Geno-Sen's

SCRUB TYPHUS Real Time PCR Kit

Quantitative

For use with QIAGEN Rotor-Gene Q, Rotor-Gene 6000, ABI-7500, StepOne, StepOne Plus, QuantStudio™, Roche LightCycler®480, Bio-Rad CFX96™, I cycler, Analytik Jena qTOWER 3, Exicycler 96 (Bioneer), AriaMx (Agilent Technology) & Slan 48, ALTA 48, INSTA Q 96, etc.,

IVD

PACK INSERT

Revised Sept 2016

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Genome Diagnostics Pvt. Ltd.

(An ISO 13485:2012, 9001:2008 Certified Company)

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The Netherlands

Table of Contents

SCRUB TYPHUS Geno-Sen's Real Time PCR Kit

1. Contents of the Kit:

Color Code	Contents	REF 9111325 100 rxns	REF 9111326 50 rxns	REF 9111327 25 rxns
R1 Blue	SCRUB TYPHUS Super mix.	25 rxns x 4 Vials	25 rxns x 2 Vials	25 rxns x 1 Vials
R2 Yellow	Mg Sol RT.	1 Vial	1 Vial	1 Vial
S.Typhus-S1 Red	*SCRUB TYPHUS Standard 1* *1 X 10^5 copies/µl*	1 Vial of 300µl	1 Vial of 300µl	1 Vial of 300µl
S.Typhus - S2 Red	*SCRUB TYPHUS Standard 2* *1 X 10^4 copies/µl*	1 Vial of 300µl	1 Vial of 300µl	1 Vial of 300µl
S.Typhus - S3 Red	*SCRUB TYPHUS Standard 3* *1 X 10^3 copies/µl*	1 Vial of 300µl	1 Vial of 300µl	1 Vial of 300µl
S.Typhus - S4 Red	*SCRUB TYPHUS Standard 4* *1 X 10^2 copies/µl*	1 Vial of 300µl	1 Vial of 300µl	1 Vial of 300µl
S.Typhus - S5 Red	*SCRUB TYPHUS Standard 5* *1 X 10^1 copies/µl*	1 Vial of 300µl	1 Vial of 300µl	1 Vial of 300µl
W White	Molecular Grade Water.	1 Vials of 1 ml	1 Vial of 1 ml	1 Vial of 1 ml
IC-1 (R3) Green	IC-1 RG (R3)	1 Vial of 1 ml	1 Vial of 1 ml	1 Vial of 1 ml

R = Reagents
S = Quantitation Standards
W = Molecular Grade Water.

All Vials have Color Coder tops to distinguish between different reagents.

2. Storage of the Kit.

All the reagents of the kit should be stored at -20°C and is stable till expiry at this temperature. Repeated thawing and freezing (> 3x) should be avoided, as this may reduce the sensitivity of the assay. If the kit is to be used only occasionally, the reagents should be frozen in aliquots. Storage at +4°C is not recommended & should not exceed a period of 2 hours in any case.

3. SCRUB TYPHUS Information

Application

Scrub typhus is an acute, febrile, infectious illness that was first described by the Chinese about 2000 years ago. This illness is caused by *Orientia* (formerly *Rickettsia*) tsutsugamushi, an obligate intracellular gram-negative bacterium, which was first isolated in 1930. Even though it is recognized as one of the tropical rickettsioses diseases, *O tsutsugamushi* has a different cell wall structure and genetic composition than that of the rickettsiae. Humans are accidental hosts in this zoonotic disease. The term scrub is used because of the type of vegetation (terrain between woods and clearings) that harbors the vector; however, the name is not entirely correct because certain endemic areas can also be sandy and semiarid. Cases diagnosed in the United States have been imported from regions of the "tsutsugamushi triangle," which extends from northern Japan and far-eastern Russia in the north, to northern Australia in the south, and to Pakistan and Afghanistan in the west, where the disease isendemic.

It is estimated that about one million cases of this disease occur annually. Because of reports of *O tsutsugamushi* strains with reduced susceptibility to antibiotics, as well as reports of interesting interactions between this bacterium and HIV, a renewed interest in this illness has emerged.

Humans acquire the disease when an infected chigger, the larval stage of trombiculid mites (*Leptotrombidium deliense* and others), bites them while feeding and inoculates *O tsutsugamushi* pathogens. The bacteria multiply at the inoculation site with the formation of a papule that ulcerates and becomes necrotic, evolving into an eschar, with regional lymphadenopathy that progresses to generalized lymphadenopathy within a few days. Before symptoms develop, patients are rickettsemic. As in other rickettsial diseases, perivasculitis of the small blood vessels occurs. The endothelium is involved, however, the basic histopathologic lesions suggest that macrophages might be more affected.

Samples which can be used for Extraction: Serum, plasma, whole blood.

4. Precautions for PCR

The following aspects should always be taken care of:

- Store positive material (Specimens, Standards or amplicons) separately from all other reagents and add it to the reaction mix in a separate facility.
- Thaw all components thoroughly at room temperature before starting the assay.
- When thawed, mix the components and centrifuge briefly.
- Work quickly on ice or in the Cooling Block.
- All the reagents including the NTC (except for standards & specimens) should be mixed & dispensed in pre-mix area.

- All the standards & specimens should be mixed & dispensed in extraction area.
- Use pipette tips with filters only.
- Always use disposable powder-free gloves

5. Additionally Required Materials and Devices

- DNA isolation kit (see **8.a. DNA extraction**)
- 0.2 ml PCR tubes for use with 36-well rotor (Corbett Research, Cat.-Nr.: SE-1003F) alternatively 0.1 ml PCR tubes for use with 72-well rotor (Corbett Research, Cat.-Nr.: ST-1001)
- Micro Pipettes Variable Volume 2-20µl, 10-100µl, 100-1000µl,
- Sterile pipette tips with aerosol barrier 2-20µl, 10-100µl, 100-1000µl,
- Disposable powder-free gloves
- Vortex mixer
- Centrifuge Desktop with rotor for 1.7 ml reaction tubes
- *Rotor Gene™ 2000/3000* or *Rotor Gene™ 6000*, Corbett Research (The Real time PCR Instrument)

6. Principle of Real-Time PCR

The robust assay exploits the so-called Taqman principle. During PCR, forward and reverse primers hybridize to a specific sequence product. A TaqMan probe, which is contained in the same reaction mixture and which consists of an oligonucleotide labeled with a 5'-reporter dye and a downstream, 3'-quencher dye, hybridizes to a target sequence within the PCR product. A Taq polymerase which possesses 5' - 3' exonuclease activity cleaves the probe. The reporter dye and quencher dye are separated upon cleavage, resulting in an increase in fluorescence for the reporter. Thus, the increase in fluorescence is directly proportional to the target amplification during PCR.

7. Description Of the Product.

The ***Geno-Sen's SCRUB TYPHUS*** *PCR* Reagents constitute a ready to use system for detection and quantification of SCRUB TYPHUS using Polymerase chain reaction (PCR) in the Rotor Gene 2000/3000/6000 (Corbett Research). *The Specific Master* mix contains reagents and enzymes for the specific amplification of SCRUB TYPHUS and for the direct detection of the specific amplicon in fluorescence channel Cycling A.FAM of the *Rotor Gene 2000/3000/6000 & the Reference gene on* Cycling A. Joe. External positive Standards (SCRUB TYPHUS S 1-5) are supplied

which allow the determination of the gene load. For further information, please refer to section 8.c Quantitation.

8. Procedure

8.a DNA Extraction

DNA Extraction kits are available from various manufacturers. Sample volumes for the DNA Extraction procedure depend on the protocol used. Please carry out the DNA Extraction according to the manufacturer's instructions. The recommended Extraction kits are the following:

Sample Material	**Nucleic Acid Isolation Kit**	**REF Cat. Num.**	
Serum or plasma.Whole blood, etc.	***Geno Sen's*** **® Genomic DNA Extraction Mini Kit — for DNA purification** QIAamp Blood DNA Mini extraction Kit (50) Suitable Extraction kit which give a higher yield.	98021 or 98022 51104	Genome Diagnostics Pvt. Ltd. India QIAGEN

Above Kits for evaluated in conjuction with the *Geno Sen's*® *SCRUB TYPHUS Real Time PCR RG Kit on the RotorGene 3000/6000*.. However the sample size was limited for this study hence for all practical purposes all the validations were conducted with the *Geno Sen's*® Genomic DNA Extraction Mini Kit — for DNA purification.
However the customer can use their own extraction systems depending on how good the yield is. Always use an extraction kit with a higher DNA yield.

Blood collection tubes coated with anticoagulants may inhibit the PCR, However these inhibitors will be eliminated by the use of the isolation kits given above. It is recommended to avoid the usage of heparin blood.

When using Extraction protocols with ethanol-containing washing buffers, please carry out an additional centrifugation step before the elution to remove any remaining ethanol. This prevents possible inhibition of PCR.

The *SCRUB TYPHUS Rotor Gene PCR Reagents* should not be used with phenol based isolation methods.

8.b *Inhibition Control:*

Inhibition Control Gene allows the user to determine & control possible PCR inhibition. The Inhibition Control gene reagents are in built in the premix provided and need not be run separately. There is need to add internal control Gene in the reaction mix which has been provided as IC-1 RG (R3). To add the IC Gene 0.5 µl/rxn of R3 is added to the premix as shown in the Figure 4 & 5. The results can be visualized in the Joe channel. . However if there is a need for the Internal control to be used as an extraction efficiency control, then 5 µl of R3 i.e. Inhibition control should be added to each sample before adding the Buffer MBD in the extraction process.
However in such a case, the IC-1 (R3) should not be mixed with the pre-mix as described above & instead 0.5 µl/rxn Molecular Grade water should be added to the pre-mix.

Also Note that in such a case there will be no amplification of Internal control in the Joe Channel in the NTC, & Standards. There will only be amplification in the Joe Channel in the Samples to which the IC-1 (R3) has been added before extraction.

Whereas if the IC-1 (R3) is added to the premix then there will be amplification in Joe Channel in all the samples, standards & NTC.

8.c Quantitation

The quantitation standards provided in the kit *(SCRUB TYPHUS S 1-5)* are treated in the same way as extracted samples and the same volume is used i.e. (10µl) instead of the sample. To generate a standard curve in the *RotorGene™ 2000/3000/6000*, all 5 Standards should be used as defined in the menu window *Edit Samples* of the *RotorGene™* software. The same should also be defined as standards with the specified concentrations (see *RotorGene™* Manual). The standard curve generated as above can also be used for quantitation in subsequent runs, provided that at least one standard is used in the current run. For this purpose, the previously generated standard curve needs to be imported (see *Rotor Gene™ 2000/3000/6000 Manual*). However, this quantitation method may lead to deviations in the results due to variability between different PCR runs & due to varying Reaction efficiencies.

Attention: The standards are defined as copies/µl. The following formula has to be applied to convert the values determined using the standard curve into Copies/ml of sample material:

Result (Copies/µl) x Elution Volume (µl)

Result (Copies/ml) = $\frac{\text{Sample Volume (ml)}}{\text{Sample Volume (ml)}}$

Or else direct conversion can be done keeping in mind the starting volume of the sample & the final eluted Volume e.g.

If the starting volume of the sample while using the ***Geno Sen's®*** Genomic DNA Extraction Mini Kit is 200µl & the final Eluted Volume is 60µl then to obtain the direct values i.e. Copies/ml for the patient samples the following values for the standards can be fed directly into the operating software which is again based on the above formula and will yield direct conversion of per ml of patient sample data.

S1: 10^5 Copies /µl =	30000000 Copies/ml
S2: 10^4 Copies /µl =	3000000 Copies/ml
S3: 10^3 Copies /µl =	300000 Copies/ml
S4: 10^2 Copies /µl =	30000 Copies/ml
S5: 10^1 Copies /µl =	3000 Copies/ml

If the starting volume of the sample while using the Qiagen QIAamp DNA Mini extraction kit is 200µl & the final Eluted Volume is 50µl then to obtain the direct values i.e. copies/ml for the patient samples the following values for the standards can be fed directly into the operating software which is again based on the above formula and will yield direct conversion of per ml of patient sample data.

S1: 10^5 Copies/µl =	25000000 Copies/ml
S2: 10^4 Copies /µl =	2500000 Copies/ml
S3: 10^3 Copies /µl =	250000 Copies/ml
S4: 10^2 Copies /µl =	25000 Copies/ml
S5: 10^1 Copies /µl =	2500 Copies/ml

Preparation for PCR

8. d. Preparation for PCR amplification:

First make sure that the Cooling Block (accessory of the *Rotor Gene*™, Corbett Research) is pre-cooled to +4°C in a Refrigerator or Deep Freezer. Place the desired number of PCR tubes into the Cooling Block. Make sure that the tubes for standards & at least one negative control (*Water, PCR grade*) are included per PCR run. To generate a standard curve, use all supplied Standards *(SCRUB TYPHUS S 1-5)* for each PCR run. Before each use, all reagents need to be thawed completely and mixed (by pipetting or by brief vortexing).

Please follow the pipeting scheme mentioned below for each sample depending upon the number of samples a mix can be prepared as follows. Each sample.

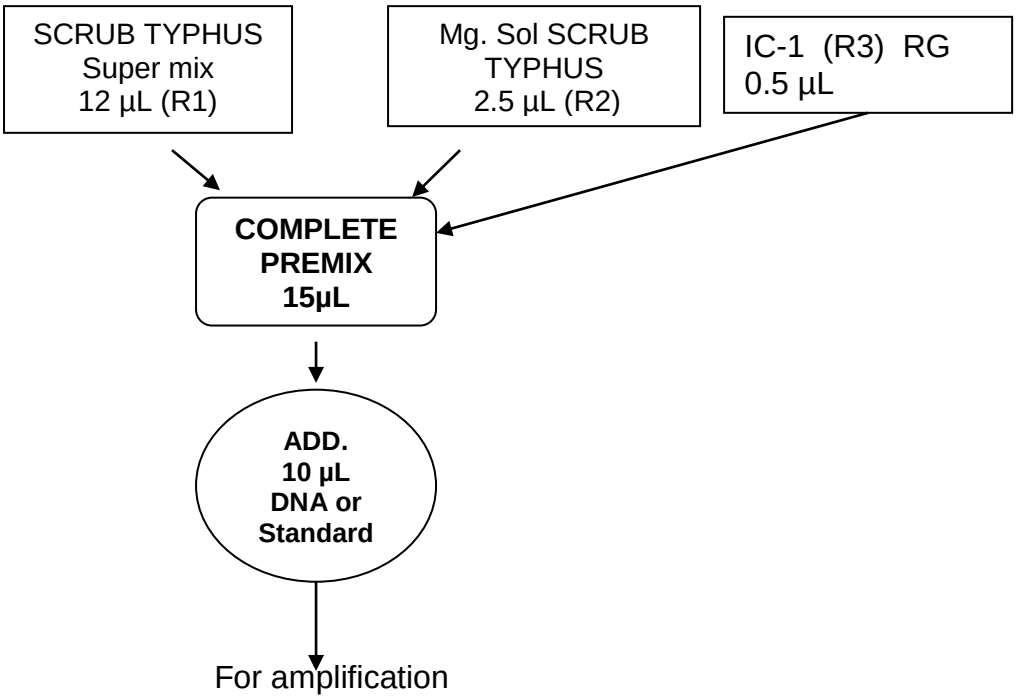

Fig. 4.

Depending upon the number of samples the following pipetting scheme can be followed. e.g. for 10 rxns.

SCRUB TYPHUS MASTER MIX	**1 rxns.**	**10 rxns.**
SCRUB TYPHUS Super Mix (R1)	**12 µL**	**120 µL**
SCRUB TYPHUS Mg Sol. (R2)	**2.5 µL**	**25 µL**
IC-1 (R3) RG	**0.5 µL**	**5 µL**
Total	**15µL**	**150µL**

Fig. 5.

Pipette 15 µl of the Master Mix into each labelled PCR tube. Then add 10 µl of the earlier extracted DNA to each sample tube and mix well by pipeting up and down. Correspondingly, 10 µl of the Standards (SCRUB TYPHUS *S1-5*) must be used as a positive control and 10 µl of water (*Water, PCR grade*) as a negative control. Close the PCR tubes and transfer the SCRUB TYPHUS tubes into the rotor of the *RotorGene*™ instrument. The *RotorGene*™ software versions 5.0.53 and higher require a Locking Ring (accessory of the *RotorGene*™, Corbett Research) to be placed on top of the rotor to prevent accidental opening of the tubes during the run.

8.e. Programming the *RotorGene*™ 2000/3000

The *RotorGene*™ *2000/3000* PCR program for the detection of SCRUB TYPHUS can be divided into following steps:

A. Setting of general assay parameters & reaction volume
B. Thermal Profile & Calibration
C. Cycling profile/ & Initial activation of the Hot Start enzyme
D. Cycling for Amplification of DNA
E. Adjustment of the sensitivity of the fluorescence channels
F. Starting of the *Rotor Gene*™ run

Program the *RotorGene*™ *2000/3000* for these 5 steps according to the parameters shown in Fig. 6-20. All specifications refer to the *RotorGene*™ software version 6.0.33. Please find further information on programming the *RotorGene*™ in the *RotorGene*™ *2000/3000 Operator's Manual*,. In the illustrations these settings are shown by arrows

Setting of general assay parameters & Reaction volume.

First, confirm whether the PCR tubes used are No Domed PCR tubes by clicking in the box as shown in the figure. Please note that tubes with domes cannot be used in Rotor gene hence click in the box as shown below.

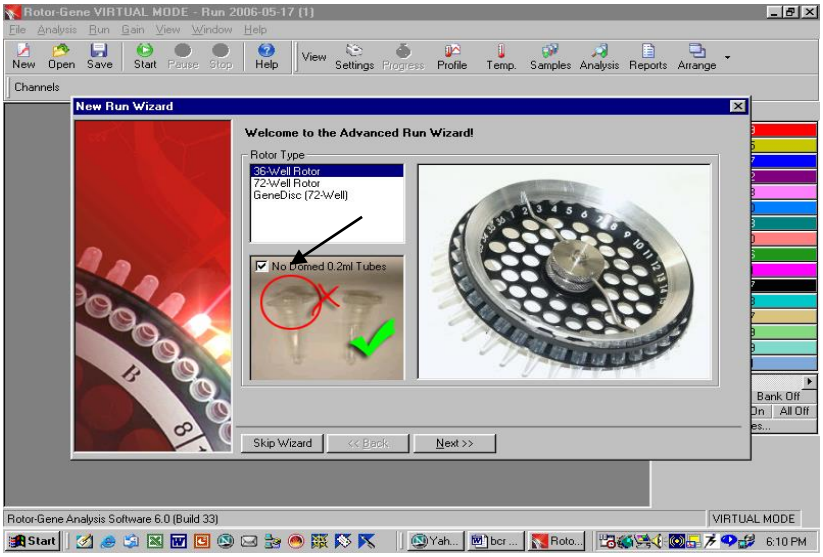

Fig. 6.

Confirmation of Reaction Volume as follows.

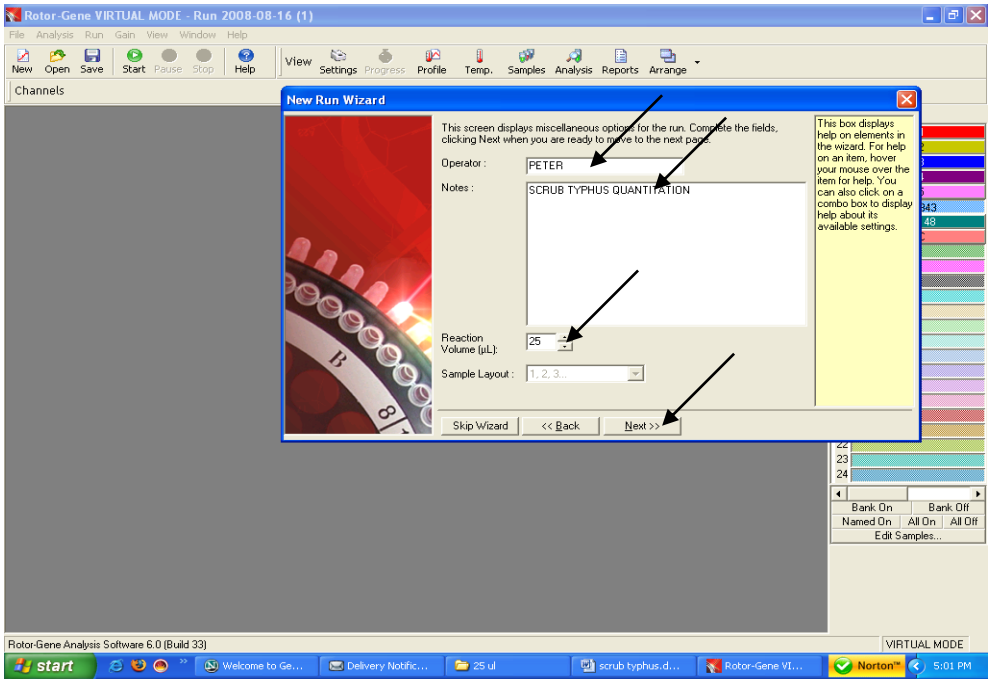

Fig. 7. Setting of general assay parameters.

- Please click on the volume buttons to make sure that 25µl is reflected in the window as shown above.
- Then click next and a new window will open as shown below.

THERMAL PROFILE & CALIBRATION:

Here the thermal profile for the assay will be defined.

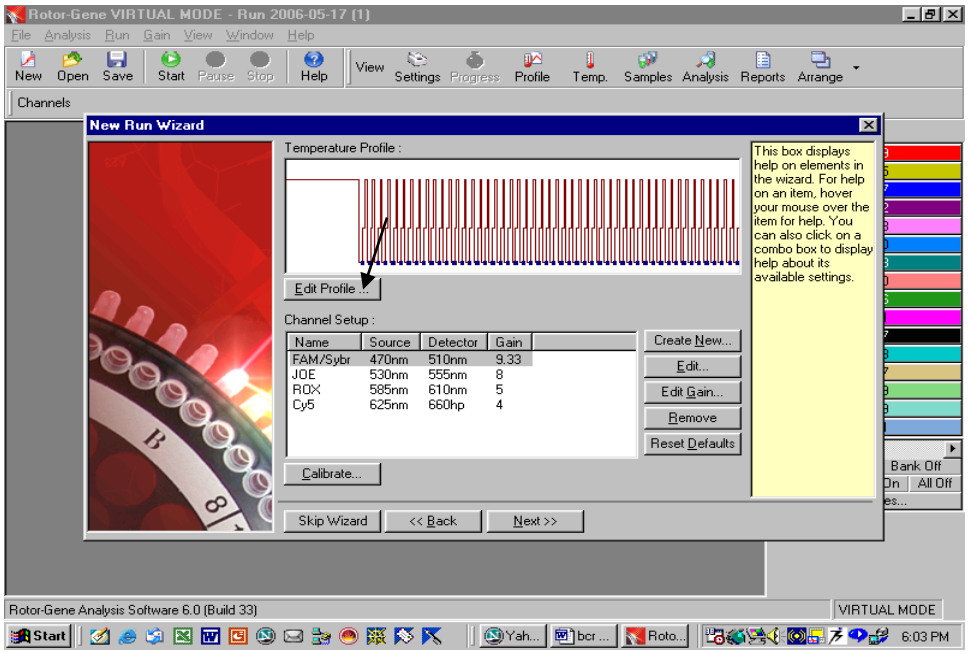

Fig. 8.

Programming the temperature profile is done by activating the button *Edit Temperature Profile* in the next *New Experiment Wizard* menu window as shown above.

CYCLING PROFILE: Hold 95°C for 10 minutes as below

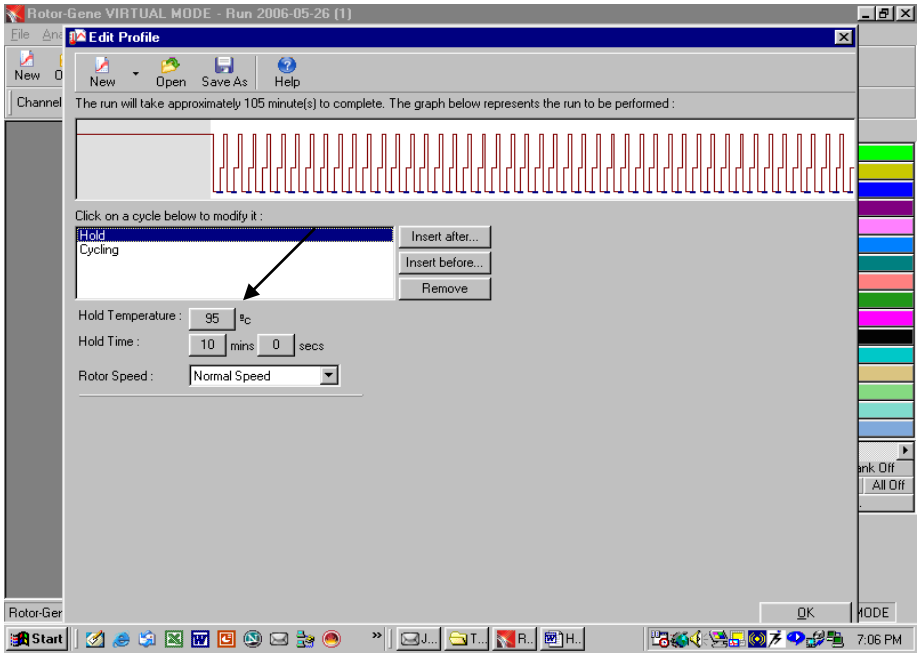

Fig. 9. Initial activation of the Hot Start enzyme.

Setting up of denaturation step in the cycling profile as depicted below i.e.

95°C for 15 seconds.

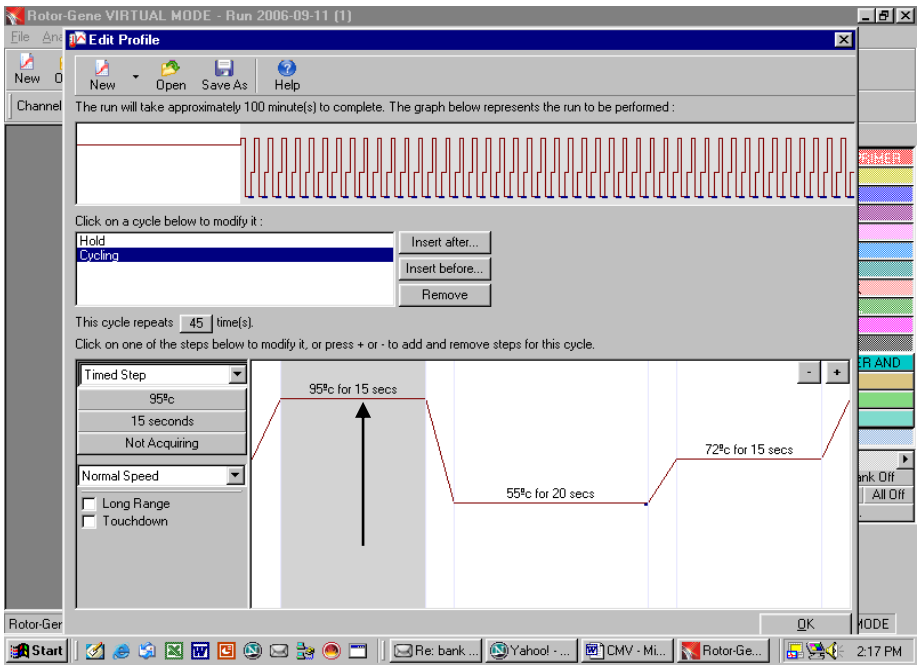

Fig. 10.

Setting up of Anneling step in the cycling profile as depicted below i.e. 55°C for 20 **Seconds and defining the Data acquiring channel i.e FAM & JOE**

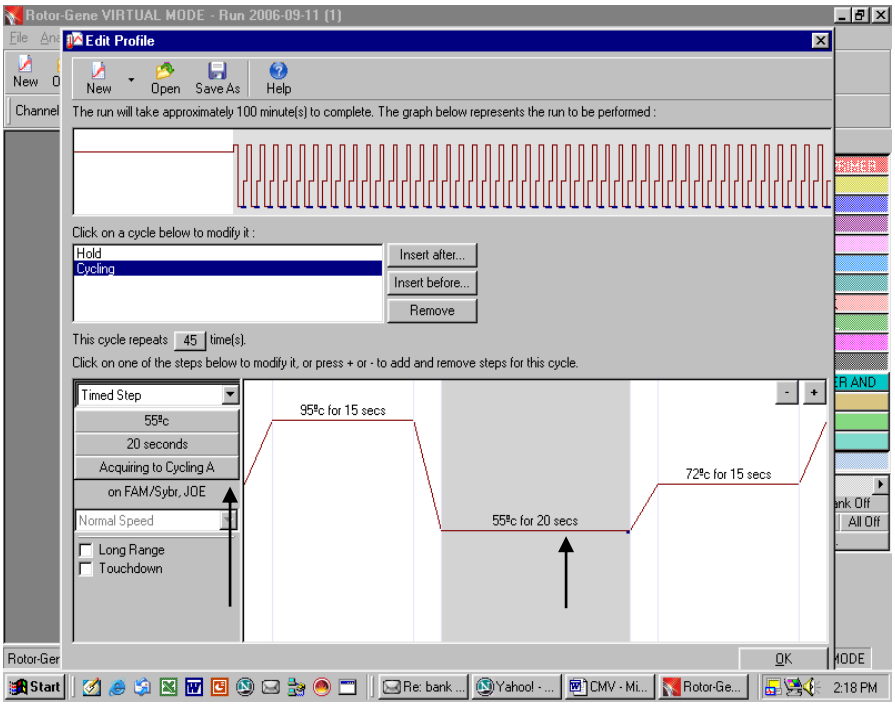

Fig. 11.

Setting up of Extension step in the cycling profile as depicted below i.e. 72°C for 15 **Seconds**

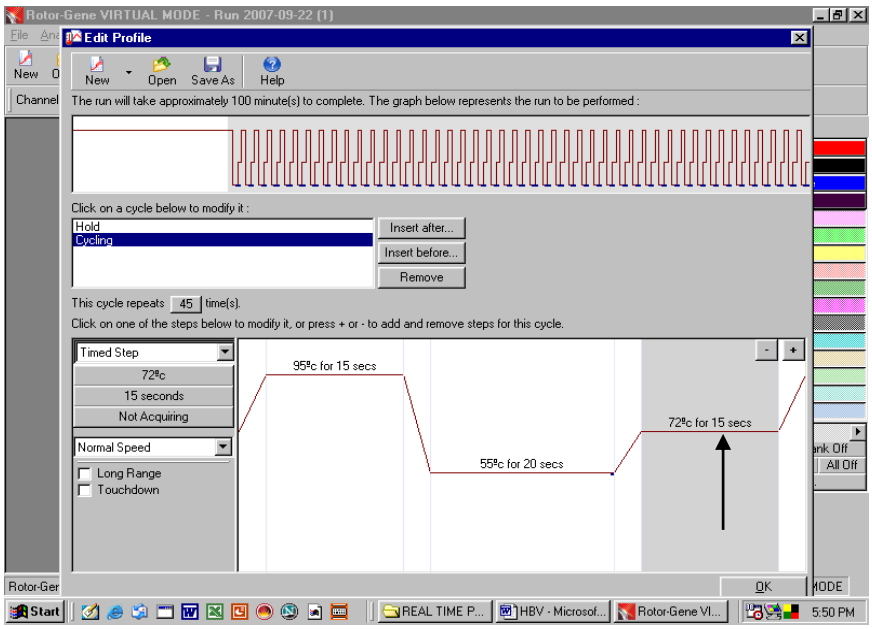

Fig. 12.

Setting up of Number of Cycles to 45 cycles in the cycling profile as depicted below.

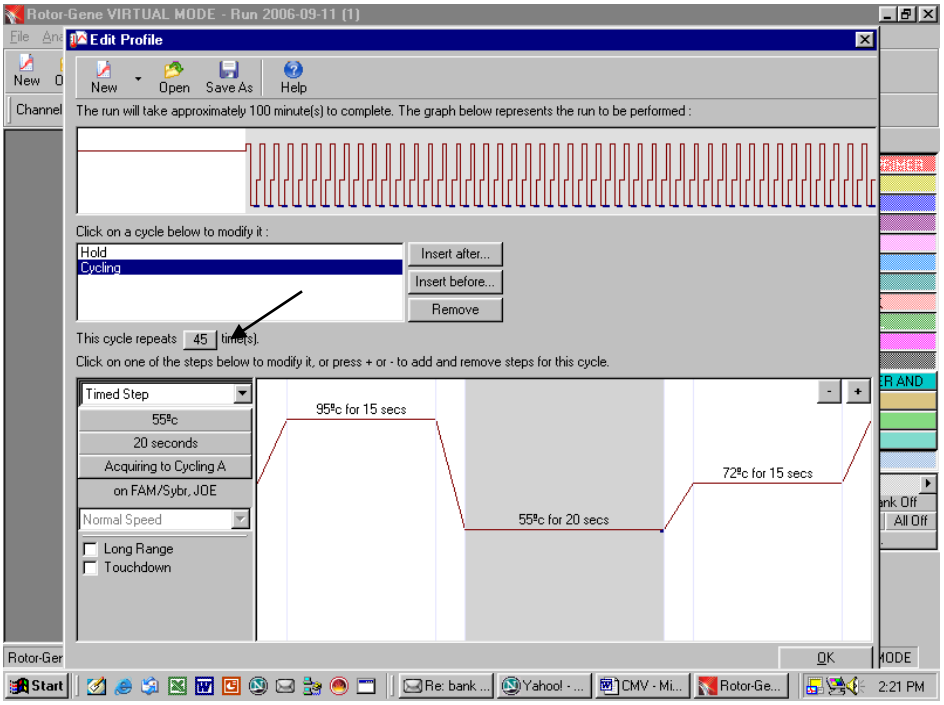

Fig. 13.

Final Confirmation of the Thermal profile by pressing OK button as shown below.

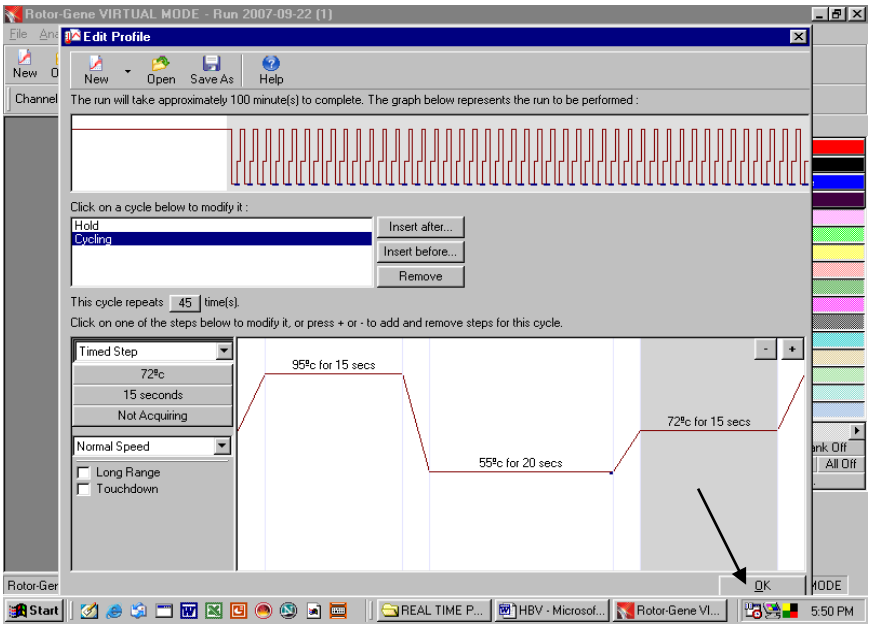

Fig. 14.

Setting the gains for the acquiring channel by clicking at the Calibrate button as shown below.

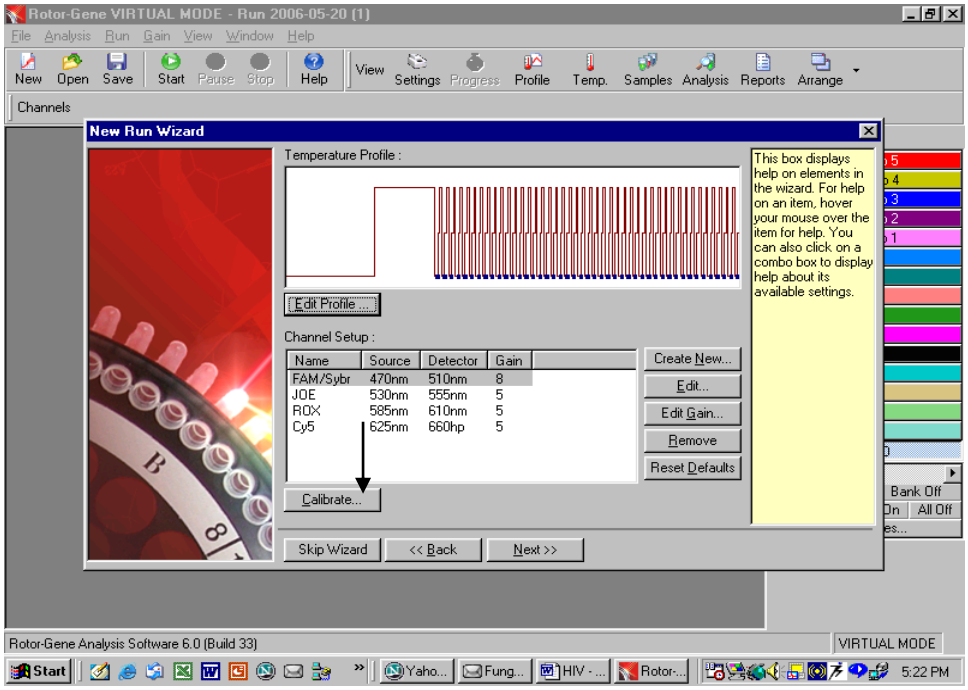

Fig. 15.

The detection range of the fluorescence channels has to be determined according to the fluorescence intensities in the PCR tubes. This adjustment is done in the menu window *Auto Gain Calibration Setup* (activation in menu window *New Experiment Wizard* under *Calibrate*). Please set the calibration temperature to the annealing temperature of the amplification program (compare Fig. 16).

Adjustment of the fluorescence channel sensitivity as shown below.

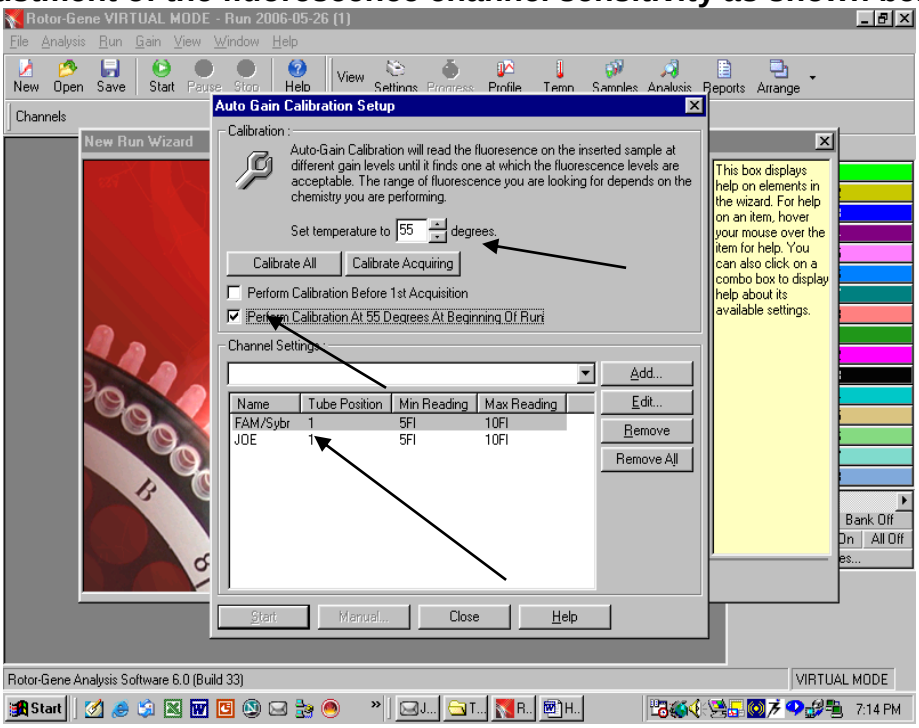

Fig. 16.

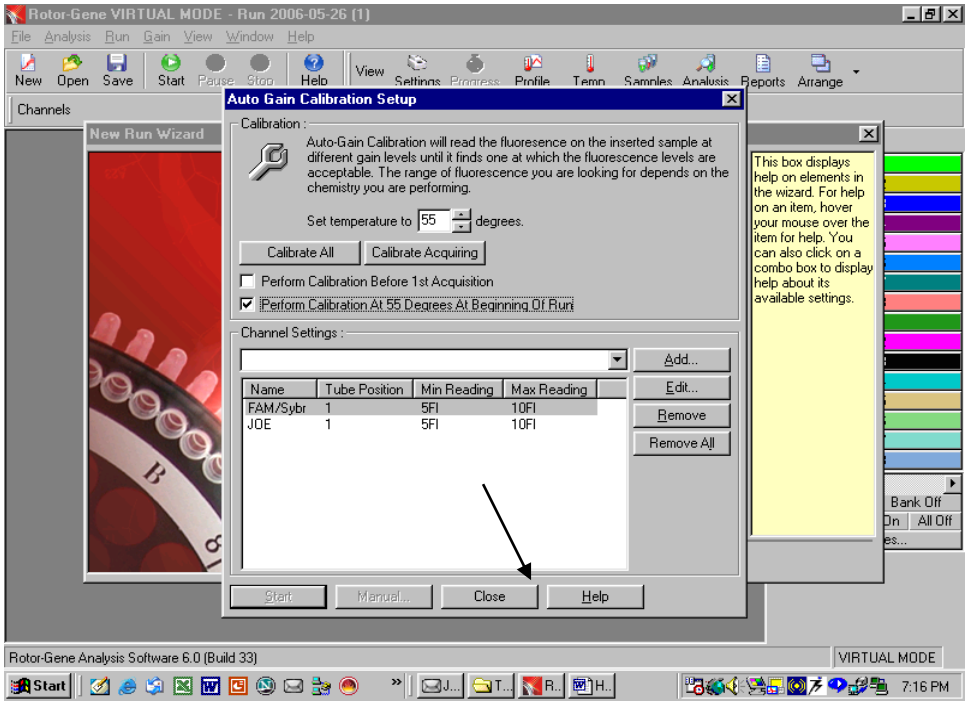

Fig. 17.

Please do not forget to click on the box against " Perform calibration at 55°C at beginning of the run." After that press Close and a new window will open as shown below.

The gain values determined by the channel calibration are saved automatically and are listed in the last menu window of the programming procedure.

PRESS NEXT

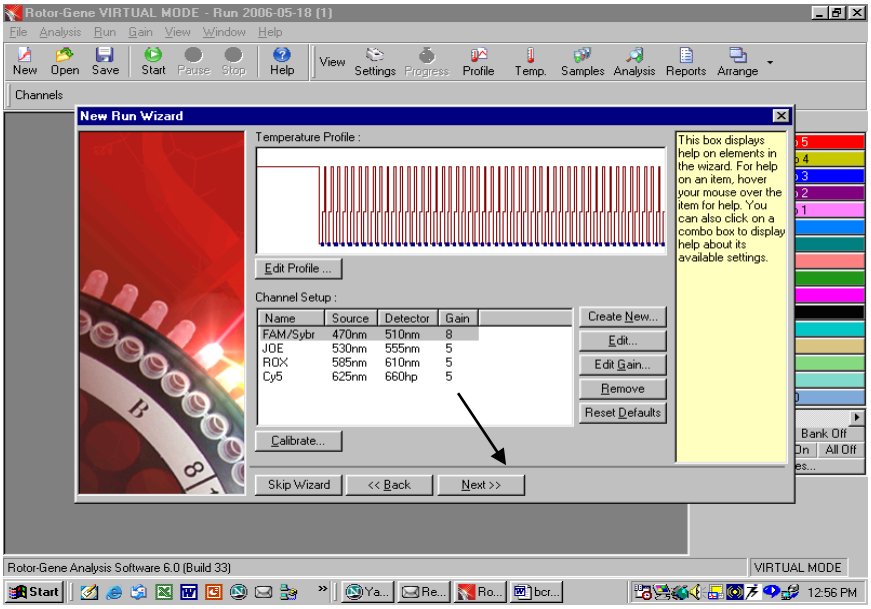

Fig. 18.

Starting of the *Rotor Gene*™ run.

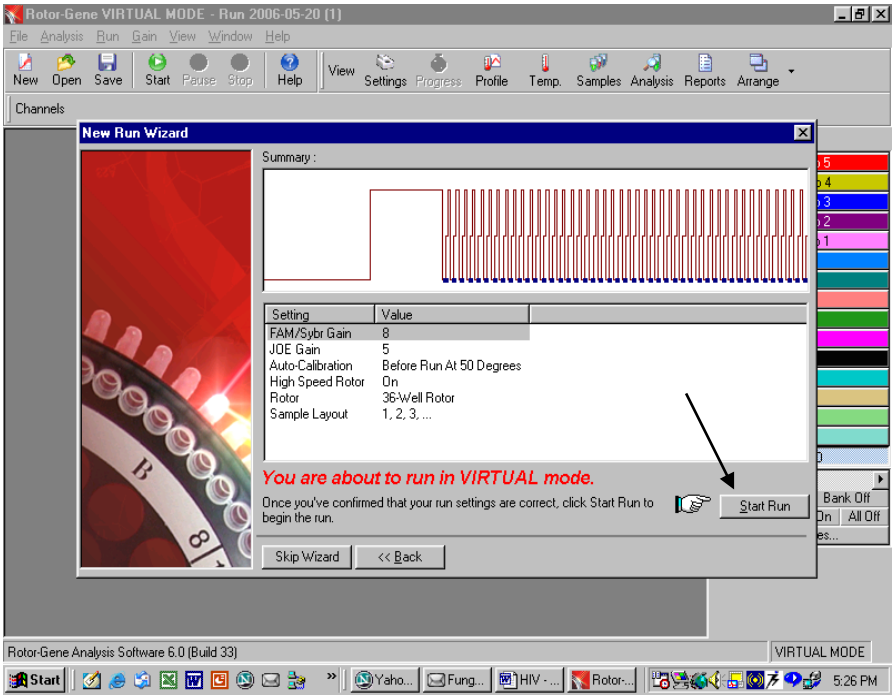

Fig. 19:
Press Start Run Button.

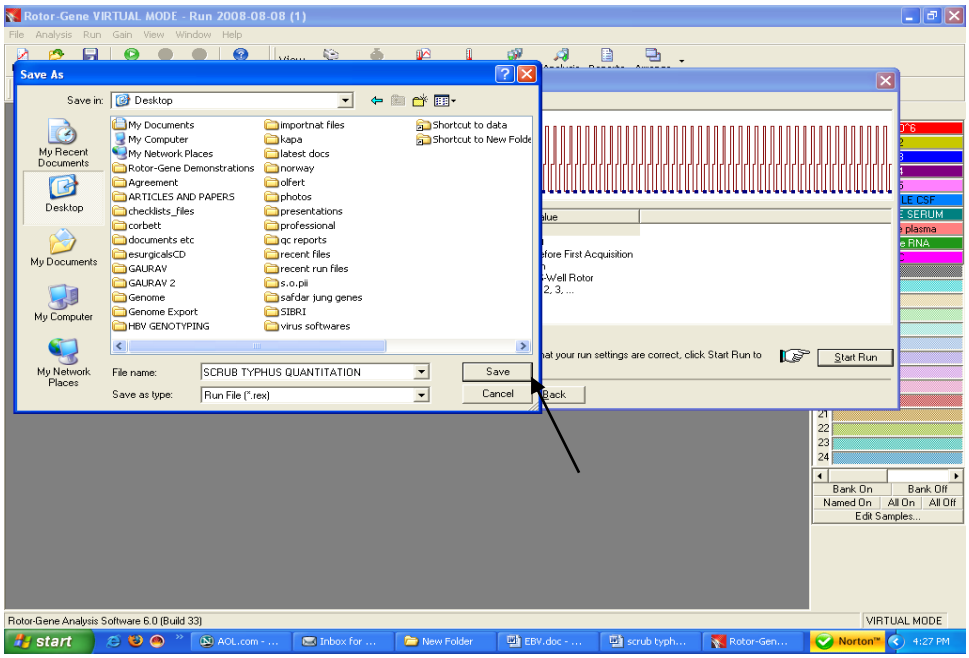

Fig. 20.

SAVING THE RUN FILE AS ABOVE

Store the run file either in my documents or a designated folder as shown above.

The moment save button is clicked after the file name, machine will start.

8.f. Programming the *RotorGene*™ 6000

The *RotorGene*™ 6*000* PCR program for the detection of Scrub Typhus can be divided into following steps:

G. Setting of general assay parameters & reaction volume
H. Thermal Profile & Calibration
I. Cycling profile/ & Initial activation of the Hot Start enzyme
J. Cycling for Amplification of DNA
K. Adjustment of the sensitivity of the fluorescence channels
L. Starting of the *Rotor Gene*™ run

Program the *RotorGene*™ 6000 for these 5 steps according to the parameters shown in Figures 21-36 below All specifications refer to the *RotorGene*™ 6000 software version 1.7 Please find further information on programming the *RotorGene*™ in the *RotorGene*™ 6000 *Operator's Manual*,. In the illustrations these settings are shown by arrows

g) Setting of general assay parameters & Reaction volume.

Please see to it that you in advanced mode and then click Hydrolysis Probes. On a double click the software will automatically go to the next function. If there is just a single click then click new after highlighting the Hydrolysis Probes.

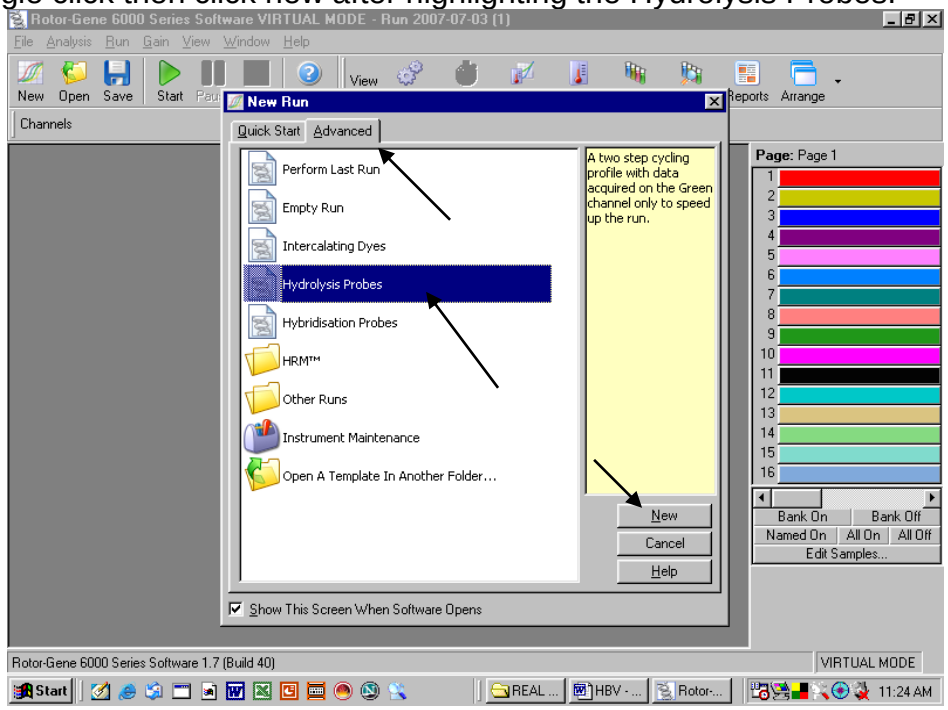

Fig. 21.

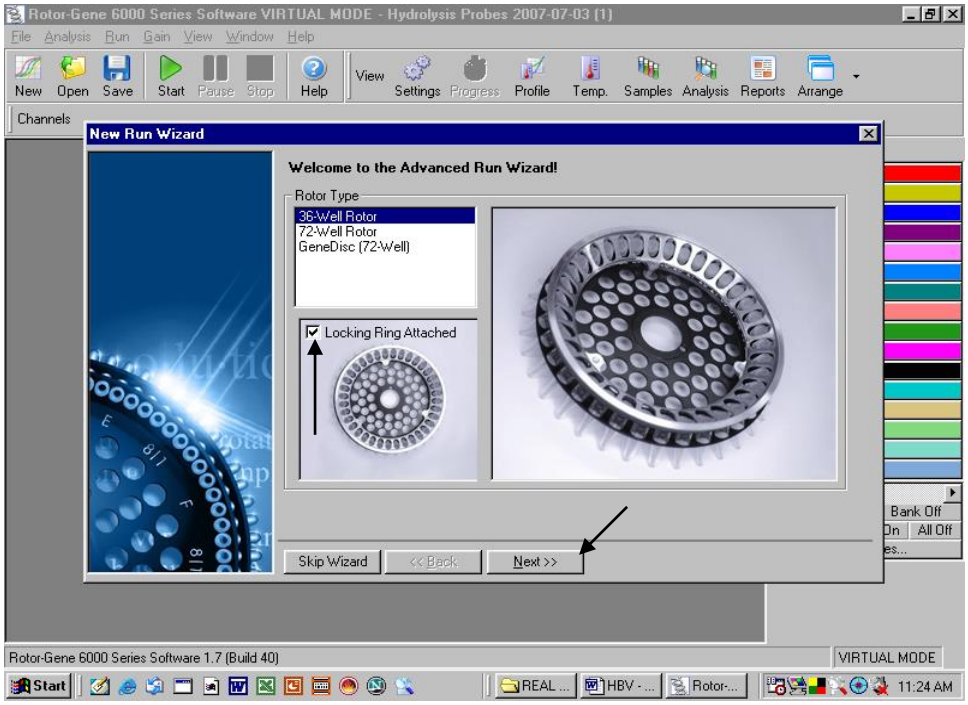

Fig. 22.

First, confirm by clicking in the box as shown in the figure above whether a locking ring has been attached. Then click next to proceed to the next step.

Confirmation of reaction Volume as follows.

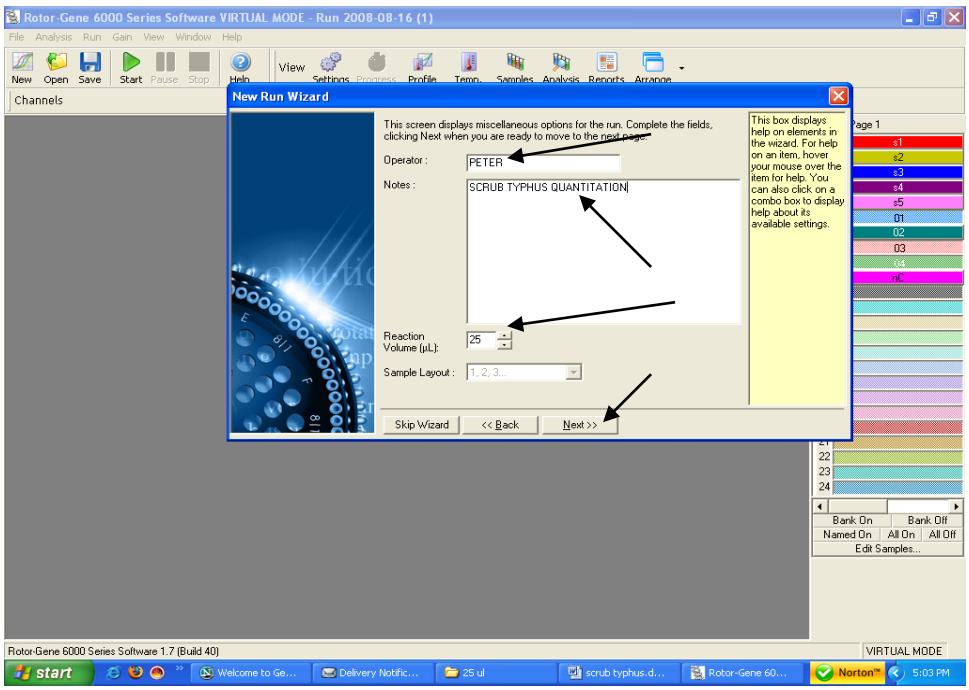

Fig. 23.

- Please click on the volume buttons to make sure that 25µl is reflected in the window as shown above.
- In case required Operators Name can be Fed into the system.

- Any Notes which need to be either printed into the Report can be typed out in the Box of Notes.
- Then click next and a new window will open as shown below.

h) THERMAL PROFILE & CALIBRATION:

Here the thermal profile for the assay will be defined.

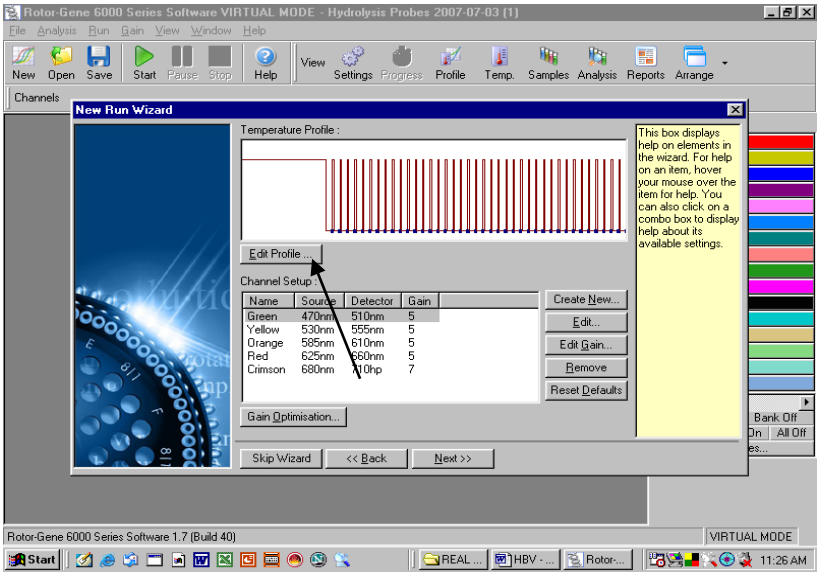

Fig. 24.

Programming the temperature profile is done by activating the button *Edit Profile* in the next *New RUN Wizard* menu window as shown above.

i) CYCLING PROFILE: First hold 95°C for 10 minutes as below

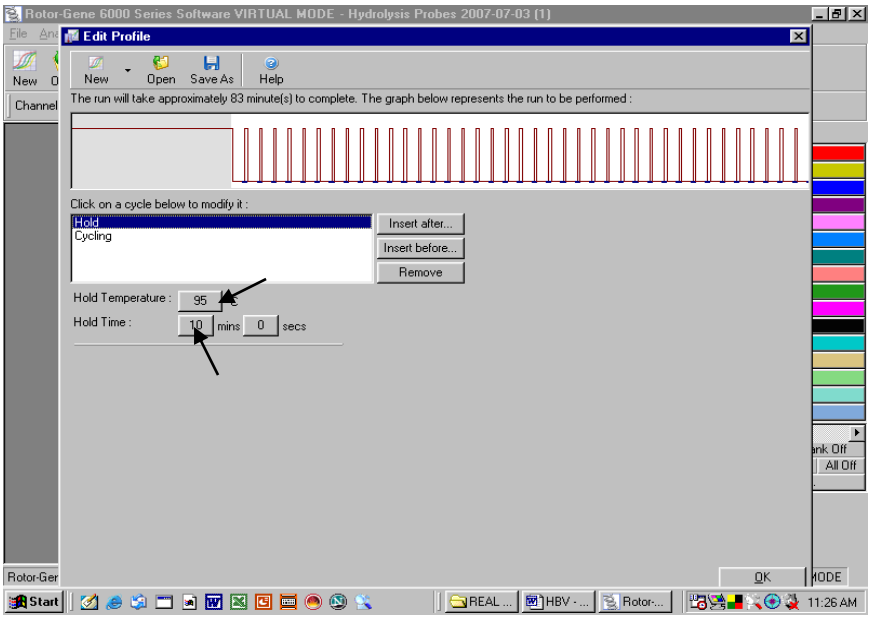

Fig. 25. Initial activation of the Hot Start enzyme. Generally the window will open with the Hold Temp as 95°C and the Hold Time as 10 minutes. In case it is different then set the same to as shown above.

j) Setting the Cycling and acquisition.

When clicked on Cycling the window will open as below.

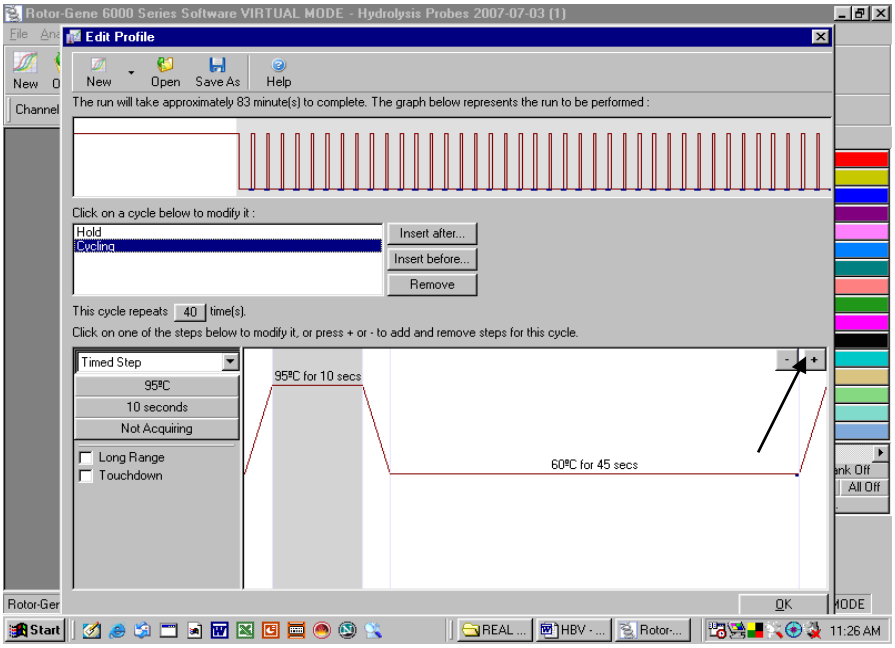

Fig. 26.

Click on the Plus sign at the right hand as shown in the figure to make the Cycling a three step process. A new window as shown below will be there.

Setting up of denaturation step in the cycling profile as depicted below i.e. 95°C for 15 seconds.

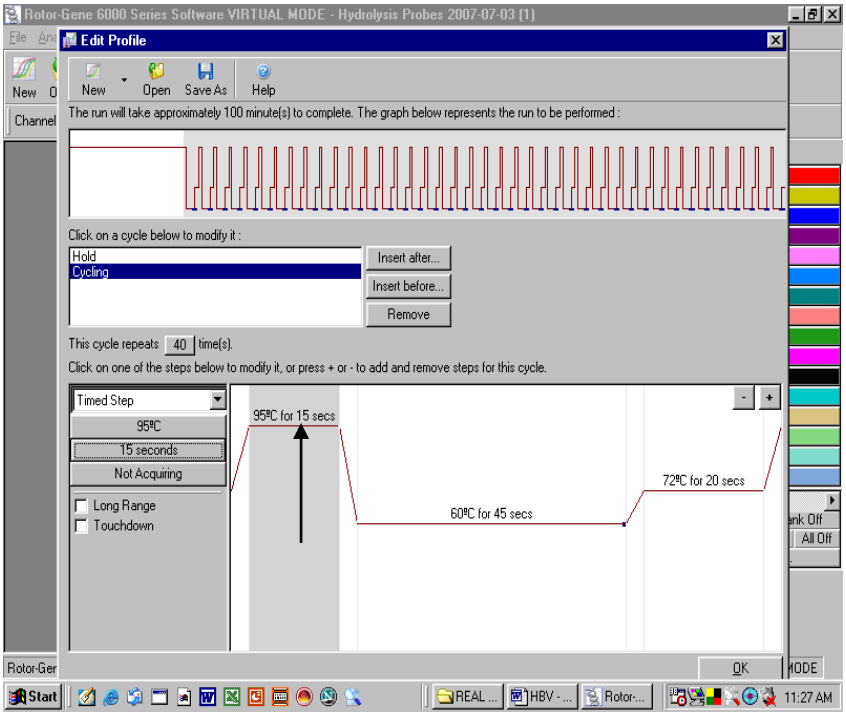

Fig. 27.

Setting up of Anneling step in the cycling profile as depicted below i.e. 55°C for 20 Seconds

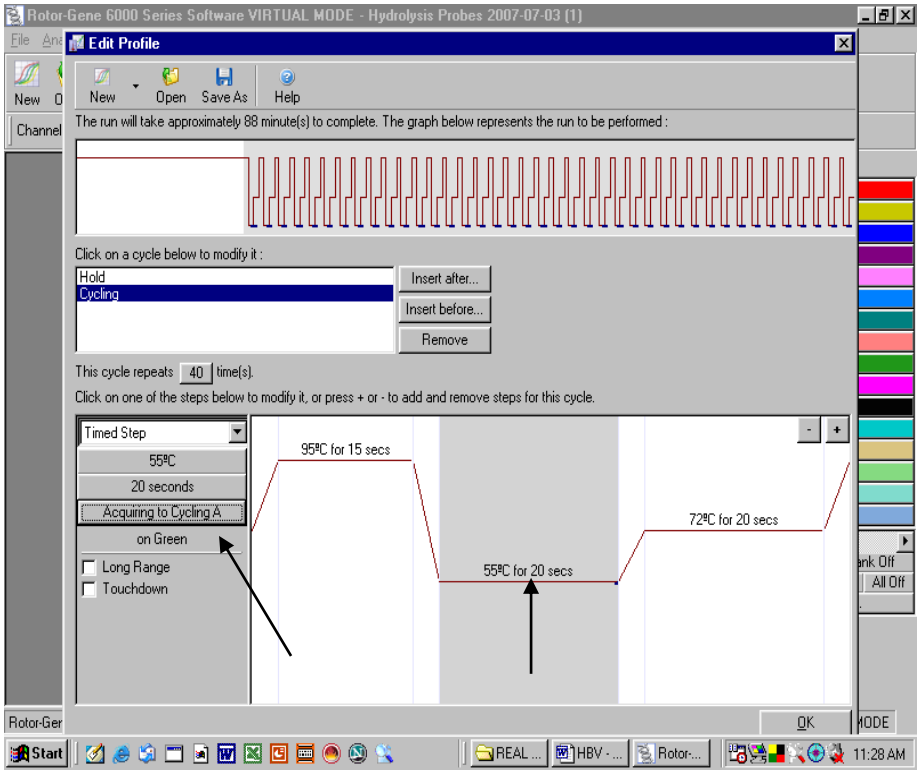

Fig. 28.

After setting the Anneling temperature and the time for anneling click on the "Acquiring to Cycling A" as shown by arrow. A New window will open as shown below.

Defining the Data acquiring channel i.e Green (FAM) & Yellow (JOE)

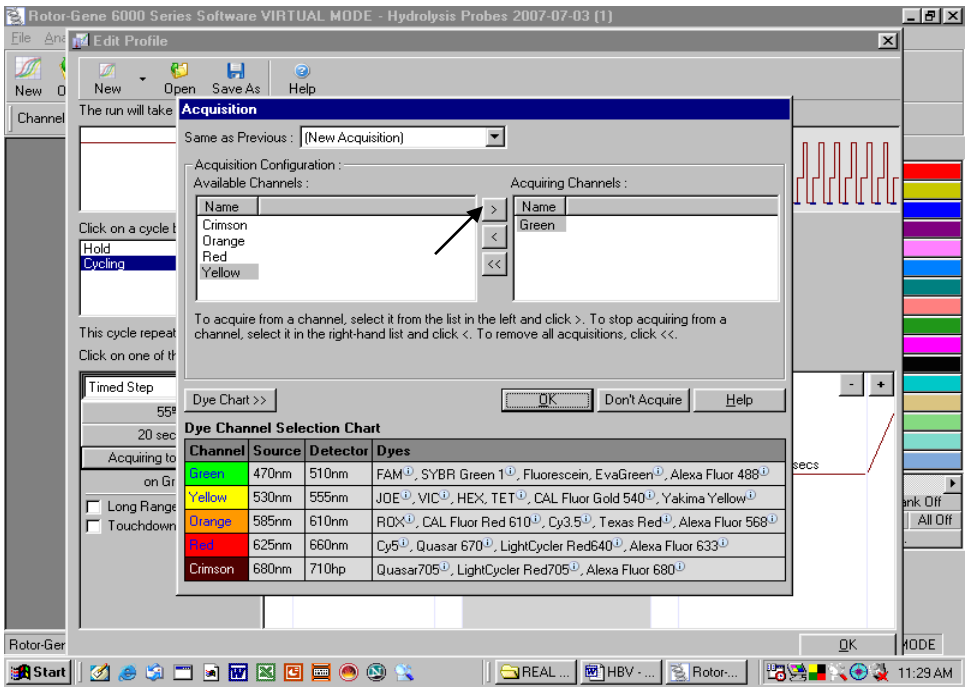

Fig. 29.

Highlight the Yellow and then press the right arrow. Just see before shifting the yellow to right that there is no other channel in the right except for Green. In case any other Channel appears besides Green on the right then the same be shifted to the left.

Confirmation of Channels as shown below.

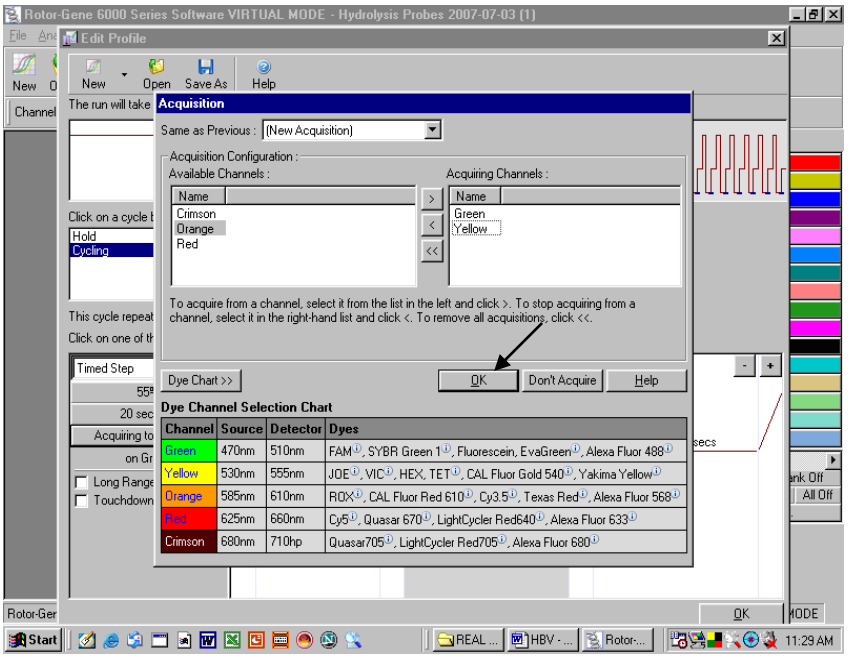

Fig. 30.

Once the Yellow and Green Channels are on the Right side then press OK as shown by the arrow.

Setting up of Extension step in the cycling profile as depicted below i.e. 72°C for 15 Seconds

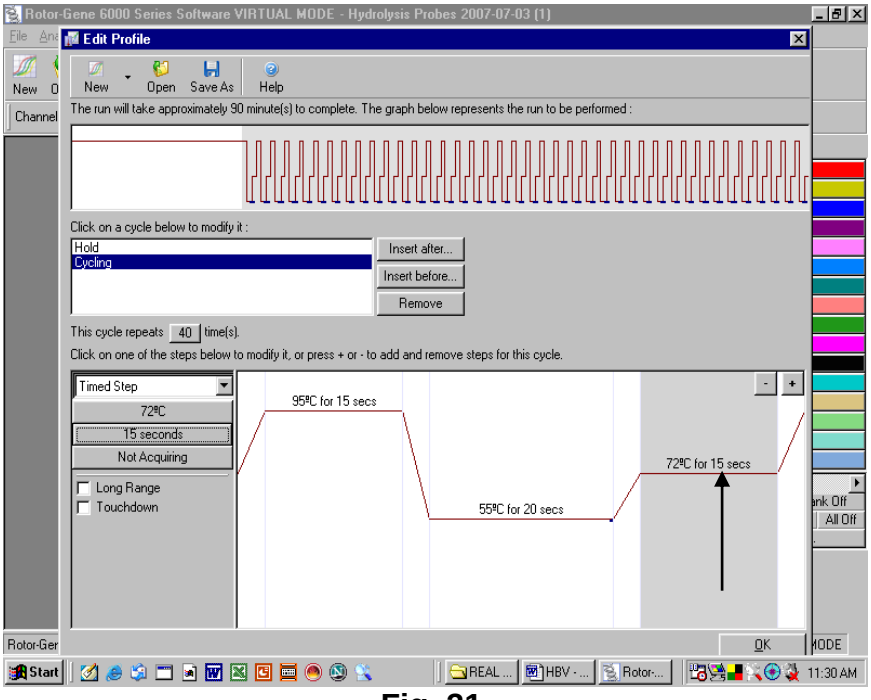

Fig. 31.

Setting up of Number of Cycles to 45 cycles in the cycling profile as depicted below.

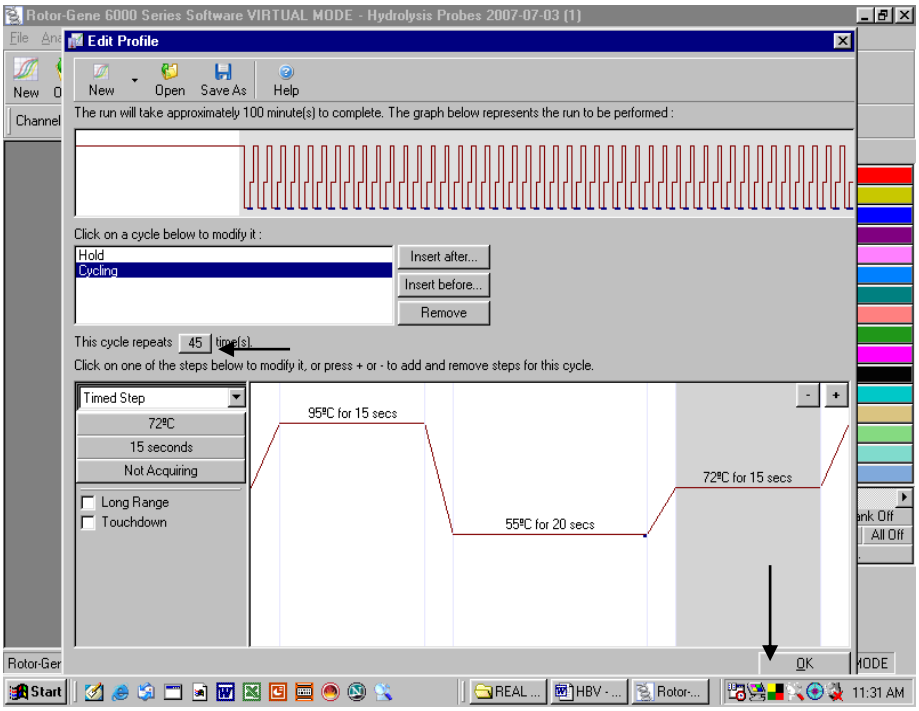

Fig. 32.

After setting the number of Cycles Press OK.

k) Setting the gains for the acquiring channel by clicking at the Gain Optimisation button as shown below.

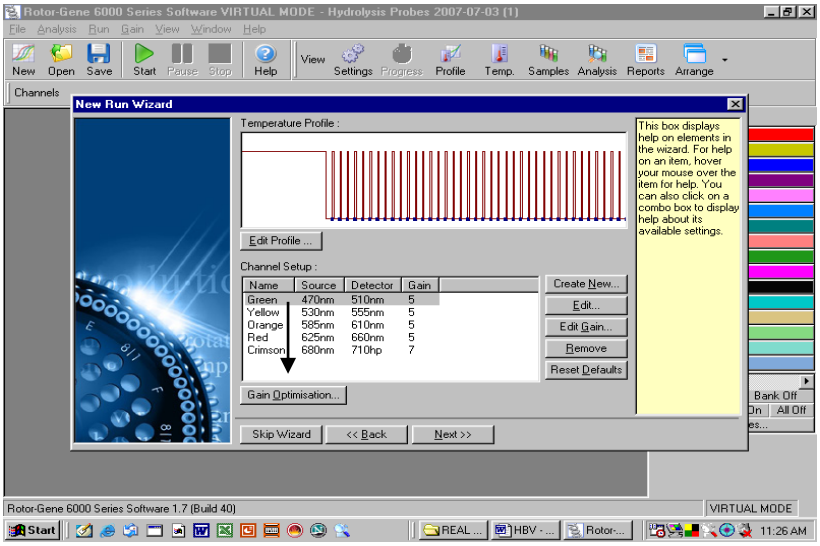

Fig. 33

The detection range of the fluorescence channels has to be determined according to the fluorescence intensities in the PCR tubes. This adjustment is done in the menu window *Auto Gain optimization Setup* (activation in menu window *New Experiment Wizard* under Gain Optimization). Please set the temperature to the annealing temperature of the amplification program (compare Fig.34 .

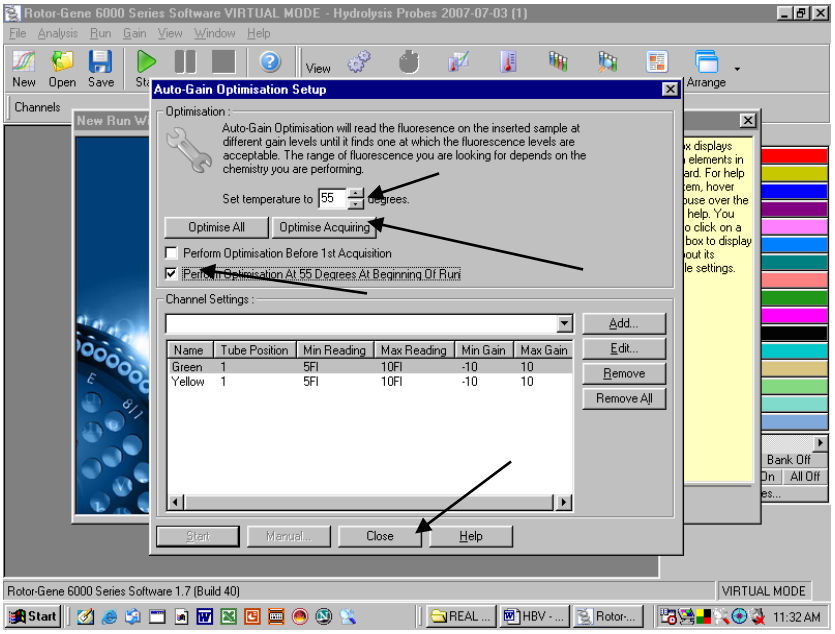

Fig. 34.

The following needs to be done.

- Click on the Optimise Acquiring
- Click on Set temperature To Adjust the Temperature to 55°C.
- Click on the Box Perform Optimisation At 55 degree At beginning of Run.
- Just see that below the channel settings there appear only two channels i.e. Green and Yellow. In case it is different then the channels have not been set properly. Close the window and reset the channels.
- Then Press Close.

L) PRESS Start RUN

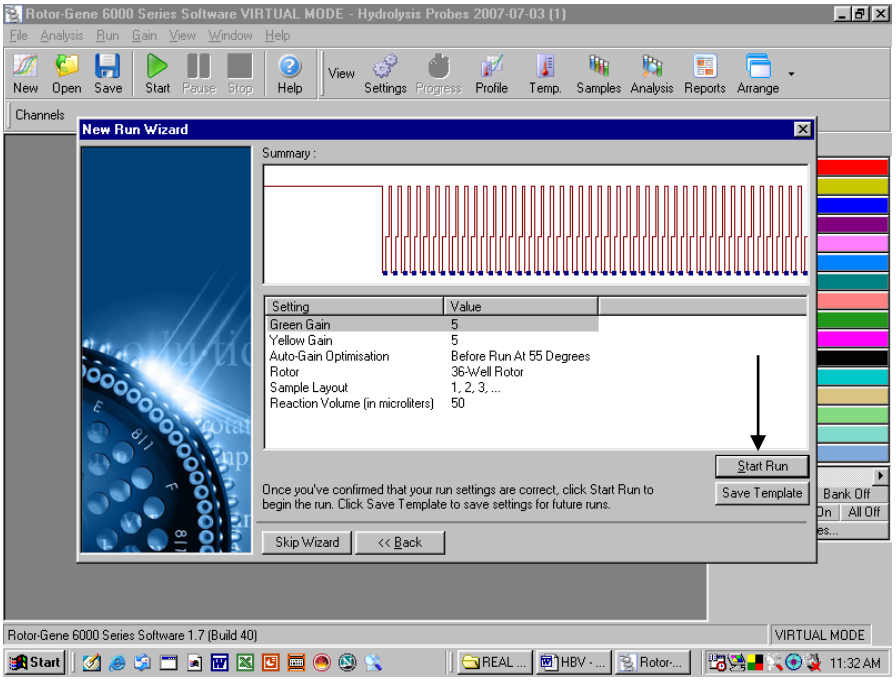

Fig. 35.

Saving the RUN File.

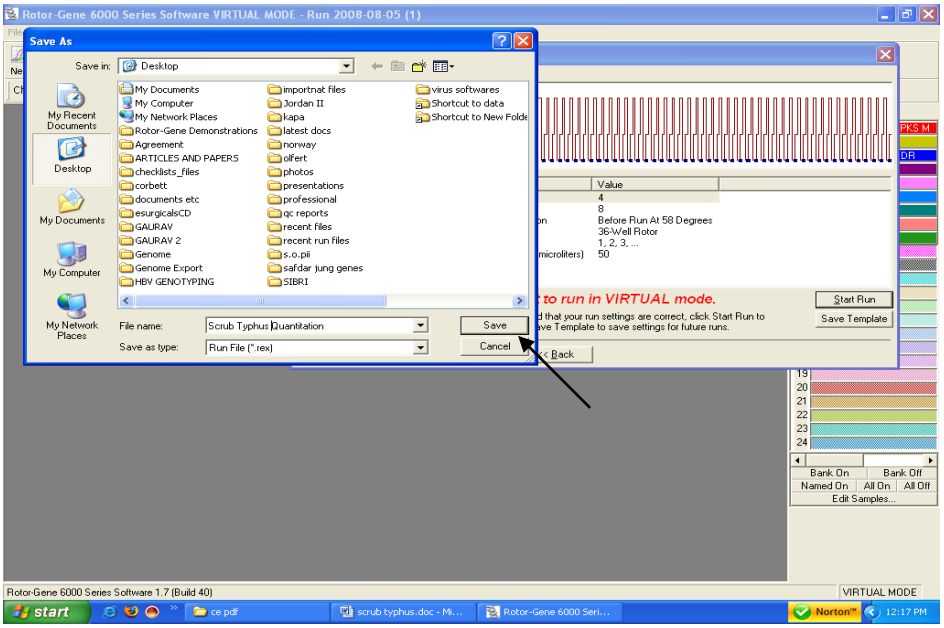

Fig. 36.

Store the run file either in my documents or a designated folder as shown above. The moment save button is clicked after the file name, machine will start.

9. a) Generated Data Interpretation & Analysis for RotorGene 2000/3000

Data analysis is performed with the *RotorGene*™ software according to the manufacturer's instructions (*RotorGene*™ *3000 Operator's* Manual).

The following results are possible:

1. A signal is detected in fluorescence channel Cycling A.FAM.

The result of the analysis is positive: The sample contains SCRUB TYPHUS DNA.

2. In fluorescence channel Cycling A.FAM no signal is detected.

No SCRUB TYPHUS DNA detectable. It can be considered negative if there is amplification in the Joe Channel. Please refer for details on PCR inhibition in the section PCR inhibition.

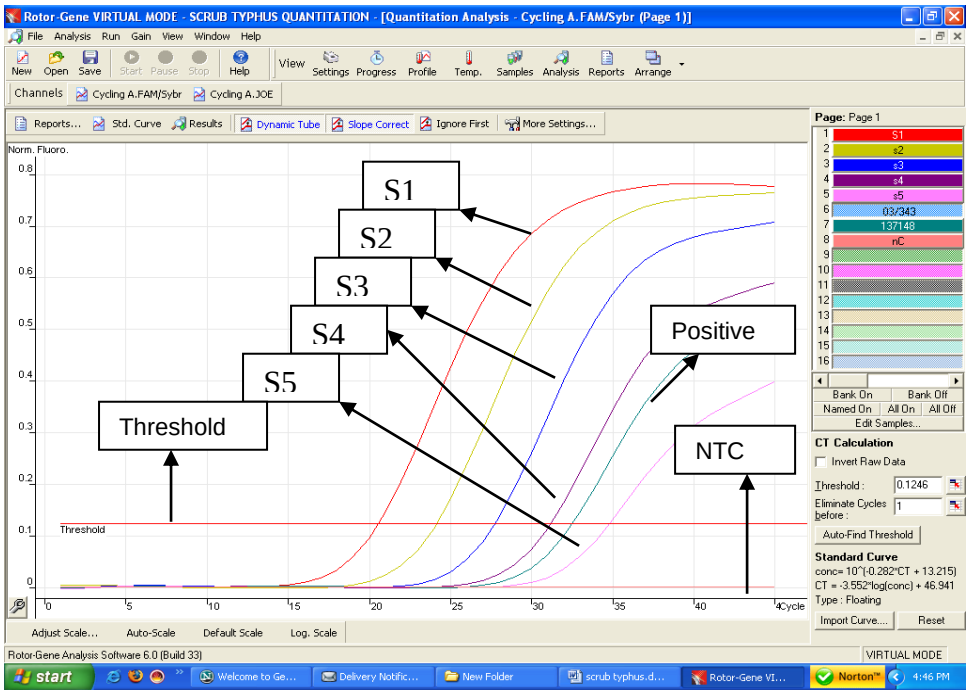

Fig. 37: Detection of the quantitation standards *(SCRUB TYPHUS S 1-5)* in fluorescence channel Cycling A.FAM. NTC: non-template control.

Examples of positive and negative PCR reactions are given in the above figure.

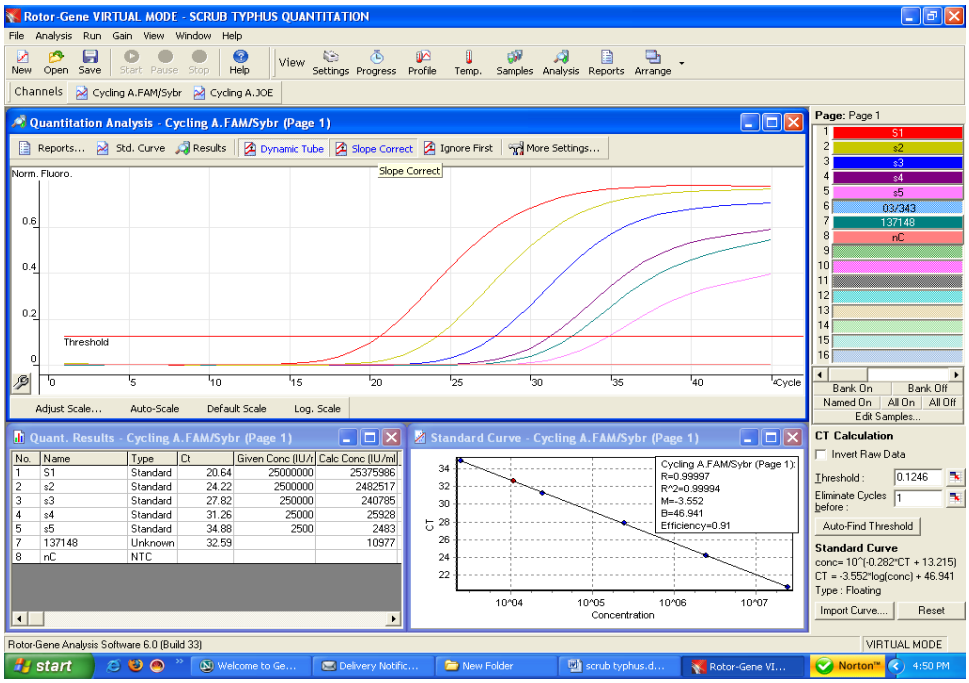

Fig. 38.

Example of analysed data for SCRUB TYPHUS where all the amplification curves can be seen as well as the standard curve, reaction efficiency, M value etc. can be seen and the quantitative data for the samples can be seen.

Inhibition Control gene amplification.

Analyze the Joe Channel

PCR Inhibition

A signal is detected in fluorescence channel Cycling A. Joe: **No PCR inhibition**

In fluorescence channel Cycling A. Joe no signal is detected.

But signal detected in FAM: The sample is positive for SCRUB TYPHUS DNA.

In fluorescence channel Cycling A. Joe no signal is detected.

No signal detected in FAM as well: A possible PCR inhibition has occurred.

9. b) Generated Data Interpretation & Analysis for RotorGene 6000

Data analysis is performed with the *RotorGene*™ software according to the manufacturer's instructions (*RotorGene*™ 6*000 Operator's* Manual).

The following results are possible:

3. A signal is detected in fluorescence channel Cycling A.Green.

The result of the analysis is positive: The sample contains SCRUB TYPHUS DNA.

4. In fluorescence channel Cycling A.Green no signal is detected.

No SCRUB TYPHUS DNA detectable. It can be considered negative if there is amplification in the Yellow Channel. Please refer for details on PCR inhibition in the section PCR inhibition.

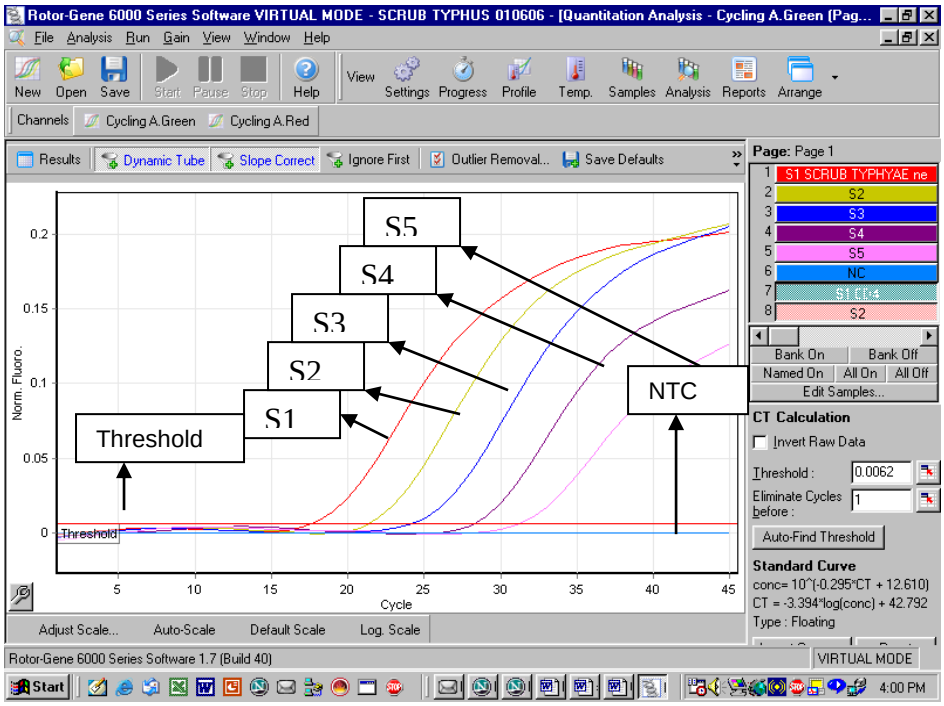

Fig. 39: Detection of the quantitation standards *(SCRUB TYPHUS S 1-5)* in fluorescence channel Cycling A.Green. NTC: non-template control.

Examples of positive and negative PCR reactions are given in the above figure.

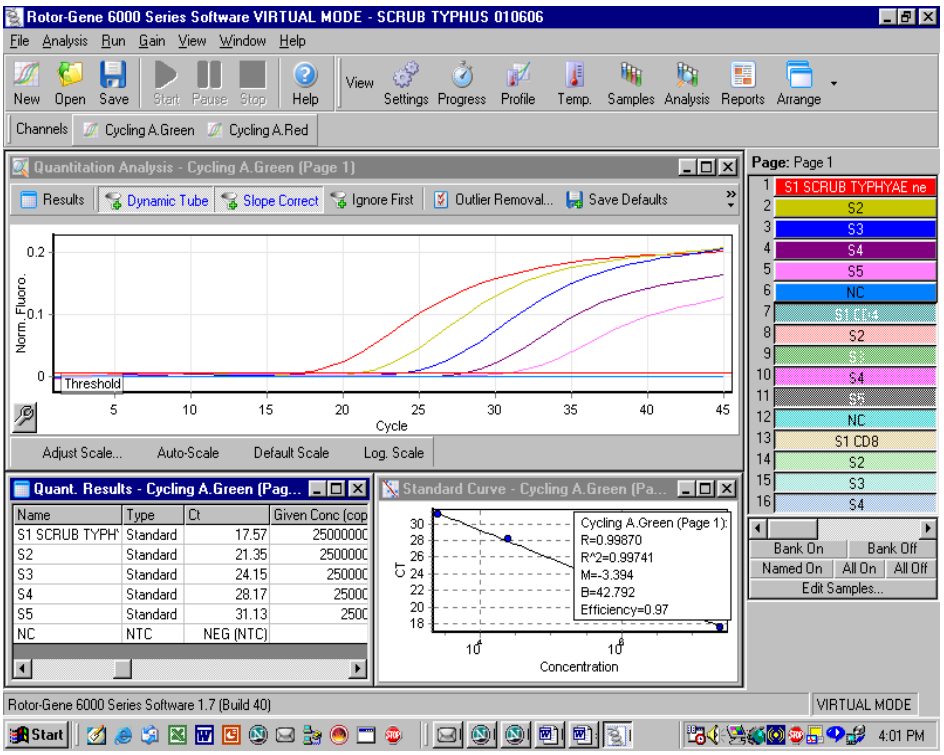

Fig. 40.

Example of analysed data for SCRUB TYPHUS where all the amplification curves can be seen as well as the standard curve, reaction efficiency, M value etc. can be seen and the quantitative data for the samples can be seen.

Inhibition Control gene amplification.

Analyze the Yellow Channel

PCR Inhibition

A signal is detected in fluorescence channel Cycling A. Yellow: **No PCR inhibition**

In fluorescence channel Cycling A. Yellow no signal is detected.
But signal detected in Green: The sample is positive for SCRUB TYPHUS DNA.

In fluorescence channel Cycling A. Yellow no signal is detected.
No signal detected in Green as well: A possible PCR inhibition has occurred.

10. a) Troubleshooting for RotorGene 2000/3000

1. No signal with positive Standards (SCRUB TYPHUS *S 1-5*) in fluorescence channel Cycling A.FAM.

- Incorrect programming of the *Rotor-Gene™ 2000/3000.*

  ➔ Repeat the PCR with corrected settings.

2. Weak or no signal in fluorescence channel Cycling A. FAM:

- The PCR conditions do not comply with the protocol.

  ➔ Repeat the PCR with corrected settings.

- The SCRUB TYPHUS Super Mix *R1* has been thawed and frozen too often.
- The SCRUB TYPHUS Super Mix R1 has been kept at +4°C for longer than 5 hours.

  ➔ Please mind the storage conditions given in the **Storage.**
  ➔ Repeat the assay using a new SCRUB TYPHUS super mix (R1).

- **The PCR was inhibited.**

➔ Make sure that you use a recommended extraction method (see **8.a. DNA extraction**) and stick closely to the manufacturer's instructions.

10. b) Troubleshooting for RotorGene 6000

1. No signal with positive Standards (SCRUB TYPHUS *S 1-5*) in fluorescence channel Cycling A.Green.

- Incorrect programming of the *Rotor-Gene*™ 6*000.*

➔ Repeat the PCR with corrected settings.

2. Weak or no signal in fluorescence channel Cycling A. Green:

- The PCR conditions do not comply with the protocol.

➔ Repeat the PCR with corrected settings.

- The SCRUB TYPHUS Super Mix *R1* has been thawed and frozen too often.
- The SCRUB TYPHUS Super Mix R1 has been kept at +4°C for longer than 5 hours.

➔ Please mind the storage conditions given in the **Storage.**
➔ Repeat the assay using a new SCRUB TYPHUS super mix (R1).

- **The PCR was inhibited.**

Make sure that you use a recommended extraction method (see **8.a. DNA extraction**) and stick closely to the manufacturer's instructions.

11. Specifications

11.a Sensitivity and Reproducibility

In order to determine the sensitivity of the ***Geno-Sen's SCRUB TYPHUS*** *Real Time PCR Kit*, a dilution series has been set up from 10^7 down to 10^0 Copies/µl of SCRUB TYPHUS DNA and analyzed with the ***Geno-Sen's*** *SCRUB TYPHUS Real Time PCR Kit*. The assays were carried out on three different days in the form of 8-fold

determinations. The results were determined by a probit analysis. The detection limit as determined for ***Geno-Sen's*** *SCRUB TYPHUS Real Time PCR Kit* is consistently 70 Copies/ml. This means that there is 95% probability that 70 Copies/ml will be detected.

Analytical Sensitivity

Analytical Sensitivity in Conjunction with the Geno Sen's® **Genomic DNA Extraction Mini Kit — for DNA purification (Cat . No. 98021) of the *Geno Sen's® SCRUB TYPHUS*** *Real Time PCR RG Kit on RotorGene 3000/6000 was determined by Spiking a known negative Serum to a nominal 80 copies/ml. This was subjected to extraction using the Geno Sen's®* **Genomic DNA Extraction Mini Kit — for DNA purification (Cat . No. 98021) eight times with starting volume of 200**µl & elution volume of 60µl.

All the Eight extractions were then analyzed with the *Geno Sen's® SCRUB TYPHUS* *Real Time PCR RG Kit along with the standards & the NTC.*

All the eight extractions were amplified correctly & the mean value obtained for the eight replicates was 78 copies/ml.

Hence Analytical Sensitivity in Conjunction with the Geno Sen's.® **Genomic DNA Extraction Mini Kit — for DNA purification (Cat . No. 98021) of the *Geno Sen's® SCRUB TYPHUS*** Real *Time PCR RG Kit on Rotor Gene 3000/6000 was determined to be 80 copies/ml.*

11.b Specificity

In order to check the specificity of the ***Geno-Sen's*** **SCRUB TYPHUS** Real Time PCR kit, different DNA & DNA listed below were analyzed with ***Geno-Sen's*** SCRUB TYPHUS Real Time PCR Kit. None of these led to a positive signal with the ***Geno-Sen's*** SCRUB TYPHUS Real Time PCR kit. Gene sequence analysis of the amplified region of SCRUB TYPHUS shows a pronounced homology among the various SCRUB TYPHUS subtypes, and no homology with other DNA. Besides which utmost care has been taken in selection of the primers & probes being used in the kit.
To further Validate the stringent data In order to check the specificity of the ***Geno Sen's®*** **SCRUB TYPHUS *Real Time PCR RG*** *Kit*, different RNA & DNA listed below were analyzed with ***Geno Sen's®*** **SCRUB TYPHUS** *Real Time PCR RG Kit*. None of these led to a positive signal with the ***Geno Sen's®*** **SCRUB TYPHUS** *Real Time PCR RG Kit*.

Vericella Zoster Virus	TTV	N. Meningitis
Human Herpes Virus 1 & 2	Hepatitis C Virus	S. Pneumonia
Epstein barr Virus	Hepatitis E Virus	ENTEROVIRUS
Cytomagalovirus	HIV-1	Mycobacterium tuberculosis
Chlamydia pneumonia	HIV-2	Hepatitis A
Parvovirus B 19	WEST NILE VIRUS	Staphylococcus aureus
Dengue Virus 1-4	H. Influenza	Hepatitis B Virus
Leprosy	Malaria	ChikunGunya Virus
B.pseudomallie	JEV	Leptospira interrogans.

In order to validate the Specificity further with wet lab testing the following Known clinical samples were analyzed using the ***Geno Sen's.®*** **SCRUB TYPHUS** Real Time PCR RG kit on RotorGene 3000/6000. The extraction was carried out with the Geno

Sen's® **Genomic DNA Extraction Mini Kit — for DNA purification (Cat. No. 98021)**

The run was carried out with the known set of standards in order to quantiate the **SCRUB TYPHUS** DNA Gene.

Sample Type	Serum	Plasma
High +ve's	1	1
Medium +ve's	4	5
Low +ve's	4	3
Extremely low +ve's	3	2
Negative samples.	5	4
	17	15

All the above samples were correctly identified by the ***Geno Sen's*®** **SCRUB TYPHUS** Real Time PCR RG kit & all the 6 extremely low samples were accurately detected by the ***Geno Sen's*®** **SCRUB TYPHUS** Real Time PCR RG kit & exhibited copies around 80 copies /ml or less than 80 copies/ml.

Further studies are underway on this aspect.

12. Warranty::

Products are guaranteed to confirm to the quality and content indicated on each vial and external labels during their shelf life. Genome Diagnostics Pvt. Ltd. obligation and purchaser's rights under the warranty are limited to the replacement by Genome Diagnostics Pvt. Ltd of any product that is shown defective in fabrication, and that must be returned to Genome Diagnostics Pvt. Ltd Freight prepaid, or at Genome Diagnostics Pvt. Ltd. option, replacement of the purchasing price. Any complaint on damaged goods during transport must be directed to the handling or transport agent.

In Vitro Diagnostic Medical device, as per the Directive 98/79/EC specifications. This product must be used by qualified professionals only. It is the responsibility of the user to ascertain that a given product is adequate for a given application. Any product not fulfilling the specifications included in the product sheet will be replaced. This warranty limits our responsibility to the replacement of the product. No other warranties, of any kind, express or implied, including without limitation, implicit warranties of commercialization ability or adequacy for a given purpose, are provided by Genome Diagnostics Pvt. Ltd. Genome Diagnostics Pvt. Ltd will not be responsible for any direct, indirect, consequential or incidental damage resulting of the use, misuses, results of the use or inability to use any product.

13. Limitations of product use:

a.) All reagents may exclusively be used for *in vitro* diagnostics.

b.) The product is to be used by personnel specially instructed and trained in for the *in-vitro* diagnostics procedures only.
c.) It is important to pipet the indicated quantities, and mix well after each reagent addition. Check pipettes regularly.
d.) Instructions must be followed Correctly in order to obtain correct results. If the user has any questions, please contact our Technical Dept. (dharam@vsnl.com or at pbpl@vsnl.net).
e.) This test has been validated for use with the reagents provided in the kit. The use of other Reagents or methods, or the use of equipment not fulfilling the specifications, may render equivocal results. User is responsible for any modifications done in any of the indicated parameters. Compliance with the kit protocol is required.
f.) Detection of bacterial DNA depends on the number of DNA present in the sample, and can be affected by sample collection methods, patient-related factors (e.g. age, symptoms), or for infection stage and sample size.
g.) False negative results may be obtained due to polymerase inhibition. It is recommended to perform control reactions to distinguish between inhibition and true negatives. This is achieved by the inhibition Control included in the kit.
h.) Cross contamination between samples and exogenous DNA can only be avoided by following good laboratory practice. Instructions in this document must be strictly followed.
i.) Attention should be paid to expiration dates printed on the kit box and labels of all components. Do not use expired components.

If you have any further questions or problems, please contact our technical support at dharam@vsnl.com OR pbpl@vsnl.net.

14. LIST OF GENO-SEN'S RANGE OF REAL TIME PCR KITS

S.NO.	PRODUCT
1	**HIV-1 RG quantitative Real time PCR kit.**
2	**HBV RG quantitative Real time PCR kit.**
3	**HCV RG quantitative Real time PCR kit.**
4	**HCV Genotyping 1/2/3/4 RG qualitative Real time PCR kit.**
5	**HEV RG quantitative Real time PCR kit.**
6	**HAV RG quantitative Real time PCR kit.**
7	**JEV RG quantitative Real time PCR kit.**

8	ENTEROVIRUS RG quantitative Real time PCR kit.
9	DENGUE RG quantitative Real time PCR KIT
10	HSV 1 & 2 RG quantitative Real time PCR kit.
11	CMV RG quantitative Real time PCR kit.
12	Hanta Virus RG quantitative Real time PCR kit.
13	Measles Virus RG quantitative Real time PCR kit.
14	West Nile Virus RG quantitative Real time PCR kit.
15	H5 N1 (Bird Flu) RG quantitative Real time PCR kit.
16	Chikungunya RG quantitative Real time PCR kit.
17	TTV RG quantitative Real time PCR kit.
18	SARS RG quantitative Real time PCR kit.
19	JC/BK Virus RG quantitative Real time PCR kit.
20	MTb Complex RG quantitative Real time PCR kit.
21	MTb Complex /MOTT RG quanlitative Real time PCR kit.
22	Chlamydia pneumonia RG quantitative Real time PCR kit.
23	Streptococcous pneumonia RG quantitative Real time PCR kit.
24	N. Meningitis RG quantitative Real time PCR kit.
25	H. Influenza RG quantitative Real time PCR kit.
26	Leprosy RG quantitative Real time PCR kit.
27	Helicobacter Pylori RG quantitative Real time PCR kit.
28	Scrub Typhus RG quantitative Real time PCR kit.
29	B. Pseudomalie RG quantitative Real time PCR kit.
30	Filaria RG quantitative Real time PCR kit.
31	Leptospira(pathogenic) RG quantitative Real time PCR kit.

32	**CCL3-L1 RG quantitative Real time PCR kit.**
33	**Malaria (P. Vivax) RG quantitative Real time PCR kit.**
34	**Bcr/abl Major RG quantitative Real time PCR kit.**
35	**Bcr/abl Minor RG quantitative Real time PCR kit.**
36	**PML/RARA RG quantitative Real time PCR kit.**
37	**RARA/PML RG quantitative Real time PCR kit.**
38	**GAPDH RG quantitative Real time PCR kit.**
39	**β-Actin RG quantitative Real time PCR kit.**
40	**β-Globin RG quantitative Real time PCR kit.**
41	**Abl gene RG quantitative Real time PCR kit.**
42	**Rabies RG quantitative Real time PCR kit.**
43	**Factor V Leiden detection RG Real time PCR kit.**

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