MaizeGDB <https://www.maizegdb.org>

Variable Control:

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| **URI used** | https://www.maizegdb.org/genome/assembly/Zm-B73-REFERENCE-NAM-5.0 |
| **Analysis date** | 29/04/2020 |
| **Acronyms** | |
| **RaCE -** Researcher Compliance Experiment | |
| **MaCE -** Machine Compliance Experiment | |

FINDABLE

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| **Principle** | F1 | |
| **Description** | (Meta)data is assigned persistent and globally unique identifiers. | |
| **RaCE** | **/ \* Globally Unique? \* /**  The standardization, documentation, and use of URIs makes Identifiers globally unique.  **/ \* Persistent? \* /**  Identifiers were found on identifiers.org:  https://registry.identifiers.org/registry/maizegdb.locus  **/ \* Comments \* /**  There isn’t. | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | There are no improvements. | |
| **MaCE** | **METRIC DESCRIPTION** | **ANALYZE** |
| **Unique Identifier**  Test whether the metadata resource has a unique identifier | It has an Uniform Resource Identifier type identifier . |
| **Identifier Persistence**  Metric to test whether the metadata resource's unique identifier is likely to be persistent. The known scheme is registered with FAIRSharing (https://fairsharing.org/standards/?q=&selected\_facets=type\_exact:identifier%20schema). For URLs that do not follow a scheme in FAIRSharing , we tested known URL persistence schemes ( purl , oclc , fdlp , purlz , w3id, ark ). | No link persistence was found, but MaizeGDB was found at Identifiers.org |
| **Data Identifier Persistence**  Metric to test whether the unique identifier for the data resource is likely to be persistent. The known scheme is registered with FAIRSharing (https://fairsharing.org/standards/?q=&selected\_facets=type\_exact:identifier%20schema). For URLs that do not follow a scheme in FAIRSharing , we tested known URL persistence schemes ( purl , oclc , fdlp , purlz , w3id, ark ). | No link persistence was found, but MaizeGDB was found at Identifiers.org |
| **Result of MaCE (by color)** | **Unique Identifier** |  |
| **Identifier Persistence** |  |
| **Data Identifier Persistence** |  |
| **Recommendations** | **Unique Identifier** | There are no improvements. |
| **Identifier Persistence** | There are no improvements. |
| **Data Identifier Persistence** | There are no improvements. |

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| **Principle** | F2 | |
| **Description** | Data is described with rich metadata. | |
| **RaCE** | **/ \* Is there metadata standardization? \* /**  Yes, the data are standardized.  [https://www.maizegdb.org/nomenclature/maize\_assembly\_nomenclature\_2016\_update.pdf#STANDARD](https://translate.google.com/translate?hl=pt-BR&prev=_t&sl=pt&tl=en&u=https://www.maizegdb.org/nomenclature/maize_assembly_nomenclature_2016_update.pdf%23STANDARD#STANDARD)  **/ \* The metadata are complete? \* /**  Yes, the repository has a standardization committee for each of the intens.  **/ \* Comments \* /**  There isn't. | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | There are no improvements. | |
| **MaCE** | **Structured Metadata**  Tests whether a machine is capable of finding structured metadata. They can be (for example) RDFa , embedded json , json-ld or structured metadata negotiated by content, such as RDF Turtle . | Structured metadata are not found (photo i used the library extruct in python and https://demos.algorithmia.com/web-page-inspector) |
| **Grounded Metadata**  Tests whether a machine is capable of finding grounded metadata . that is, metadata terms that are in a resolvable namespace , where the resolution leads to a definition of the meaning of the term. Examples include JSON-LD, embedded schema or any form of RDF. This test currently excludes XML, even when terms are spaced by name. Versions future of this test pod to be more flexible . | No, metadata is found with its attributes, but there is no way to identify metadata. |
| **Result of MaCE (by color)** | **Structured Metadata** |  |
| **Grounded Metadata** |  |
| **Recommendations** | **Structured Metadata** | No recommendations. |
| **Grounded Metadata** | It is necessary to use structured data languages ​​to assist in the use of the data. |

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| **Principle** | F3 | |
| **Description** | Metadata must clearly and explicitly include the data identifier described. | |
| **RaCE** | **/ \* Is it possible to identify the data in the metadata? How is it done? \* /**  It is possible to identify, the URI for the data is included.  **/ \* Are there different identifiers for metadata and data? \* /**    There is not, it uses the same identifiers .    **/\*Comments\*/**    Reference other IDs external to the repository. | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | There are no improvements. | |
| **MaCE** | **Data Identifier Explicitly in Metadata**  Metric for testing whether metadata contains the data's unique identifier. This is done by looking for a variety of properties, including foaf : primaryTopic , schema : mainEntity , schema : distribution , sio: is-about and iao : is-about . The codeRepo sitory scheme is used for software versions . | It was not possible to find the data identifier in the metadata using any (common) property / predicate reserved for that purpose. |
| **Metadata Identifier Explicitly in Metadata**  Metric to test whether the metadata contains the unique identifier for the metadata itself. This is done using a variety of scraping tools , including resolving DOI metadata, using the Python tool ' extruct ' and other ... | Unique identifiers are found for the metadata, such as the DOI for example. |
| **Result of MaCE (by color)** | **Data Identifier Explicitly in Metadata** |  |
| **Metadata Identifier Explicitly in Metadata** |  |
| **Recommendations** | **Data Identifier Explicitly in Metadata** | The use of structured data together with the identification of properties in these structured data would bring more value to the (meta)data stored and thus meet this metric |
| **Metadata Identifier Explicitly in Metadata** | There are no improvements. |

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| **Principle** | F4 | |
| **Description** | (Meta)data is recorded or indexed in searchable resources. | |
| **RaCE** | **/ \* The URI or local ID returns the record in engines of search? \* /**  Yes, it is returned . | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | There are no improvements. | |
| **MaCE** | **Searchable in Major Search Engine**  It tests whether a machine is able to discover the resource by searching, using Google. | The searcher used the identifier and returned the record of (meta)data |
| **Result of MaCE (by color)** | **Searchable in Major Search Engine** |  |
| **Recommendations** | **Searchable in Major Search Engine** | There are no improvements. |

ACCESSIBLE

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| **Principle** | A1 |
| **Description** | (Meta)data is retrieved by its identifier using standardized communication protocols. |
| **RaCE** | **/ \* The database use standardized protocols ? \* /**    Yes, it uses standardized protocols for data access.    **/ \* The database has proprietary software for data access ? \* /**    It does not have any proprietary software.    **/\*Comments\*/**    It is possible to access the data via FTP. |
| **Result of RaCE (by color)** |  |
| **Recommendations** | There are no improvements. |
| **MaCE** | There is no FAIR METRICS GEN2 for this principle. |
| **Result of MaCE (by color)** | There is no FAIR METRICS GEN2 for this principle. |
| **Recommendations** | There is no FAIR METRICS GEN2 for this principle. |

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| **Principle** | A1.1 | |
| **Description** | Protocol is open, free and universally implemented. | |
| **RaCE** | **/ \* Does it have open, free and universally implemented access? \* /**    Yes, no registration or proprietary software is required to access (meta)data.  **/ \* Comments \* /**    There is n't . | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | There are no improvements. | |
| **MaCE** | **Uses Open Free Protocol for data Retrieval**  The data can be recovered by an open and free protocol. Tests the data GUID for resolution protocol. Currently passes InChI keys , DOIs , identifiers and URLs . The recognition of other identifiers will be added at the request of the community. | Yes, it is possible to access from an open and free protocol, with return URLs . |
| **Uses Open Free Protocol for Metadata Retrieval**  Metadata can be retrieved using an open and free protocol. Tests the metadata GUID for resolution protocol. Currently passes InChI keys , DOIs , identifiers and URLs . The recognition of other identifiers will be added at the request of the community. | Yes, it is possible to access from an open and free protocol, with return URLs . |
| **Result of MaCE (by color)** | **Uses Open Free Protocol for data Retrieval** |  |
| **Uses Open Free Protocol for Metadata Retrieval** |  |
| **Recommendations** | **Uses Open Free Protocol for data Retrieval** | There are no improvements. |
| **Uses Open Free Protocol for Metadata Retrieval** | There are no improvements. |

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| **Principle** | A1.2 | |
| **Description** | The protocol allows for authentication and authorization when necessary. | |
| **RaCE** | **/ \* Does the protocol allow authentication and authorization? \* /**    There is no restricted access . | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | There are no improvements. | |
| **MaCE** | **Data Authentication and Authorization**  Test a discovered data GUID for the ability to implement authentication and authorization in resolution protocol. Currently passes InChI keys , DOIs , identifiers and URLs . He also searches for metadata by Dubl in Core's ' accessRights ' property , which can point to a document that describes the data access process. The recognition of other identifiers will be added at the request of the community. | The GUID returned from the metadata is a URI, known to allow authentication / authorization . |
| **Metadata Authentication and Authorization**  Tests the metadata GUID for the ability to implement authentication and authorization in its resolution protocol. Currently passes InChI keys , DOIs , identifiers and URLs . Recognition from other i dentifiers will be added at the request of the community. | The GUID returned from the metadata is a URI, known to allow authentication / authorization. |
| **Result of MaCE (by color)** | **Data Authentication and Authorization** |  |
| **Metadata Authentication and Authorization** |  |
| **Recommendations** | **Data Authentication and Authorization** | There are no improvements. |
| **Metadata Authentication and Authorization** | There are no improvements. |

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| **Principle** | A2 | |
| **Description** | Metadata must be accessible even when data is no longer available. | |
| **RaCE** | **/ \* Is there a data versioning policy? \* /**  Yes, there is politics.  **/ \* (Meta)data can be erased? \* /**  Yes, they can be deleted.  **/ \* (Meta)data can be updated? \* /**  Yes, they can be updated.  **/ \* Is it possible to access metadata of data that no longer exists? \* /**  Yes, it is possible to access the data metadata that no longer exists and they return to the newer metadata, but even if they continue to store their metadata.  **/ \* Is there a persistence policy? \* /**  Yes, there is a persistence policy, in which it performs metadata and ID versioning.  **/ \* Comments \* /**  There are no comments. | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | There are no improvements. | |
| **MaCE** | **Metadata Persistence**  Metric to test if the metadata contains a persistent policy, explicitly identified by a key persistencePolicy (data with hash ) or a predicate in http://www.w3.org/2000/10/swap/pim/doc#persistencePolicy linked data. | It was not possible to find any persistence policy using any approach |
| **Result of MaCE (by color)** | **Metadata Persistence** |  |
| **Recommendations** | **Metadata Persistence** | In order to comply with this metric, it is necessary to indicate a persistence policy in the registration source code. |

INTEROPERABLE

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| **Principle** | I1 | |
| **Description** | (Meta)data use formal, accessible, shared and widely applicable language for knowledge representation. | |
| **RaCE** | **/ \* Is there a use of languages ​​to represent knowledge? \* /**    Yes, languages ​​are used for the representation of knowledge.  Uses JSON  https://www.frontiersin.org/articles/10.3389/fpls.2019.01050/full    **/ \* Taxonomies, ontologies, controlled vocabularies are referenced or found in the repository? (Must meet F 1) \* /**    There are documents for standardization of metadata, other types of documents were not found.  **/\*Comments\*/**    There is a session in the repository related to the standardization of (meta)data:  [https://www.viprbrc.org/brc/staticContent.spg?decorator=vipr&type=Document¶m=vipr-data-standards.html](https://translate.google.com/translate?hl=pt-BR&prev=_t&sl=pt&tl=en&u=https://www.viprbrc.org/brc/staticContent.spg%3Fdecorator%3Dvipr%26type%3DDocument%26param%3Dvipr-data-standards.html) | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | Improving and adding documents about taxonomies, ontologies, controlled vocabularies are possible improvements. | |
| **MaCE** | **Metadata Knowledge Representation Language (WEAK)**  Maturity indicator to test whether metadata uses a formal language widely applicable to knowledge representation. This particular test has a broad view of what defines a ' knowledge representation language '; in this assessment, anything that can be represented as structured data will be accepted. | Yes, it is possible to retrieve (meta)data through data structured as JSON. |
| **Metadata Knowledge Representation Language (STRONG)**  Maturity indicator to test whether metadata uses a formal language widely applicable to knowledge representation. This particular test has a broad view of what defines a ' knowledge representation language '; in this evaluation, a knowledge representation language is interpreted as one in which the terms are semantically based on ontologies. Any form of RDF will pass this test (including RDF that is automatically extracted by third-party analyzers, such as Apache Tika ). | Yes, it is possible to retrieve (meta)data through data structured as JSON. |
| **Result of MaCE (by color)** | **Metadata Knowledge Representation Language (WEAK)** |  |
| **Metadata Knowledge Representation Language (STRONG)** |  |
| **Recommendations** | **Metadata Knowledge Representation Language (WEAK)** | There are no improvements. |
| **Metadata Knowledge Representation Language (STRONG)** | There are no improvements. |

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| **Principle** | I2 | |
| **Description** | (Meta)data using the following vocabulary FAIR Principles. | |
| **RaCE** | **/ \* Vocabularies following the Fair Principles? \* /**    Follow the Principle s FAIR.  https://www.maizegdb.org/FAIRpractices  **/ \* Comments \* /**    There isn't . | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | There are no improvements. | |
| **MaCE** | **Metadata Uses FAIR Vocabularies (WEAK)**  Maturity indicator to test whether linked data metadata uses resolved terms. This only tests if they resolve, and FAIR data does not resolve, so it is a rather weak test. | Does not meet this metric using Extruct , https://demos.algorithmia.com/web-page-inspector |
| **Metadata Uses FAIR Vocabularies (STRONG)**  Maturity indicator to test whether linked data metadata uses resolved linked data (FAIR) terms. | No resolved predicates were found for linked data. |
| **Result of MaCE (by color)** | **Metadata Uses FAIR Vocabularies (WEAK)** |  |
| **Metadata Uses FAIR Vocabularies (STRONG)** |  |
| **Recommendations** | **Metadata Uses FAIR Vocabularies (WEAK)** | The use of representation languages ​​would assist in the identification of resolvable links and thus meet this metric. |
| **Metadata Uses FAIR Vocabularies (STRONG)** | For linked data to be used, for this to occur, data must be written in knowledge representation languages.  Use of FAIR DATA POINTS would assist in meeting this metric. |

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| **Principle** | I3 | |
| **Description** | (Meta)data includes qualified references for other (meta)data. | |
| **RaCE** | **/ \* Is there use of structured data languages? \* /**    Do not use.    **/ \* Is there qualification among (meta)data entities? \* /**    There is no establishment of qualifications.    **/ \* Comments \* /**    There isn't . | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | The use of structured data languages ​​would achieve this Principle considering that these types of languages ​​provide a means for characterizing qualification among (meta)data. | |
| **MaCE** | **Metadata Contains Qualified Outward References**  Maturity indicator to test whether metadata is externally linked to third-party resources. It only tests metadata that can be represented as linked data. | It is not possible to establish this connection with linked data |
| **Result of MaCE (by color)** | **Metadata Contains Qualified Outward References** |  |
| **Recommendations** | **Metadata Contains Qualified Outward References** | The use of representation languages ​​would assist in achieving this metric, since from its use it provides a means for implementing linked data. |

REUSABLE

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| **Principle** | R1 |
| **Description** | (Meta)data are richly described with the plurality of precise and relevant attributes. |
| **RaCE** | **/ \* Is there a standardization of (meta)data? \* /**    There is, there is a session with standardized documents for submission of goal (data).    **/ \* Is there reference to metadata in other repositories? \* /**    Yes, there is this type of reference.    **/ \* Comments \* /**    There isn't . |
| **Result of RaCE (by color)** |  |
| **Recommendations** | There are no improvements. |
| **MaCE** | There is no FAIR METRICS GEN2 for this principle. |
| **Result of MaCE (by color)** | There is no FAIR METRICS GEN2 for this principle. |
| **Recommendations** | There is no FAIR METRICS GEN2 for this principle. |

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| **Principle** | R1.1 | |
| **Description** | (Meta)data is published with clear and accessible data usage licenses. | |
| **RaCE** | **/ \* Usage licenses are found in the registry? \* /**    Do not.    **/ \* Are usage licenses found in the repository? \* /**    Yes.    **/ \* Link to user licenses \* /**    [https://www.re3data.org/repository/r3d100010795](https://translate.google.com/translate?hl=pt-BR&prev=_t&sl=pt&tl=en&u=https://www.re3data.org/repository/r3d100010795)  https://fairsharing.org/FAIRsharing.aq280w | |
| **Result of RaCE (by color)** |  | |
| **Recommendations** | The use licenses are found in the repository, however they are not referenced in the records. | |
| **MaCE** | **Metadata Includes License ( Weak )**  Maturity indicator to test whether metadata contains an explicit license pointer. This test 'weak' will use a regular expression that is not case-sensitive and sweep the style metadata key / value, as well as metadad the linked data. Tests: xhtml , dvia , dcterms , cc , data.gov.au and Schema license predicates on linked data and validates the value of these properties. | Yes, it is returned . |
| **Metadata Includes License (Strong)**  Maturity indicator to test whether the metadata 's linked data contains an explicit pointer to the license. Tests: xhtml , dvia , dcterms , cc , data.gov.au and Schema license predicates on linked data and validates the value of these properties. | No explicit pointer to Machine-Reada ble was found regarding the use license. |
| **Result of MaCE (by color)** | **Metadata Includes License (Weak)** |  |
| **Metadata Includes License (Strong)** |  |
| **Recommendations** | **Metadata Includes License (Weak)** | As there are no knowledge representation languages, it is very complicated to find any kind of license predicate without this representation, so it is essential to use it . |
| **Metadata Includes License (Strong)** | As there are no knowledge representation languages, it is very complicated to find any kind of license predicate without this representation, so it is essential to use it . |

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| **Principle** | R1.2 |
| **Description** | (Meta)data are associated with detailed provenance. |
| **RaCE** | **/ \* Provenance (meta)data is identified? \* /**    Yes, the source metadata is identified.    **/ \* There are documents to describe the provenance \* /**    There is no document of details of provenance. |
| **Result of RaCE (by color)** |  |
| **Recommendations** | Even if the (meta)data is associated with detailed provenance, there is no connection, nor documents that refer to the conception of a provenance. |
| **MaCE** | There is no FAIR METRICS GEN2 for this principle. |
| **Result of MaCE (by color)** | There is no FAIR METRICS GEN2 for this principle. |
| **Recommendations** | There is no FAIR METRICS GEN2 for this principle. |

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| **Principle** | R1.3 |
| **Description** | (Meta)data meet community standards relevant to the domain. |
| **RaCE** | It is not possible to analyze this Principle . |
| **Result of RaCE (by color)** | It is not possible to analyze this Principle . |
| **Recommendations** | It is not possible to analyze this Principle . |
| **MaCE** | There is no FAIR METRICS GEN2 for this principle. |
| **Result of MaCE (by color)** | There is no FAIR METRICS GEN2 for this principle. |
| **Recommendations** | There is no FAIR METRICS GEN2 for this principle. |