Project BudBurst: A National Phenology Network Field Campaign for Citizen Scientists

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**Introduction: What is Project BudBurst?**

**Purpose**
- Harness the power of citizen scientists to observe plant phenology and record valuable plant responses.
- Allow researchers to compile environmental information to examine the effects of global climate change.
- Identify any local, regional, and national climate characteristics that affect plant phenology.

**Method**
- New and improved website provides user-friendly framework for registering sites and plants, submitting observations, and uploading photos and comments.
- SMS and MMS capability allows mobile users to submit observations or notes with optional image attachments.
- Social networking tools enable communication between users.

**Mobile Data Collection: SMS / MMS / E-mail**

- **Kannel SMS Gateway**
  - Accepts and processes SMS text messages sent to a connected GSM/GPRS modem with SIM card (phone number).
  - **Command examples:**
    - `whoami`:
    - `list sites`
    - `list plants <site_id>`
    - `list images <plant_id>`
    - `update <plant_id> <image_id>`
    - `snail <note>`
  - Sends SMS replies (flats, usage information, confirmation) or scheduled reminders to benefited users.

- **Twisted Mail Framework**
  - Accepts and processes MMS picture messages and e-mails sent to the Project BudBurst e-mail address.
  - Expects the same commands as the SMS gateway, but also accepts image attachments with updates or notes.
  - Sends e-mail replies or scheduled reminders to the recipient’s e-mail account.
  - Frames Simple Alerts of plants or offers BudBurst-related news and information in interested users via e-mail or on their home pages.

**Web-based Tools**

- **Manage Observations**
  - Create accounts, add plant locations, and report phenological observations via web forms or SMS/MMS from mobile devices.
  - Upload images and add comments for each phenological stage.
  - View and report observations based on previously saved mobile notes.

- **Analyze Results**
  - View the distribution of plants across the nation using integrated Google Maps.
  - Quickly and easily access tables containing plant information, images, and reported phenological observations.

- **Social Networking**
  - Browse forums, create new threads, or reply to existing ones to communicate with other BudBurst users.
  - Use tools integrated into profile pages to post to MySpace/Facebook and view an overview of user activity.

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