

**Part 1:** **TITLE, AUTHORS, APPROVALS, etc**

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| **Code assigned:** | **2020.001P** |  |
| **Short title:** Create a new subfamily (*Petromoalphasatellitinae*) with four new genera and six new species (*Alphasatellitidae*) | | |
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**List the ICTV Study Group(s) that have seen this proposal**

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| *Nanoviridae* study group |

**ICTV study group comments and response of proposer**

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**Authority to use the name of a living person**

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| --- | --- | --- |
| **Taxon name** | **Person from whom the name is derived** | **Permission attached (Y/N)** |
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**Submission dates**

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| Date first submitted to SC Chair | July 30, 2020 |
| Date of this revision (if different to above) |  |

**ICTV-EC comments and response of the proposer**

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**Part 2:** **NON-TAXONOMIC PROPOSAL**

**Text of proposal**

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**Part 3:** **TAXONOMIC PROPOSAL**

**Name of accompanying Excel module**

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| 2020.001P.R.Petromoalphasatellitinae\_nsf.xlsx |

**Abstract**

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| Associated with the newly described coconut foliar decay virus are nine different alphasatellites. Here we propose to create a new subfamily *Petromoalphasatellitinae* (**pe**rennial **tro**pical **mo**nocotyledons) within the family *Alphasatellitidae*.  In that new subfamilywe propose to create four new genera and propose to remove the genus *Babusatellite* from the subfamily *Nanoalphasatellitinae* and incorporate it into the *Petromoalphasatellitinae.* We also move three species from the genus *Babusatellite* to a new genus. |

**Text of proposal**

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| |  | | --- | | In 2018 the family *Alphasatellitidae* with the two subfamilies *Geminialphasatellitinae* and *Nanoalphasatellitinae* was established [1]. Also in 2018 we described novel types of single-stranded (ss) DNA in coconut foliar decay virus [2]. The virus was found to affect only coconut palms (*Cocos nucifera*) and is restricted to the Vanuatu Archipelago [3,4]. Associated with coconut foliar decay virus are nine different alphasatellites, seven of which can be classified as distinct species, based upon a species demarcation threshold of 81% sequence identity determined here. Applying a genus demarcation threshold of 68% sequence identity three new genera, *Cocosatellite* (*Coco* for coconut), *Coprasatellite* (*Copra* for coconut meat) and *Kobbarisatellite* (*Kobbari* is an Indian dish from coconut meat) are proposed. Five of the seven alphasatellite species can be assigned to the genus *Cocosatellite*, one to the genus *Coprasatellite*, and one to the genus *Kobbarisatellite.* To accommodate the three new genera we propose to establish a new subfamily *Petromoalphasatellitinae* in the family *Alphasatellitidae*.  In addition to creation of these three genera we propose to incorporate the genus *Babusatellite* in the *Petromoalphasatellitinae* and to remove it from the subfamily *Nanoalphasatellitinae*. Justification for the new classification of the genus *Babusatellite* along with the three newly created genera in the same subfamily is provided by the fact that all these alphasatellites associate with viruses that infect **pe**rennial **tro**pical **mo**nocotyledonous plants. Moreover, their respective sizes range in between those of the *Geminialphasatellitinae* and *Nanoalphasatellitinae* members. Finally, phylogenetic analysis clearly supports classification of the species of the genus *Babusatellite* in the same subfamily along with the species of the newly established genera *Cocosatellite, Coprasatellite* and *Kobbarisatellite*. Based on the phylogenetic analysis coupled with pairwise identities, we move the three species (*Banana bunchy top alphasatellite 2*, *Banana bunchy top alphasatellite 3* and *Cardamom bushy dwarf alphasatellite*) to a new genus *Muscarsatellite* (***Muscar*** from ***Mus****a* and *Elettaria* ***car****damomum*). Table 1 lists the alphasatellite species and the proposed genera of the proposed subfamily *Petromoalphasatellitinae*. | |

**Supporting evidence**

**Table 1: Species and genera of the newly proposed subfamily *Petromoalphasatellitinae* (new taxa in red)**

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| **Subfamily** | **Genus** | **Species (exemplars bold)** | **Accession**  **number** | **Acronym** | **Isolate** |
| *Petromoalphasatellitinae* | *Cocosatellite* | *Coconut foliar decay alphasatellite 1* | M29963 | CFDA1 | VU-85 |
| *Petromoalphasatellitinae* | *Cocosatellite* | ***Coconut foliar decay alphasatellite 1*** | MF926423 | CFDA1 | VU-88 |
| *Petromoalphasatellitinae* | *Cocosatellite* | *Coconut foliar decay alphasatellite 1* | MF926424 | CFDA1 | VU-89 |
| *Petromoalphasatellitinae* | *Cocosatellite* | *Coconut foliar decay alphasatellite 1* | MF926425 | CFDA1 | VU-13 |
| *Petromoalphasatellitinae* | *Cocosatellite* | ***Coconut foliar decay alphasatellite 2*** | MF926426 | CFDA2 | VU-89 |
| *Petromoalphasatellitinae* | *Cocosatellite* | ***Coconut foliar decay alphasatellite 5*** | MF926430 | CFDA5 | VU-89 |
| *Petromoalphasatellitinae* | *Cocosatellite* | ***Coconut foliar decay alphasatellite 4*** | MF926429 | CFDA4 | VU-89 |
| *Petromoalphasatellitinae* | *Cocosatellite* | *Coconut foliar decay alphasatellite 4* | MF926444 | CFDA4 | VU-13 |
| *Petromoalphasatellitinae* | *Cocosatellite* | *Coconut foliar decay alphasatellite 4* | MF926433 | CFDA8 | VU-15 |
| *Petromoalphasatellitinae* | *Coprasatellite* | ***Coconut foliar decay alphasatellite 7*** | MF926432 | CFDA7 | VU-89 |
| *Petromoalphasatellitinae* | *Kobbarisatellite* | ***Coconut foliar decay alphasatellite 3*** | MF926427 | CFDA3 | VU-89 |
| *Petromoalphasatellitinae* | *Kobbarisatellite* | *Coconut foliar decay alphasatellite 3* | MF926431 | CFDA6 | VU-88 |
| *Petromoalphasatellitinae* | *Babusatellite* | ***Banana bunchy top alphasatellite 1*** | L32167 | BBTA1 |  |
| *Petromoalphasatellitinae* | *Muscarsatellite* | ***Banana bunchy top alphasatellite 2*** | AF416471 | BBTA2 | VN-YB-sat3-00 |
| *Petromoalphasatellitinae* | *Muscarsatellite* | ***Banana bunchy top alphasatellite 3*** | HQ616080 | BBTA3 | CN-Haikou-10 |
| *Petromoalphasatellitinae* | *Muscarsatellite* | ***Cardamom bushy dwarf alphasatellite*** | KF435148 | CBDA | IN-Kalimpong-07 |



**Figure 1: A.** Distribution of pairwise identities of members of the proposed *Petromoalphasatellitinae* subfamily determined using SDT [5]. Respective genus and species demarcation thresholds of 69 % and 81 % sequence identity are indicated.

**B.** Color-coded per cent sequence identity matrix derived from SDT showing support of the species and genus demarcation thresholds. Asterisks (\*) mark coconut foliar decay virus DNA-R, formerly coconut foliar decay alphasatellite R [2], that we propose to be considered a genome component of coconut foliar decay virus. See proposal 2020.022P.

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**Figure 2**: Maximum likelihood phylogenetic tree constructed from a MUSCLE [6] sequence alignment of alphasatellites using PHYML [7] with the GTR+I+G4 substitution model. The tree shows support for the proposed establishment of the new subfamily *Petromoalphasatellitinae*. Branches with less that 60% bootstrap support have been collapsed using TreeGraph 2 [8]. Scale bar: 0.5 nucleotide substitutions/site. Asterisks (\*) mark coconut foliar decay virus DNA-R, formerly coconut foliar decay alphasatellite R [2], that we propose to be considered a genome component of coconut foliar decay virus. See proposal 2020.022P.

**References**

1. Briddon RW, Martin DP, Roumagnac P, Navas-Castillo J, Fiallo-Olive E, Moriones E, Lett JM, Zerbini FM, Varsani A (2018) *Alphasatellitidae*: a new family with two subfamilies for the classification of geminivirus- and nanovirus-associated alphasatellites. Arch Virol 163:2587-2600. doi:10.1007/s00705-018-3854-2. PMID: 29740680.

2. Gronenborn B, Randles JW, Knierim D, Barriere Q, Vetten HJ, Warthmann N, Cornu D, Sileye T, Winter S, Timchenko T (2018) Analysis of DNAs associated with coconut foliar decay disease implicates a unique single-stranded DNA virus representing a new taxon. Sci Rep 8:5698. doi:10.1038/s41598-018-23739-y. PMC5890292.

3. Randles JW, Hanold D, Julia JF (1987) Small circular single-stranded DNA associated with foliar decay disease of coconut palm in Vanuatu. J Gen Virol 68:273-280. doi:10.1099/0022-1317-68-2-273.

4. Randles JW, Julia JF, Calvez C, Dollet M (1986) Association of single-stranded DNA with the foliar decay disease of coconut palm in Vanuatu. Phytopathology 76:889-894

5. Muhire BM, Varsani A, Martin DP (2014) SDT: a virus classification tool based on pairwise sequence alignment and identity calculation. PLoS One 9:e108277. doi:10.1371/journal.pone.0108277. PMC4178126.

6. Edgar RC (2004) MUSCLE: multiple sequence alignment with high accuracy and high throughput. Nucleic Acids Res 32:1792-1797. doi:10.1093/nar/gkh340. PMC390337.

7. Guindon S, Gascuel O (2003) A simple, fast, and accurate algorithm to estimate large phylogenies by maximum likelihood. Syst Biol 52:696-704

8. Stover BC, Muller KF (2010) TreeGraph 2: combining and visualizing evidence from different phylogenetic analyses. BMC Bioinformatics 11:7. doi:10.1186/1471-2105-11-7. PMC2806359.