

Practical Issues Regarding New Zealand

In light of the astronomical background highlighted above and as the sky in New Zealand is often covered with clouds (particularly along the horizon), it is often difficult to determine the new moon by sighting. The problem is compounded by the fact that Muslims in New Zealand are concentrated in certain regions and we have very few Muslims living in areas North of Auckland where probability for sighting the Hilal may be slightly higher. This has necessitated us to seek information on the sighting from further afar outside the country. However, as shown astronomically, even when it is not possible to sight the new moon in New Zealand (because it is not sightable as yet), it is quite possible to sight it in another country where the moon sets a little later the same evening.

As we are all aware, New Zealand being among the East most countries in the world is the first to see the sun. So the sun rises as well as sets in New Zealand before other countries (except Fiji). By the same token the moon also rises and sets here before the rest of the world. This means that the rest of the world is likely to see the new moon before us and we will be the last one to sight it. So, because of this law of nature and the requirement of Shariah (according to Fatawah obtained from various Ulama around the world), it is important that the countries we seek information from regarding the sighting of Hilal lie within the same time zone as New Zealand. This then restrict us to only one country, Fiji Islands. Fiji is well inhabited by Muslims throughout the main islands, and more often than not the skies are clear. Fiji does have a proper Islamic system in place for determination of the new moon, whereby sighting in any part of the country is quickly reported (and verified) to Fiji Muslim League Office in Suva. An announcement is also made for the general public then on the radio in the 8 pm news.

Experience over the years has shown that if astronomically the new Hilal is expected to be seen (Imkan-e-Ru'yah), Muslims in Fiji would spot it. It has also proved the point that being the east-most countries of the world, New Zealand and Fiji are the last in the world to sight the new moon. The current system used by the New Zealand Hilal Committee has offered us a practical solution to a perennial problem that divides the Muslim Ummah in most countries.

Conclusion

Astronomical calculations establish the time of the birth of new moon and not the time when the new crescent would be visible. A new born moon may not be visible for up to 24 hours and hence the Islamic month can start up to two days after the birth of the new moon.

Since the new crescent grows continuously, it may not be seen at sunset in one part of the world but may be seen some hours later in another part of the world. This is the reason Islamic months start on different dates in different parts of the world.

Because of the difficulties in sighting the new crescent in New Zealand, we have fatawah from various scholars allowing us to accept sightings from places that have the same time zone as New Zealand and have established Islamic system for moon sighting. Since Fiji Islands fulfills both conditions we accept moon sightings in Fiji.

References and Acknowledgements

1. Mohammad Ilyas; 2000: The Quest for a Unified Islamic Calendar.
2. Khalid Shaukat; June 2004. www.moonsighting.com.
3. Moon Phases Star Message screensaver - http://www.moonphases.info/moon_phases.html

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UNDERSTANDING THE LUNAR CYCLE AND THE VISIBILITY OF THE NEW BORN CRESCENT

"It is He Who made the sun a radiance and the moon a light and determined stages for it so you know the number of years and the count (of time)." (Yunus - 10:5)

They ask you about the new crescents. Say! These are means to mark fixed periods of time for mankind... (Al Baqara -2:189)

Allah the Exalted created moons as they are signs to mark fixed periods of time for mankind so start fasting by sighting the moon and stop the same by sighting it too. If the sky is overcast and cloudy (on the 29th day) then you should complete thirty days. (Hakim, Musanna'at Abdur Razzaq)

Islam has established a very simple system for tracking time. Islamic months start at the sighting of the new crescent and are either of twenty nine days if the next crescent is sighted on the twenty ninth of the month or thirty days if the next crescent is not sighted. This simple system of establishing new months can be used without any elaborate system of time keeping or calculations and therefore can be used by all communities and in every era.

However, in the present era of global communication and readily available information on the birth of the astronomical new moon, some confusion on the start of Islamic months has become prevalent. The questions raised on the issue can be summarised as follows:

- Why can we not use the scientific data to determine the start of the new month in the same manner in which we use scientific calculations to determine the time for prayers?
 - Why does the Islamic month start up to two days after the birth of the new moon?
 - Why is the start of a new month in New Zealand often on a different day from the Middle East (particularly Ramadhan and the Eidain)?
- This paper explores these issues by considering the following:
- Birth of the new moon
 - Phases of the moon
 - Definition of hilal
 - Formation of the hilal
 - Important factors for visibility
 - Visibility of the hilal
 - Visibility on different dates

The Visible Crescent and the birth of the new Moon

The main reason for the confusion on the start of the new month (hilal) as used in the Shariah is the same as the new born moon as determined in astronomy. The reality is that these two are not the same. Rather the new born moon and the hilal are two different phases of the moon.

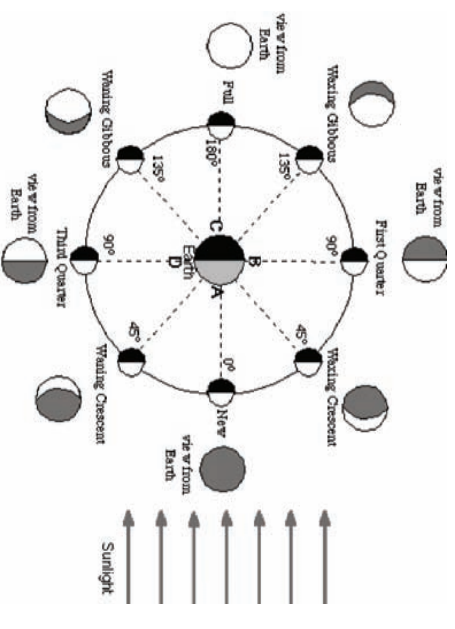
In order to understand the difference between the new born moon and the visible crescent we need to know the process that causes the phases of the moon.

Phases of the Moon

The Quran says:

"And the moon, we have measured for her mansions (to traverse) till she returns like the old, (and curved) lower part of a date-stalk. It is not permitted for the sun to catch-up to the moon, nor can the night outstrip the day; each swims along in (its own) orbit." (Nash - 36:39-40)

We see the moon because it reflects the sunlight falling on it towards the earth. The amount of light that is reflected to the earth varies with the position of the moon respective to the earth-sun axis. The amount of light that is reflected from the moon to the earth determines the phases (or the size and the shape of the moon) as seen from the earth. Below the phases of the moon are shown.



The Sun-Moon angle is the angle defined by Sun>Earth>Moon (where you are) as the angle vertex. As the Sun-Moon angle increases we see more of the sunlit part of the Moon. Note that if this drawing were to scale, then the Moon would be half this size and its orbit would be about 22 times larger in diameter and the Sun would be about 389 times farther away than the Moon!

and the earth. As the new born moon moves around the earth, more of the sunlight reflecting from the moon falls onto the earth, making it appear larger (i.e. it waxes) until the moon appears as a full moon. After this the moon moves towards the sun-earth axis and wanes until it once more becomes the invisible crescent.

When the moon is close to the earth-moon-sun centreline, very little light from the moon reflects on the earth and the moon appears either very small or invisible, as happens towards the end of a lunar month.

New Born Moon

Astronomically, the moon is born when the centres of the moon, sun and the earth all lie in the same plane, with the moon in between the earth and sun. Because the moon is in between the sun and the earth at birth, no sunlight reflects from the moon on to the earth, and for this reason the moon is not visible at birth.

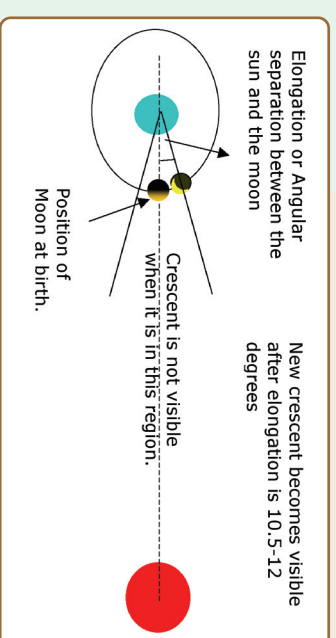
It is possible to accurately calculate the time when this occurs and this time is published in calendars or available from the Astronomical almanacs. However this time is not the time of the formation of the Shari'at hila - i.e. it is not the time when the new moon becomes visible.

Visible Crescent (Hila)

Hila comes from the Arabic word hilla which means "it manifested or it appeared". Hence, in the application of roayah, hila is the new crescent when it appears (or becomes visible). The use of the hila in the Quran, hadith and Islamic jurisprudence refers to the visible new crescent rather than the astronomical new moon.

Formation of Hila

Since the moon is continuously moving around the earth, it keeps moving away from the sun-moon-earth centreline after its birth. As the moon moves away from this plane, sunlight falling on the moon starts to reflect towards the earth and when enough light is reflected, the moon starts to appear as a thin crescent. In understanding the formation of hila it is useful to know the term 'elongation'. Elongation is the angular separation of the moon from the sun-earth axis as shown below.



- Generally:
- Up until elongation of 7 degrees, no sunlight reflected from the moon comes towards the earth, hence the crescent remains invisible.
 - The crescent remains invisible from earth even via telescopes for elongations less than 7.5 degrees.
 - Elongation needs to be greater than 10.5 degrees for sightings in favourable conditions although the earliest confirmed naked eye sighting is at elongation of 9.3 degrees.
 - The crescent becomes widely visible for elongations greater than 12 degrees.

As a rule of thumb, the moon's elongation changes by one degree every two hours (this is a crude approximation based on linear trigonometry while in reality actual motion is in three dimensions). This is the reason new moons are not sighted for up to a day after

birth and consequently Islamic months can start up to two days after the birth of the new moon.

Factors Affecting Visibility of the New Crescent

A part from the elongation of the moon, there are other factors that influence the visibility of the new crescent. Among these are:

- The crescent's height at sunset and the brightness of the background sky,
- The crescent's brightness or width,
- Atmospheric influences on light such as refraction and absorption.

Sighting on Different Dates in Different Parts of the World

An intriguing question is: Why is it that often the moon is not sighted in New Zealand but it is sighted in the Middle East?

The reason can be understood by reflecting on the development of the new crescent, for example:

- If at sunset in NZ, angular separation is 8 degrees, the moon will not be seen.
- Then after 8 hours, angular separation becomes 12 degrees.
- Hence, in all places where the sun sets eight hours after sunset in NZ, the new crescent could be visible.
- Therefore, on the same day the new moon may not be seen in NZ, but it can be seen in Oman (sunset 8 hours after sunset in NZ) and further West.
- In NZ the new crescent will be seen the next day.

Since the sun sets first in New Zealand (according to international date lines), often countries in the West (eg Middle East) see the hila a day earlier than countries in the East (eg Australia, New Zealand).

A question that follows is: Why can't we use the sightings of other regions? Among the reasons for this is the time factor between the two regions. For example, when Ramadhan is decided in the Middle East, it is already early morning or even dawn in New Zealand and hence we cannot possibly declare Ramadhan at that time of the day.

It is perfectly acceptable that solar dates and lunar dates can be different in different parts of the world, as seen from the narration of Kurayb who says:

That Kurayb, who travelled to Syria encountered the start of Ramadhan there on a Friday, upon returning to Medina, informed Ibn Abbas that he had seen the crescent-moon on the night of Friday, and that the people in Syria, including Muawiyah the governor, had fasted on Friday. Ibn Abbas replied that they (in Medina) had seen the crescent-moon on Saturday, and that they would not stop fasting until they either saw it again, or had completed thirty days. Kurayb asked, "Will you not suffice with the sighting of Muawiyah?" Ibn Abbas replied, "No, that is how the Messenger of Allah (pbuh) commanded us." (Muslim)