984 0.047289 *	geneSt.PolyAP:fertilization_Strategies0.180	4251.20	2164.96	1.964 0.049584 *
<pre>geneSt.AOX:fertilization_Strategies0.180</pre>	3355.68	2164.96	1.550 0.121156	<pre>geneSt.PP2C:fertilization_Strategies0.180</pre>	4279.16	2164.96	1.977 0.048103 *
<pre>geneSt.Apase:fertilization_Strategies0.180</pre>	4379.51	2164.96	2.023 0.043094 *	<pre>geneSt.ProD:fertilization_Strategies0.180</pre>	3992.49	2164.96	1.844 0.065175 .
<pre>geneSt.ATrfA:fertilization_Strategies0.180</pre>	4364.80	2164.96	2.016 0.043800 *	<pre>geneSt.ProH:fertilization_Strategies0.180</pre>	4305.52	2164.96	1.989 0.046743 *
<pre>geneSt.ATrfB:fertilization_Strategies0.180</pre>	4153.63	2164.96	1.919 0.055050 .	geneSt.PyrK:fertilization_Strategies0.180	3890.59	2164.96	1.797 0.072337 .
<pre>geneSt.CatT:fertilization_Strategies0.180</pre>	4122.41	2164.96	1.904 0.056902 .	<pre>geneSt.RPK:fertilization_Strategies0.180</pre>	4298.01	2164.96	1.985 0.047127 *
<pre>geneSt.CatTR:fertilization_Strategies0.180</pre>	3449.46	2164.96	1.593 0.111103	<pre>geneSt.Sulfase:fertilization_Strategies0.180</pre>	4125.97	2164.96	1.906 0.056689 .
<pre>geneSt.CGL:fertilization_Strategies0.180</pre>	4303.71	2164.96	1.988 0.046835 *	<pre>geneSt.SulfT:fertilization_Strategies0.180</pre>	4107.41	2164.96	1.897 0.057811 .
<pre>geneSt.CHI:fertilization_Strategies0.180</pre>	4220.80	2164.96	1.950 0.051236 .	<pre>geneSt.SulfT2A:fertilization_Strategies0.180</pre>	4232.69	2164.96	1.955 0.050584 .
<pre>geneSt.ClCh:fertilization_Strategies0.180</pre>	-28.88	2164.96	-0.013 0.989358	<pre>geneSt.SulfT2B:fertilization_Strategies0.180</pre>	4288.60	2164.96	1.981 0.047612 *
<pre>geneSt.CLH:fertilization_Strategies0.180</pre>	4238.62	2164.96	1.958 0.050262 .	<pre>geneSt.SulfT2C:fertilization_Strategies0.180</pre>	4257.74	2164.96	1.967 0.049234 *
<pre>geneSt.CWP:fertilization_Strategies0.180</pre>	6111.38	2164.96	2.823 0.004764 **	<pre>geneSt.TRDX:fertilization_Strategies0.180</pre>	4511.49	2164.96	2.084 0.037183 *
<pre>geneSt.CysPI1:fertilization_Strategies0.180</pre>	4324.31	2164.96	1.997 0.045792 *	<pre>geneSt.UBIE:fertilization_Strategies0.180</pre>	3070.25	2164.96	1.418 0.156158
<pre>geneSt.CysT:fertilization_Strategies0.180</pre>	4268.98	2164.96	1.972 0.048638 *	<pre>geneSt.Unk1:fertilization_Strategies0.180</pre>	4285.87	2164.96	1.980 0.047754 *
<pre>geneSt.DUF506A:fertilization_Strategies0.180</pre>	4448.90	2164.96	2.055 0.039894 *	<pre>geneSt.Unk2:fertilization_Strategies0.180</pre>	4178.12	2164.96	1.930 0.053633 .
<pre>geneSt.DUF506B:fertilization_Strategies0.180</pre>	4299.97	2164.96	1.986 0.047026 *	<pre>geneSt.Unk3:fertilization_Strategies0.180</pre>	4296.63	2164.96	1.985 0.047198 *
<pre>geneSt.EPI:fertilization_Strategies0.180</pre>	4250.77	2164.96	1.963 0.049607 *	<pre>geneSt.Unk4:fertilization_Strategies0.180</pre>	4298.19	2164.96	1.985 0.047118 *

Figure 15: Summary of the model 2 (9)

geneSt.Unk5:fertilization_Strategies0.180	4014.68	2164.96	1.854 0.063696 . 2 059 0 039462 *	geneSt.NT:fertilization_Strategies60.180	3066.93	700.05	4.381 1.19e-05 ***
genest.Nyt.refilization_strategies60.180	2705.93	700.05	3 865 0 000111 ***	geneSt_P109A:fertilization_Strategies60.180	3093.00	700.05	4.418 9.99e-06 ***
geneSt_PP7A:fertilization_Strategies60.180	3087.53	700.05	4.410 1.04e-05 ***	const DPonzP: fortilization Strategies60.100	2217 12	700.05	4 739 2 170 06 ***
geneStPP7B:fertilization_Strategies60.180	3091.95	700.05	4.417 1.01e-05 ***	genesch DDV fastilisetien Statesies60 100	3121 71	700.05	4 450 8 26- 06 ***
geneSt.AAT1:fertilization_Strategies60.180	3013.73	700.05	4.305 1.68e-05 ***	genest.PDA:Tertilization_Strategies60.180	5121.71	700.05	4.459 8.268-06 +++
geneSt.AAT2:fertilization_Strategies60.180	3100.01	700.05	4.428 9.54e-06 ***	geneSt.PEPT:fertilization_Strategies60.180	3097.14	700.05	4.424 9.72e-06 ***
geneSt.AOX:fertilization_Strategies60.180	1761.28	700.05	2.516 0.011878 *	geneSt.PLD:fertilization_Strategies60.180	3098.60	700.05	4.426 9.63e-06 ***
<pre>geneSt.Apase:fertilization_Strategies60.180</pre>	2933.75	700.05	4.191 2.79e-05 ***	<pre>geneSt.PolyAP:fertilization_Strategies60.180</pre>	3056.47	700.05	4.366 1.27e-05 ***
<pre>geneSt.ATrfA:fertilization_Strategies60.180</pre>	3106.32	700.05	4.437 9.15e-06 ***	geneSt.PP2C:fertilization Strategies60.180	3076.32	700.05	4.394 1.12e-05 ***
<pre>geneSt.ATrfB:fertilization_Strategies60.180</pre>	3434.74	700.05	4.906 9.34e-07 ***	geneSt ProD:fertilization Strategies60 180	2824 68	700 05	4 035 5 480-05 ***
<pre>geneSt.CatT:fertilization_Strategies60.180</pre>	2968.52	700.05	4.240 2.24e-05 ***	geneSt. Problem tilization Strategies60.100	2000 20	700.05	4 427 0 500 06 ***
<pre>geneSt.CatTR:fertilization_Strategies60.180</pre>	3573.40	700.05	5.105 3.34e-07 ***	genest.Pron.rentilization_strategies60.100	3099.20	700.05	4.427 9.398-06
<pre>geneSt.CGL:fertilization_Strategies60.180</pre>	3005.90	700.05	4.294 1.76e-05 ***	geneSt.PyrK:fertilization_Strategies60.180	2986.49	700.05	4.266 2.00e-05 ***
<pre>geneSt.CHI:fertilization_Strategies60.180</pre>	2242.03	700.05	3.203 0.001363 **	geneSt.RPK:fertilization_Strategies60.180	3095.84	700.05	4.422 9.81e-06 ***
geneSt.ClCh:fertilization_Strategies60.180	114.00	700.05	0.163 0.870635	<pre>geneSt.Sulfase:fertilization_Strategies60.180</pre>	3174.23	700.05	4.534 5.81e-06 ***
geneSt.CLH:fertilization_Strategies60.180	3112.49	700.05	4.446 8.78e-06 ***	geneSt.SulfT:fertilization Strategies60.180	2964.08	700.05	4.234 2.30e-05 ***
genest.CWP:fertilization_strategies60.180	3183.24	700.05	4.547 5.468-06 ***	const CulfT2A: fortilization Strategies60 190	2027 49	700 05	4 220 1 44c OF ***
genest.CysP11:Tertilization_Strategies60.180	3440.00	700.05	4.914 8.99e-07 ***	genest. Sull T2A. Ter till zution_Strutegtesou.180	3037.40	700.05	4.335 1.446-03
genest.Cysl:Tertilization_Strategles60.180	3090.71	700.05	4.415 1.010-05 ***	genest.SulfI2B:fertilization_Strategies60.180	3085.78	700.05	4.408 1.05e-05 ***
genest. DUFS06A. rertilization_strategies00.180	2007 24	700.05	4.337 1.436-03	geneSt.SulfT2C:fertilization_Strategies60.180	3071.09	700.05	4.387 1.15e-05 ***
genest. DDF500B.Tertilization_Strategies60.180	3057.54	700.05	4.424 9.710-00	<pre>geneSt.TRDX:fertilization_Strategies60.180</pre>	3098.24	700.05	4.426 9.65e-06 ***
geneSt FT:fertilization Strategies60.100	2858 74	700.05	4 084 4 450-05 ***	<pre>aeneSt.UBIE:fertilization_Strategies60.180</pre>	2382.01	700.05	3,403 0,000668 ***
geneSt GluAse: fertilization Strategies60, 180	3372.88	700.05	4.818 1.46e-06 ***	geneSt Unk1:fertilization Strategies60 180	3246 05	700 05	4 637 3 56e-06 ***
geneSt GluDC:fertilization Strategies60 180	2887 88	700.05	4 125 3 72e-05 ***	geneSt. Unk2:fortilization_Strategies60.100	3143 00	700.05	4 401 7 120 06 ***
geneSt.GR3:fertilization_Strategies60.180	3036.84	700.05	4.338 1.44e-05 ***	genest.unk2:fertilization_strategies60.160	3143.00	700.05	4.491 7.128-06
geneSt.GST:fertilization Strategies60.180	3065.05	700.05	4.378 1.200-05 ***	geneSt.Unk3:fertilization_Strategies60.180	3096.04	700.05	4.423 9.80e-06 ***
geneSt.InosD:fertilization_Strategies60.180	3020.62	700.05	4.315 1.60e-05 ***	geneSt.Unk4:fertilization_Strategies60.180	3119.41	700.05	4.456 8.39e-06 ***
geneSt.Kinase:fertilization_Strategies60.180	3154.81	700.05	4.507 6.62e-06 ***	geneSt.Unk5:fertilization_Strategies60.180	3566.46	700.05	5.095 3.52e-07 ***
geneSt.LIP:fertilization_Strategies60.180	2696.32	700.05	3.852 0.000118 ***	aeneSt.Xvl:fertilization_Strategies60.180	3334.93	700.05	4.764 1.91e-06 ***
geneSt.LOB38A:fertilization_Strategies60.180	3093.89	700.05	4.420 9.94e-06 ***				
geneSt.LOB38B:fertilization_Strategies60.180	3103.15	700.05	4.433 9.35e-06 ***		E ( ) 0 1 (	, ,	
geneSt.MIP:fertilization_Strategies60.180	2849.29	700.05	4.070 4.71e-05 ***	Signif. codes: 0 **** 0.001 *** 0.01 ** 0.0	5 . 0.1	1	
<pre>geneSt.MSF5A:fertilization_Strategies60.180</pre>	3031.18	700.05	4.330 1.50e-05 ***				
<pre>geneSt.MSF5B:fertilization_Strategies60.180</pre>	3121.84	700.05	4.459 8.25e-06 ***	Residual standard error: 2138 on 23110 degrees	of freedom		
geneSt.MSRB:fertilization_Strategies60.180	3084.47	700.05	4.406 1.06e-05 ***	Multiple R-squared: 0.4551, Adjusted R-square	d: 0.4371		
<pre>geneSt.MtN21:fertilization_Strategies60.180</pre>	2795.40	700.05	3.993 6.54e-05 ***	E-statistic: 25.2 on 766 and 23110 DF. p-valu	e: < 2.2e-16	5	
<pre>geneSt.Nod:fertilization_Strategies60.180</pre>	3032.54	700.05	4.332 1.48e-05 ***	· · · · · · · · · · · · · · · · · · ·			

Figure 15: Summary of the model 2 (10)

# 2. The cluster dendrogram



Figure 16: the full cluster dendrogram

# 3. <u>When the number of clusters is set to three, the clustering results for each gene are obtained.</u>

The focus of this study is on the smaller clusters at the bottom of the cluster dendrogram hence no further analysis is conducted on these results.

Cluster 1: [1] St\_AT1 St.ATrfB 63 Levels: St\_AT1 St\_NT2 St..PP7A St..PP7B ... St.Xyl Cluster 2: [1] St\_NT2 St..PP7A St..PP7B St.AAT1 St.AAT2 [6] St.AOX St.Apase St.CGL St.CysPI1 St.CysT [11] St.DUF506A St.EPI St.FT St.GluDC St.GST [16] St.MIP St.MSF5B St.MSRB St.NT St.PBenzR [21] St.PDX St.PP2C St.ProD St.PyrK St.Sulfase [26] St.SulfT2B St.Unk3 St.Unk4 St.Unk5 63 Levels: St\_AT1 St\_NT2 St..PP7A St..PP7B ... St.Xyl Cluster 3: [1] St.ATrfA St.CatT St.CatTR St.CHI St.ClCh [6] St.CLH St.CWP St.DUF506B St.GluAse St.GR3 [11] St.InosD St.LOB38A St.LOB38B St.Kinase St.LIP [16] St.MSF5A St.MtN21 St.P109A St.PEPT St.Nod [21] St.PLD St.PolyAP St.ProH St.RPK St.SulfT [26] St.SulfT2A St.SulfT2C St.TRDX St.UBIE St.Unk1 [31] St.Unk2 St.Xyl 63 Levels: St\_AT1 St\_NT2 St..PP7A St..PP7B ... St.Xyl

Figure 17: the result of the cluster