Group 4

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Power Q1.3

What sample size is needed to detect it with power of 80% at Genome Wide P=0.05, in study assessing 500,000 SNPs

P(D) cases:0.3 = p_1

P(D) controls: 0.2 = p

Power 80%

α: 0.05/500,000 = 10^{-7}

For $Z\alpha$: use R, type in: sqrt(qchisq(1-0.05/500000,1))

$Z\alpha$: 5.33

$Z\beta$: 0.84

Power Q1.3

Formula:

$N=((2p(1-p_1) + p_1(2-p_1) – p^2)*(Z_\alpha + Z_\beta)^2) / (4(p_1-p)^2)$

$N=((2*0.2*(1-0.3) + 0.3*(2-0.3) – 0.2^2)*(5.33 + 0.84)^2) / (4*(0.3 – 0.2)^2)$

$N=454.3$

So you need 455 cases and 455 controls

Power Q2

Power using Genetic Power Calculator
http://pngu.mgh.harvard.edu/~purcell/gpc/

T2D locus IGF2BP2

600 cases

1200 controls

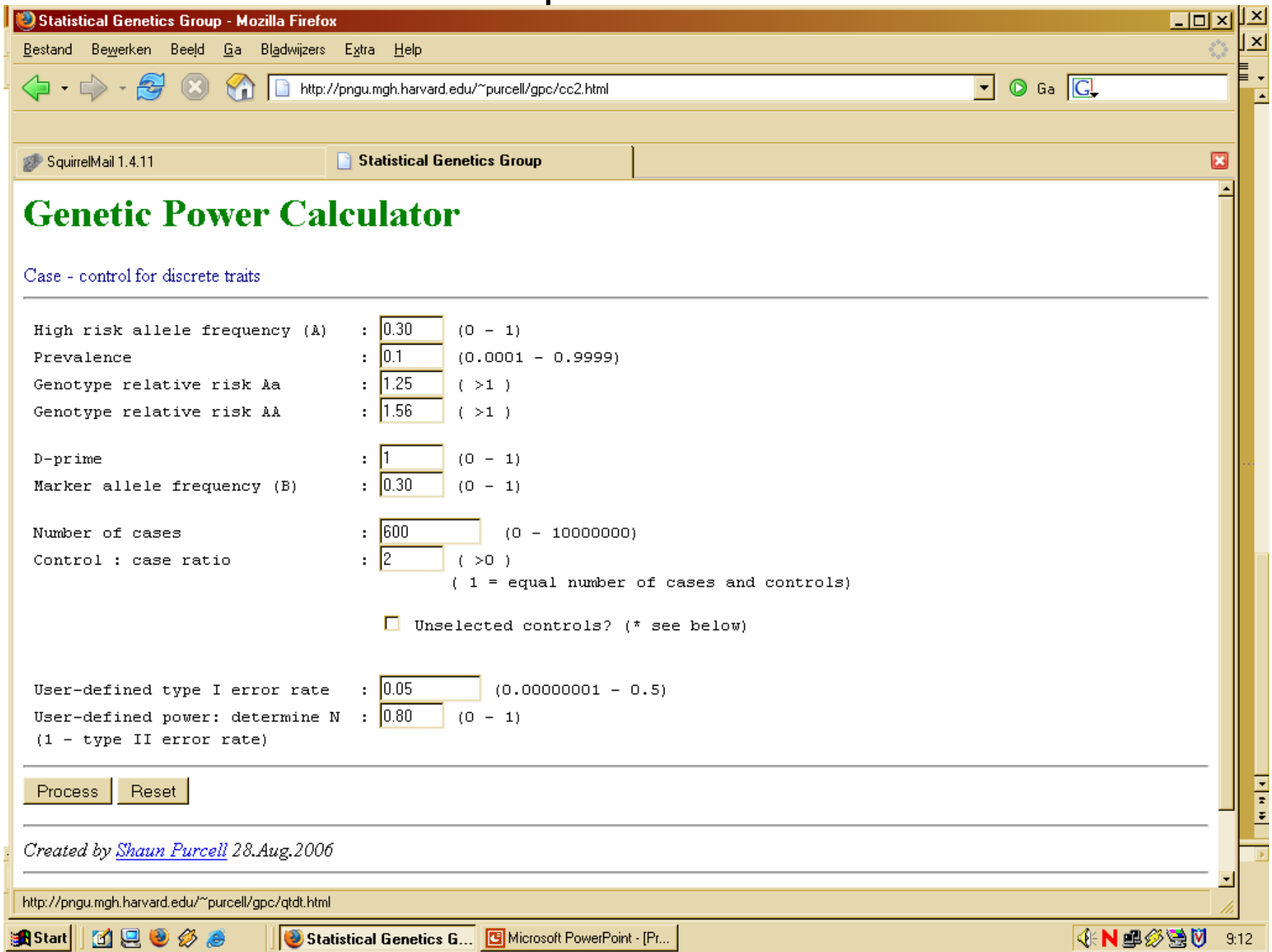
From article (Table 1):

Allele frequency risk allele in controls: 0.30

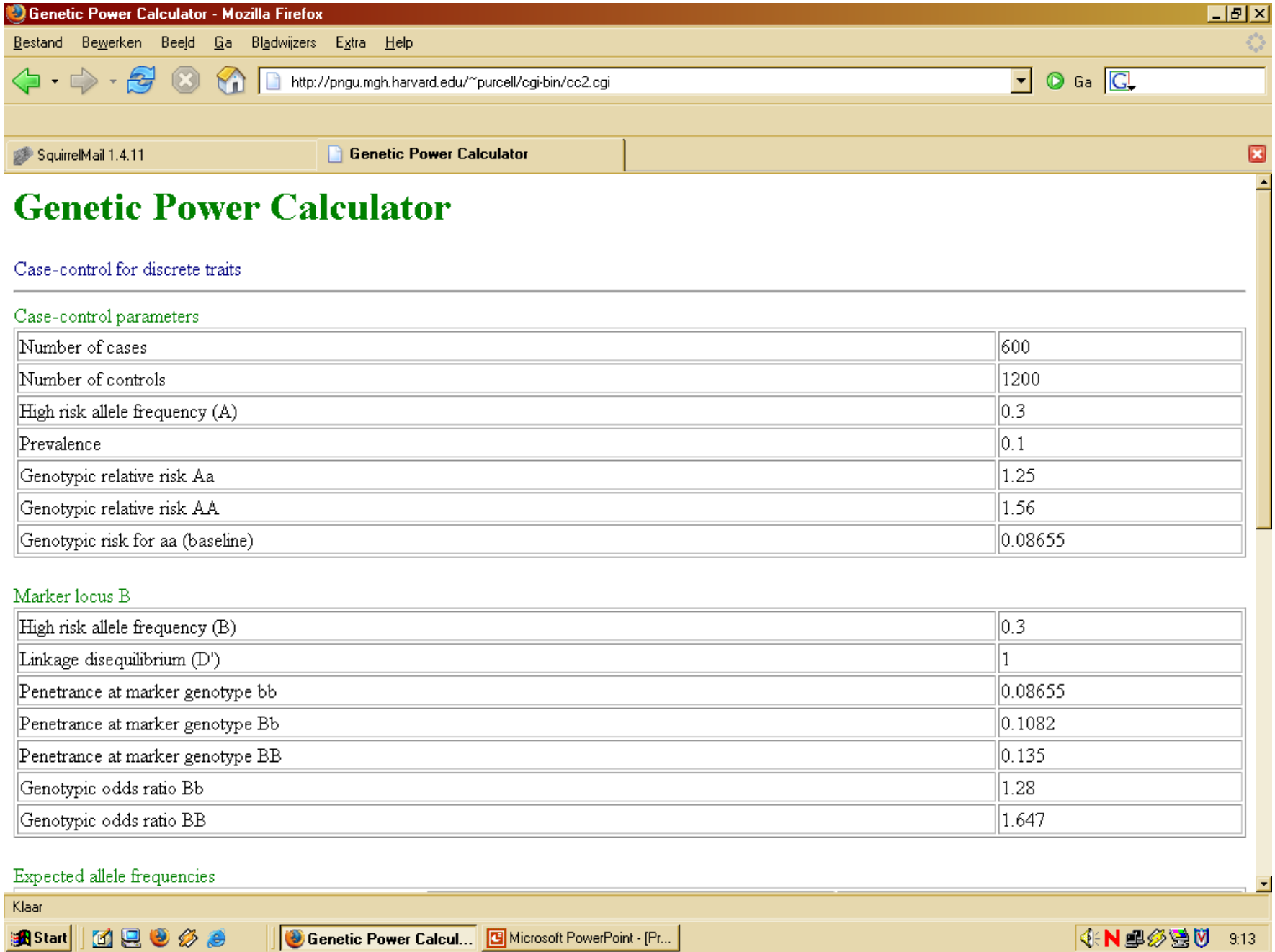
OR: 1.28 (FUSION stage 1)

OR is for allelic test

Input screen



Output


Genetic Power Calculator - Mozilla Firefox
Bestand Bewerken Beeld Ga Bladwijzers Extra Help
http://pngu.mgh.harvard.edu/~purcell/cgi-bin/cc2.cgi
SquirrelMail 1.4.11
Genetic Power Calculator
Genetic Power Calculator
Case-control for discrete traits
Case-control parameters
Number of cases 600
Number of controls 1200
High risk allele frequency (A) 0.3
Prevalence 0.1
Genotypic relative risk Aa 1.25
Genotypic relative risk AA 1.56
Genotypic risk for aa (baseline) 0.08655
Marker locus B
High risk allele frequency (B) 0.3
Linkage disequilibrium (D') 1
Penetrance at marker genotype bb 0.08655
Penetrance at marker genotype Bb 0.1082
Penetrance at marker genotype BB 0.135
Genotypic odds ratio Bb 1.28
Genotypic odds ratio BB 1.647
Expected allele frequencies
Klaar
Start
Genetic Power Calcul...
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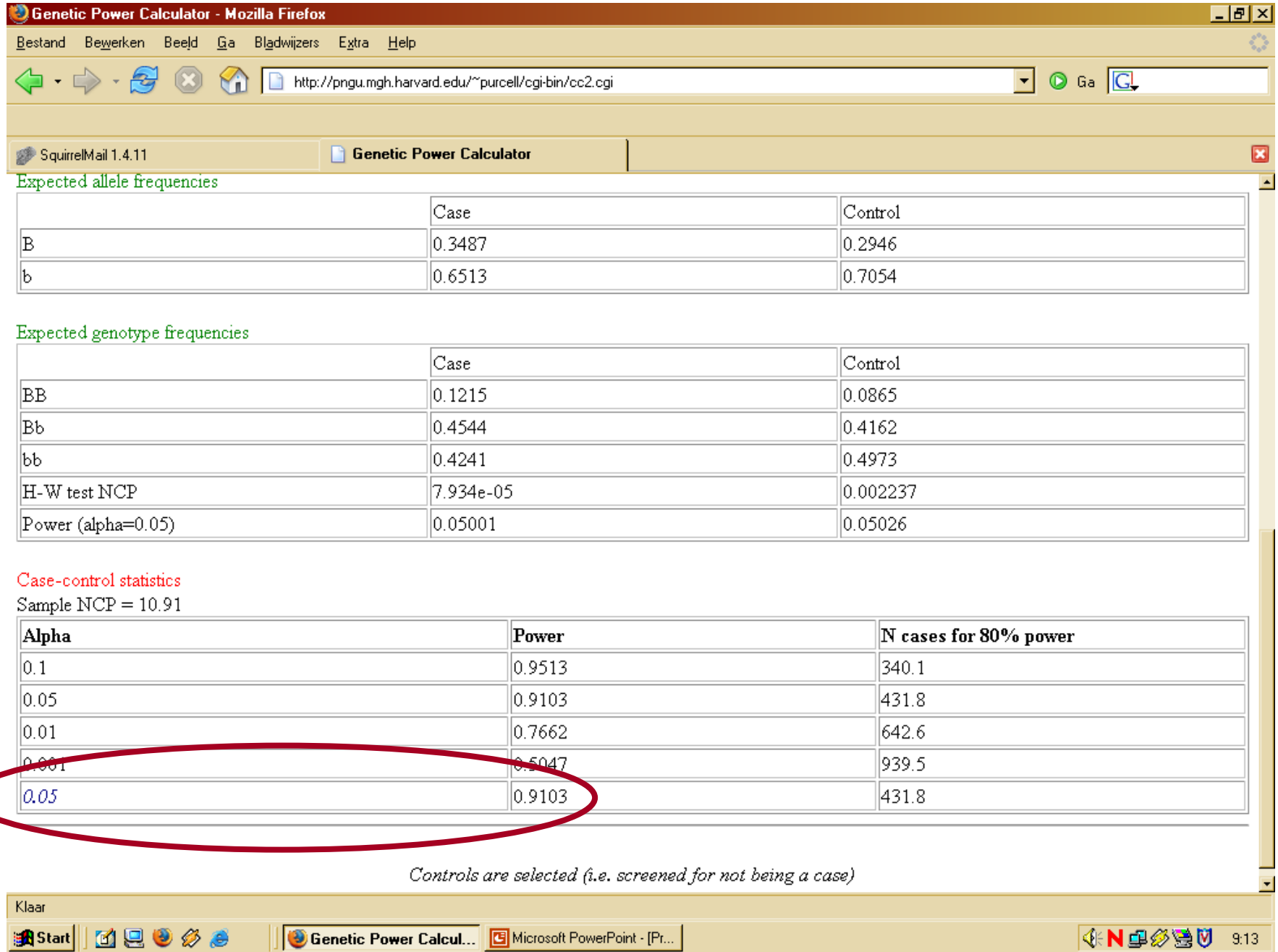
9:13

Power for single test



Genetic Power Calculator - Mozilla Firefox

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http://pngu.mgh.harvard.edu/~purcell/cgi-bin/cc2.cgi

SquirrelMail 1.4.11 | Genetic Power Calculator

Expected allele frequencies

	Case	Control
B	0.3487	0.2946
b	0.6513	0.7054

Expected genotype frequencies

	Case	Control
BB	0.1215	0.0865
Bb	0.4544	0.4162
bb	0.4241	0.4973
H-W test NCP	7.934e-05	0.002237
Power (alpha=0.05)	0.05001	0.05026

Case-control statistics

Sample NCP = 10.91

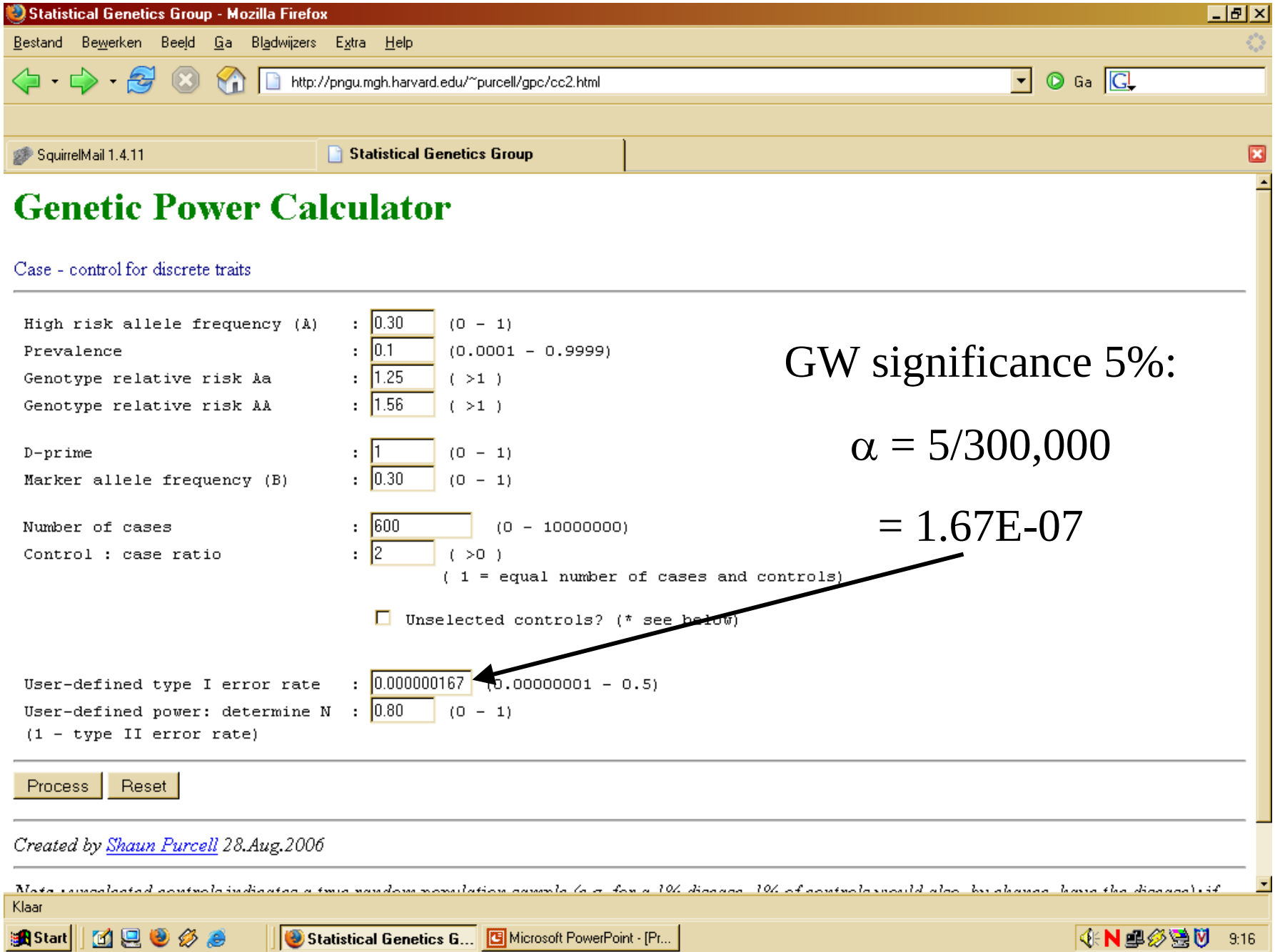
Alpha	**Power**	**N cases for 80% power**
0.1	0.9513	340.1
0.05	0.9103	431.8
0.01	0.7662	642.6
0.001	0.5047	939.5
0.05	0.9103	431.8

Controls are selected (i.e. screened for not being a case)

Klaar

Start | Genetic Power Calcul... | Microsoft PowerPoint - [Pr... | 9:13

Power for GWA 300K

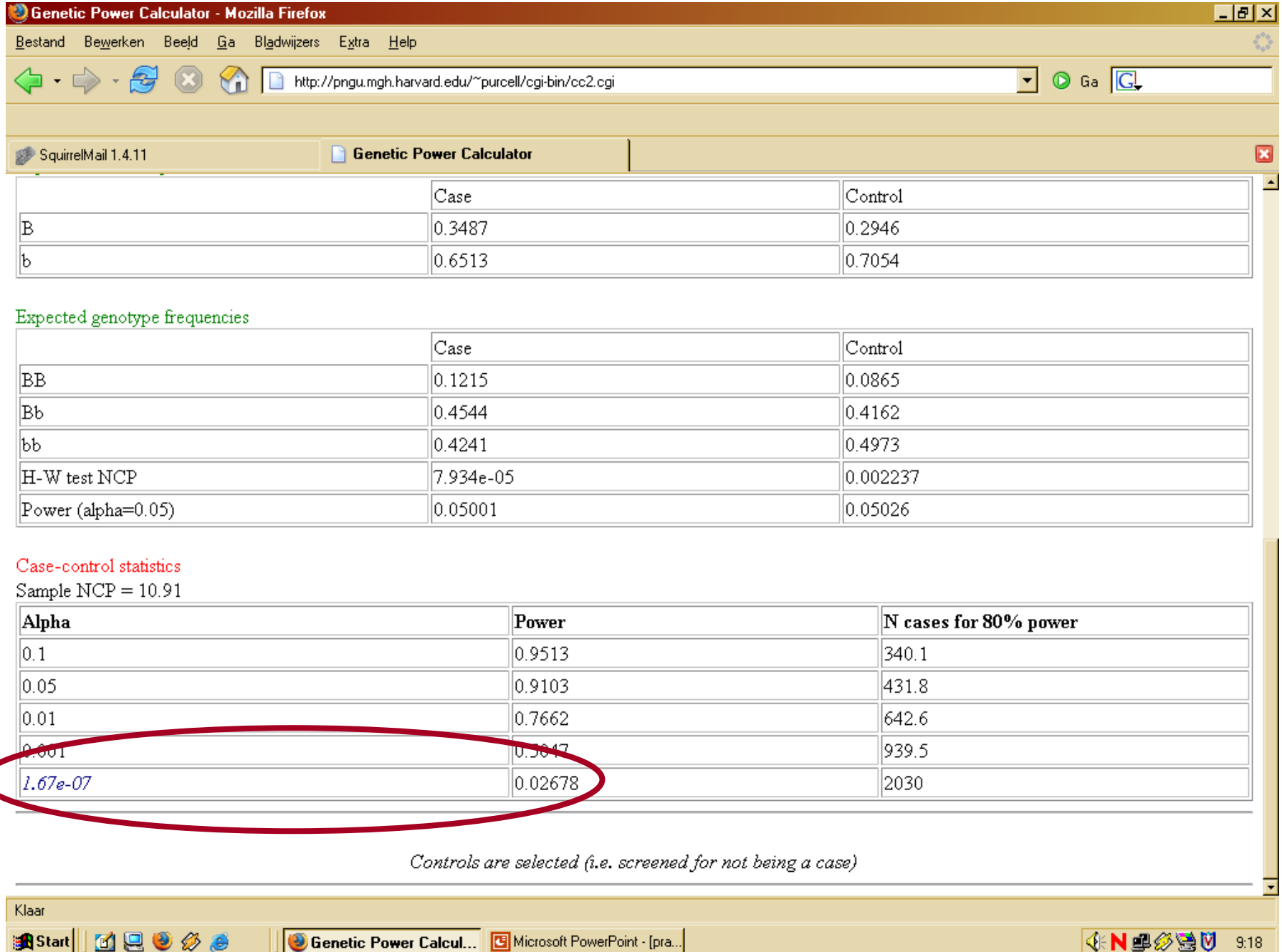


GW significance 5%:

$\alpha = 5/300{,}000$

$= 1.67\text{E-}07$

Power for GWA 300K



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SquirrelMail 1.4.11 | Genetic Power Calculator

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0.05	0.9103	431.8
0.01	0.7662	642.6
0.001	0.5047	939.5
1.67e-07	0.02678	2030

Controls are selected (i.e. screened for not being a case)

Klaar

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